

India's Role in Strengthening Healthcare Across the Global South

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Welcome to the inaugural edition of the *Global South Healthcare Journal*. In this issue, we focus on a central question facing low- and middle-income countries (LMICs): **How can we build stronger, more resilient, and more equitable healthcare systems?** India's story offers a valuable example of how innovative policies, strategic investments, and inclusive partnerships can drive transformative change in healthcare. India, widely recognised as the 'pharmacy of the world,' supplies affordable medicines and vaccines to more than 200 countries. However, India's impact goes far beyond pharmaceuticals; the country's leadership in medical devices, digital health, and supply-chain resilience also boosts health outcomes across the Global South, a role that is often underappreciated but crucial in the global health landscape.

In this editorial, we will explore the persistent challenges in LMICs, how India contributes to global health and the policies and strategies that have enabled India's growth in healthcare. We will also discuss potential opportunities for deeper collaboration between India and LMICs, highlighting the promising future of global health. By presenting key data points and pathways for future progress, we aim to inspire hope and optimism. We believe India's approach—grounded in **innovation, affordability, and scalability**—can inspire other nations seeking to strengthen their healthcare systems.

PERSISTENT CHALLENGES IN LOW- OR MIDDLE-INCOME COUNTRIES

Dual Burden of Diseases

Low- or Middle-Income Countries (LMICs) are grappling with a **dual disease burden** that comprises both infectious diseases and non-communicable diseases (NCDs). This urgent

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issue, as highlighted by the World Health Organization (WHO), demands immediate attention. Malaria, tuberculosis (TB), and HIV/AIDS continue to claim millions of lives every year in sub-Saharan Africa and Southeast Asia. Simultaneously, the incidence of NCDs, such as diabetes, hypertension, and cancer, is surging due to rapid urbanisation and lifestyle changes.^{1–3} The WHO estimates that by 2030, **NCDs will account for 70% of all deaths in LMICs**, intensifying the strain on already overburdened healthcare systems.

Infrastructure Gaps

Beyond disease prevalence, LMICs face **significant infrastructure gaps**. Many lack sufficient hospitals, laboratories, and diagnostic facilities, especially in rural or remote areas. According to World Bank data, some LMICs have fewer than **five physicians per 10,000 people**, compared to an average of 30 or more in high-income countries.⁴ This shortage affects access to basic healthcare services, including prenatal care, routine immunisations, and emergency interventions. When diagnostic services and hospital beds are scarce, life-saving treatments become inaccessible to large population segments.

Dependence on Imports

A major challenge for LMICs is their dependence on imported medicines, vaccines, and medical devices. Sub-Saharan Africa, for instance, imports over **80% of its pharmaceuticals**, leaving many countries vulnerable to **price fluctuations** and **supply chain disruptions**.⁵ During global crises—such as pandemics or political conflicts—exports can slow or cease, causing essential items like antibiotics, vaccines, or basic protective gear shortages. This high level of dependency drives up healthcare costs and widens existing inequalities in health access.

Funding Constraints

Financing also poses a substantial hurdle. Many LMICs lack the public or private funding to strengthen healthcare facilities, expand training programs for healthcare workers, or invest in advanced technologies. As a result, **out-of-pocket health expenditure** can remain alarmingly high, pushing vulnerable families into poverty when they face serious illness. According to a 2021 report by the World Bank, out-of-pocket expenses account for more than 40% of health spending in some LMICs.⁴

These challenges call for **targeted, innovative, and scalable solutions** to bridge treatment, infrastructure, and financial protection gaps. India's approach to healthcare demonstrates how strategic policy decisions, technological innovation, and international collaboration can help address many of these complexities.

INDIA'S MULTIFACETED APPROACH TO GLOBAL HEALTH

Pharmaceutical Leadership

India is the **world's largest producer of generic medicines**, accounting for over 20% of global exports by volume.⁵ Over the last two decades, Indian pharmaceutical companies have played a central role in making life-saving treatments more affordable. For instance, India's ability to produce large quantities of generic antiretroviral drugs (ARVs) helped **reduce the cost of HIV/AIDS therapy by over 90%**, enabling millions in Africa and Asia to gain access to these medications.⁶

Likewise, India manufactures more than **50% of the world's TB medicines**, playing an essential role in the global fight against tuberculosis.⁶ As NCDs become a growing concern in LMICs, Indian companies also offer cost-effective drugs for diabetes, hypertension, and cancers, making high-quality treatments accessible to patients who previously could not afford them.

Policy Frameworks Supporting Pharmaceuticals

Several Indian policies have fostered this growth in the pharmaceutical sector:

- **National Pharmaceutical Pricing Authority (NPPA):** Sets ceiling prices for essential medicines to ensure affordability.
- **Production-Linked Incentive (PLI) Scheme:** This scheme provides financial incentives for domestic production of Active Pharmaceutical Ingredients (APIs), the key components in the manufacture of pharmaceuticals. By encouraging local production of these crucial ingredients, the scheme aims to reduce LMICs' dependence on imported medicines and ensure a more stable and affordable supply chain.⁷
- **Drug Price Control Order (DPCO):** This order regulates the pricing of certain "essential" or "life-saving" drugs, helping to maintain affordability.

These frameworks have made India a reliable partner for LMICs seeking affordable, high-quality medical supplies.

Vaccine Innovation and Distribution

India's vaccine manufacturing capabilities are unmatched on the global stage. The Serum Institute of India (SII)—the world's largest vaccine producer by volume—supplies polio, measles, and pneumonia immunisations to over 100 countries.⁸ Bharat Biotech, another leading Indian firm, developed **Covaxin**. This indigenous COVID-19 vaccine showcased India's agility and innovation during the global pandemic.

Vaccine Maitri, a diplomatic initiative launched by the Indian government during the COVID-19 crisis, supplied over 65 million vaccine doses to 98 countries, many of them LMICs.⁶ India's willingness to provide vaccines at concessional rates or as grants underscore its commitment to **global health equity**.

Looking ahead, India's partnership with international organisations to scale production of the **R21 malaria vaccine**—currently in advanced trials—could significantly reduce malaria-related deaths, particularly in Africa, where the disease remains endemic.

Policy and Strategy for Vaccines

- **Universal Immunization Programme (UIP):** One of the largest public health programs globally, providing free vaccines against multiple vaccine-preventable diseases.
- **Gavi Alliance Partnerships:** India partners with Gavi to expand vaccine coverage worldwide, particularly in LMICs.

- **R&D Incentives:** Government grants and tax incentives support indigenous research and encourage public-private collaboration.

Medical Devices and Technology

India's medical device market, valued at around **\$11 billion**, is expanding by an estimated **15% annually**, positioning the country as an emerging hub for cost-effective technology solutions.⁹ During the COVID-19 pandemic, Indian innovators rapidly scaled up the production of affordable ventilators, oxygen concentrators, and diagnostic kits. These items met domestic needs and were exported to countries facing critical shortages.

In regions with limited healthcare infrastructure, Indian **portable diagnostic tools** are crucial in early disease detection. For example, handheld devices that diagnose malaria, TB, or diabetic complications in primary care settings allow healthcare workers to identify at-risk patients swiftly. Such frugal innovations improve **last-mile connectivity** and ensure essential healthcare services reach underserved communities.

Policies Driving Medical Device Growth

- **Make in India:** A flagship government initiative to boost domestic manufacturing, including medical devices.
- **Medical Devices Rules, 2017:** Aims to streamline regulations and encourage local manufacturing.
- **Atmanirbhar Bharat (Self-Reliant India):** Encourages domestic production of critical healthcare technologies to reduce import dependence.

Digital Health Revolution

India's digital health platforms are revolutionising healthcare delivery, especially in remote or underserved regions. **eSanjeevani**, a telemedicine portal launched by the Ministry of Health and Family Welfare, has facilitated over **140 million consultations**, bridging the urban-rural divide.¹⁰ Patients no longer need to travel long distances to consult specialists; internet-enabled devices bring expert healthcare to their doorstep.

Aarogya Setu, developed during the COVID-19 crisis, helped track infections, conduct contact tracing, and disseminate public health messages. This model can be replicated in LMICs for better surveillance of infectious diseases or even **NCD management**, where timely interventions are critical. Moreover, India's **artificial intelligence (AI)** advancements are creating AI-powered tools for detecting diabetic retinopathy, TB, and other conditions, relieving the burden on healthcare systems short of specialists.

Strategic Initiatives in Digital Health

- **National Digital Health Mission (NDHM):** Aims to create a unified digital health infrastructure, including unique health IDs and interoperable systems.
- **Ayushman Bharat Digital Mission (ABDM):** This mission builds upon NDHM's framework to connect patients, healthcare providers, and insurers through digital platforms.
- **TeleMental Health Program:** Addresses mental health challenges by offering remote counselling and diagnostic services.

Strengthening Supply Chains

India's PLI scheme also targets the production of APIs to **reduce reliance on imports** from other countries, ensuring that global disruptions do not halt the production of essential medicines.⁷ By boosting domestic capacity, India helps stabilise supply for LMICs looking for reliable partners who can deliver under tight timelines.

Additionally, **logistics and warehousing** are evolving rapidly. Cold-chain infrastructure improvements facilitated the distribution of COVID-19 vaccines to distant regions. This robust supply-chain network can be leveraged for other immunisation drives in LMICs, ranging from routine childhood vaccinations to emergency campaigns against emerging pathogens.

BUILDING HEALTH EQUITY AND SUSTAINABILITY

Affordability and Inclusivity

India's healthcare model emphasises **health equity**, aiming to minimise cost barriers. Initiatives like the **Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana (PM-JAY)** provide free healthcare coverage of up to INR 5 lakh (about USD 6,700) per family per year to over 500 million Indians.¹¹ This public-funded insurance scheme is one of the world's largest. It has significantly reduced **out-of-pocket expenditures** for many low-income households.

For LMICs with large uninsured populations, India's experience with PM-JAY offers lessons on **scaling health coverage** using a mix of government funding, robust data systems, and partnerships with private healthcare providers. By covering essential medical services and procedures, PM-JAY lowers financial barriers and facilitates timely care, preventing avoidable deaths and complications.

Environmental Sustainability

As global attention shifts toward sustainability, Indian manufacturers increasingly adopt green production practices.

By reducing energy consumption, waste, and pollution in pharmaceutical production, these companies aim to shrink their carbon footprint without raising product costs, aligning with the **United Nations Sustainable Development Goals (SDGs)**, particularly SDG 3 (Good Health and Well-being) and SDG 13 (Climate Action), ensuring that healthcare advances do not come at the expense of the planet.

India's renewable energy push—through solar power and cleaner industrial fuels—can serve as a model for LMICs seeking to **balance economic growth with environmental stewardship**. Responsible antibiotic manufacturing practices, for example, help combat the rise of antimicrobial resistance (AMR). This looming global health threat disproportionately affects LMICs.⁶

GLOBAL HEALTH INNOVATION ECOSYSTEMS

Research and Development (R&D)

India is emerging as a major R&D hub in healthcare. Collaborative efforts between **Indian academic institutions**, **private companies**, and **international organisations** drive breakthroughs in gene therapy, mRNA technology, biosimilars, and precision medicine. The Indian Council of Medical Research (ICMR) and the Department of Biotechnology (DBT) offer grants and partnerships that focus on **frugal innovation**—the development of affordable, resource-optimised technologies suited to LMIC settings.

Frugal Innovation as a Cornerstone

Frugal innovation, sometimes referred to as “**jugaad**” in the Indian context, is characterised by creating high-quality solutions at minimal cost. Examples include **low-cost prosthetics**, **portable electrocardiogram (ECG) devices**, and **mobile labs** for real-time disease surveillance. These innovations tackle the constraints that often limit healthcare delivery in LMICs, such as unreliable electricity, poor transportation, or low purchasing power. By promoting frugal innovation, India ensures that healthcare technologies are **practical and scalable** for regions with limited financial and infrastructural resources.

OPPORTUNITIES FOR DEEPER COLLABORATION

Local Manufacturing Partnerships

One of the most effective ways to strengthen healthcare in LMICs is by **decentralising production**. India's pharmaceutical and medical device companies can form joint ventures with local partners in Africa, Southeast Asia, and Latin America to establish **regional manufacturing hubs**.

These collaborations reduce dependency on imports, lower transportation costs, and create local employment. They also build capacity as local workers gain expertise in quality control, regulatory compliance, and supply-chain management.

Such partnerships are already emerging. For instance, India has collaborated with South African and Brazilian firms under the BRICS framework to explore joint production of HIV/AIDS drugs and COVID-19 vaccines.⁶ These initiatives can extend to other essential medicines, further boosting healthcare security.

Expanding Digital Health Solutions

Telemedicine solutions like **eSanjeevani** can be customised for LMICs to connect patients in remote areas with specialists in urban centres. Mobile health (mHealth) applications can track routine immunisations or manage NCDs, leveraging SMS reminders and AI-based risk assessments. Additionally, secure digital platforms can enable data-sharing between local health facilities and larger hospitals or research institutions, enhancing disease surveillance and policy responses.

For instance, a pilot project in Kenya used an India-based telemedicine interface to connect diabetic patients with endocrinologists abroad, resulting in better treatment adherence and improved glycemic control rates (hypothetical example reflecting real-world potential). These successes suggest a wide scope for **telehealth expansion** across the Global South.

Strengthening Research Collaborations

Joint research endeavours can help develop **new vaccines, diagnostics, and treatments** tailored to the specific needs of LMICs. By pooling resources and expertise, India and partner nations can address challenges like **antimicrobial resistance**, **neglected tropical diseases**, and **emerging zoonotic infections**. Collaborative research also fosters knowledge transfer and builds local R&D capacity. This synergy can be facilitated by existing frameworks such as the **Developing Countries Vaccine Manufacturers Network (DCVMN)** and partnerships under the **Coalition for Epidemic Preparedness Innovations (CEPI)**.

Policy Alignment and Harmonization

Regulatory harmonisation can accelerate the rollout of life-saving drugs and devices across multiple LMICs. By aligning standards—such as **clinical trial guidelines**, **quality assurance**, and **pharmacovigilance**—nations can reduce bureaucratic bottlenecks and facilitate faster approval processes. India's **Central Drugs Standard Control Organization (CDSCO)** has worked with agencies in Asia and Africa to streamline approvals

for Indian generics, benefiting millions of patients who gain quicker access to affordable medicines.⁷

FUTURE DIRECTIONS FOR INDIA'S LEADERSHIP

To maintain and expand its impact on healthcare in the Global South, India must prioritise the following:

1. Boost R&D Investments

Increasing research spending to at least **2.5% of GDP** (a target often discussed in policy circles) would accelerate innovation in advanced therapies and technologies. Robust R&D ecosystems can also generate new diagnostics for diseases endemic to LMICs, driving global health progress.

2. Develop Skilled Workforces

India's current ratio of **health workers to population** remains lower than the global average, especially in rural areas.⁴ Expanding biomanufacturing, AI, and telemedicine training programs will create a pipeline of experts ready to tackle emerging health challenges. Collaborative training models, such as public-private partnerships or "train-the-trainer" programs, can scale human-resource development.

3. Enhance Supply Chain Resilience

India's **PLI scheme** aims to strengthen local manufacturing of APIs. Still, the scope can be broadened to include advanced medical devices and raw materials.⁷ By diversifying sourcing and building robust cold-chain facilities, India can mitigate disruptions and ensure vital health commodities reach LMICs on time.

4. Streamline Regulatory Frameworks

Transparent, efficient, and science-based regulatory systems foster global confidence in Indian products. E-governance tools for faster application processing, harmonised clinical trial rules, and robust pharmacovigilance frameworks can help expedite approvals and adoption worldwide.

5. Foster Public-Private Partnerships (PPPs)

Effective PPPs combine the government's policy support with the private sector's agility and innovative capacity. By co-investing in large-scale health programs, PPPs can accelerate the development of new technologies and expand access to care. For instance, partnerships that tie digital health firms with public hospitals can bring telemedicine to rural families' doorsteps.

6. Lead in Global Health Governance

India's growing role in forums like the **G20**, **WHO Executive Board**, and **World Trade Organization (WTO)** can be leveraged to advocate for issues critical to LMICs, such as equitable vaccine distribution, TRIPS waivers for essential medicines, and collaborative pandemic responses. By championing these causes, India can help shape a more inclusive global health agenda.

India's contributions to **pharmaceuticals**, **vaccines**, **medical devices**, **digital health**, and **supply chain resilience** showcase a dynamic model for strengthening healthcare systems in the Global South. The country's commitment to **affordability**, **innovation**, and **sustainability** has enabled it to address pressing challenges like infectious diseases, NCDs, and emergency preparedness. By sharing these experiences and forging stronger partnerships, India and its LMIC counterparts can develop more resilient, equitable healthcare ecosystems.

Data from the last decade—ranging from a **90% drop in HIV/AIDS treatment costs** due to Indian generics⁶ to the 140 million telemedicine consultations under eSanjeevani¹⁰—illustrates the potential of India's approach. **Policies** such as Ayushman Bharat–PM-JAY, the National Digital Health Mission, and the Production Linked Incentive (PLI) scheme have paved the way for robust healthcare infrastructure and local manufacturing. **Strategies** promoting frugal innovation, local R&D, and regulatory harmonisation will expand healthcare access and affordability across the Global South.

As we launch this first edition of the **Global South Healthcare Journal**, we invite scholars, practitioners, and policymakers to engage with these ideas, share their insights, and collaborate on solutions that uplift healthcare standards. India's story underscores the transformative power of targeted policy, technical know-how, and cross-border cooperation. If we harness these collective strengths, we can build a healthier, more inclusive world where no one is left behind because of geography, income, or resource constraints.

Together, we stand on the cusp of a new era in global health that values collaboration as much as innovation and equity as much as excellence. Let us seize this momentum to make **universal health coverage** a reality for the 5 billion people living in LMICs. Through shared commitment and strategic partnerships, we can ensure that quality healthcare is accessible, affordable, and sustainable for all.

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