

INNOVATIONS IN HEALTHCARE AFFORDABILITY AND DELIVERY—AN INDIAN PERSPECTIVE

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With a population of more than 1.3 billion,¹ just a shade less than China's 1.4 billion, India faces enormous challenges ensuring quality healthcare for all of its citizens. Although a relatively young nation, with 50% of the population below 25 years of age and 65% below 35 years,² India still has a large aging population which needs access to medical facilities to lead a healthy life.

Improvement in life expectancy over the years, which is 69.04 years as of 2018,³ implies that the types of healthcare challenges faced by the country today are quite different from what they were thirty or forty years back. In earlier years, high rates of infant mortality, infectious diseases, and population control were the major concerns. Today, healthcare problems—such as hypertension, diabetes, and coronary heart disease, which has emerged as the leading cause of death in India—are more related to lifestyle.⁴

In this chapter we focus on healthcare in India, innovating in healthcare delivery, and increasing healthcare affordability through increased capacity.

Healthcare in India—an overview

Indian healthcare has made substantial progress, especially in the last decade. The Government of India has been trying to improve public health delivery through significant investments in the healthcare infrastructure. With limited resources and a large population to take care of, the Indian government requires innovative ways to provide quality healthcare facilities for all. It spends roughly 1.15% of gross domestic product (GDP) on the public healthcare system,⁵ which badly suffers from an insufficient number of trained health professionals. In addition, disparity in healthcare coverage between urban and rural areas does

not meet the needs of the population. The private sector has stepped in to fill this gap in India, but healthcare facilities remain beyond the reach of a large percentage of the population due to their prohibitive costs. Although the government has primary, secondary, and tertiary care facilities, it is the private sector that runs a majority of super specialty hospitals—hospitals with expertise in multiple specialized areas. However, private facilities are concentrated in and around tier 1 and 2 cities. The healthcare market in India is expected to reach US\$372 billion by 2022.⁶ India has attracted foreign direct investment (FDI) worth US\$6 billion in the healthcare sector between April 2000 and June 2018.⁷ However, there is great disparity in the availability of skilled resources between rural and urban areas. On the positive side, India is currently among the top 20 global medical device markets and the 4th largest medical device market in Asia. Medical tourist arrivals in India have also increased by over 50% to 200,000 in 2016 from 130,000 in 2015—and are expected to double in the near future.

Across the world, government spending on healthcare is expected to reach US\$10 trillion by 2022,⁸ which is the largest expense for any service in the world. Even today, less than 20% of the world's population has access to secondary and tertiary level healthcare.⁹ In order to meet the healthcare needs of citizens and increase access to affordable healthcare, the Indian government created the centrally sponsored Ayushman Bharat scheme.

Ayushman Bharat initiative by the government promises to provide affordable access to healthcare services. Launched in 2018, the scheme is the world's largest universal health coverage program with a goal to provide medical insurance worth US\$7,100 each to 100 million families every year.¹⁰ While it is similar to other health insurance schemes, the Indian government pays the insurance premium to health insurance providers on

behalf of its citizens. The entire healthcare infrastructure is now being geared up to meet the demands and massive scale of Ayushman Bharat. India's medical educational infrastructure has grown rapidly in the last 26 years: the number of medical colleges in India has increased from 314 in FY11 to 476 in FY18.

The government has increased health expenditure by 370% between 2000 and 2014, making the efficient management of expenditures and the creation of mechanisms that ensure benefits reach the needy essential.

Healthcare delivery—the need for innovation

While developing countries continue to focus on controlling malaria, tuberculosis, and HIV, which combined kill 3.8 million people annually,¹¹ adequate attention is needed to save nearly 17 million lives lost due to the absence of proper facilities for basic procedures and surgeries. The statistics reveal that out of the 313 billion surgeries done across the world, only 6% are performed in the areas where nearly half the world population lives. These are not complex surgeries of the heart, brain, or for cancer but basic surgeries, called bellwether procedures, that include an emergency cesarean section for obstructed delivery, laparotomy for a burst appendix, and surgery for compound fractures.

The infrastructure created for malaria, tuberculosis, and HIV cannot be used to perform surgeries, but the infrastructure and expertise built for performing surgeries can be used to treat malaria, tuberculosis, and HIV with virtually no additional cost. Essentially, what is needed is investment in innovations aimed at the delivery of healthcare.

Indian healthcare organizations are gradually increasing investment in artificial intelligence (AI), the internet of things (IoT), and robotics. With telemedicine becoming a fast-growing sector in India, major hospitals adopting telemedicine services, and hospitals entering into public-private partnerships (PPPs), the telemedicine market in India is expected to reach US\$32 million by 2020. This would help bridge the rural-urban divide in terms of medical facilities, extending low-cost consultation and diagnostic facilities to the remotest of areas via high-speed communication links.

As hospitals “go paperless”—by digitizing and relaying information electronically rather than on paper—consultations, access to inpatient reports, and communication within and outside the hospitals can be revolutionized. The impact of technology can be much more significant than any pill or medical equipment in reducing preventable deaths in the country. Adoption of technologies, such as less invasive diagnostics, patient-centric mobile apps, remote monitoring solutions, digital platform integration, surgical robotic tools, smaller implants, AI, and 3D printing, shall provide the necessary impetus towards achieving the vision of a connected healthcare ecosystem.

One of the first steps towards this transformation will be to use technology to leverage a digital healthcare ecosystem. Rising adoption of AI-based applications will ensure better connectivity among physicians, patients, hospitals, and the overall healthcare industry. Developments in information technology and integration with medical electronics have made it possible to provide high-quality medical care at home—at affordable prices—enabling consumers to save from 20 to 50 percent of the cost.

Capacity building—critical aspects

Rural Health Statistics 2017 show that there is an 81.6% shortage of medical specialists in government-run hospitals in India.¹² We do not have adequate specialists to fill the vacant positions in government-run hospitals. Infectious diseases are no longer a cause for concern, as they can be treated by doctors with undergraduate degrees. But degenerative diseases, which are responsible for most illnesses, cannot be treated legally by a doctor with only an undergraduate degree. It is essential for a doctor to have a graduate qualification to treat such illnesses. According to the Medical Council of India, while 63,850 seats are offered for undergraduate admissions in medical colleges across India, availability of seats for graduate studies numbers only 25,000.¹³ Of this, admissions for clinical specialties are around 14,500 and the rest are for paraclinical specialties. This gap between undergraduate and graduate seats has created 200,000 undergraduate, or MBBS, doctors who are either unutilized or underutilized in the nation's healthcare delivery. The problem can be addressed by equalizing the number of seats at the undergraduate and graduate levels in medical colleges. This will also ensure the availability of specialists in the rural and remote areas.

Over the years, education in the healthcare sector in India has become an elitist affair. It costs over US\$60 million to build a medical college that can train 100 doctors per year. In this process, the cost of education has increased beyond the means of the working class and the poor. Interestingly, many esteemed doctors across the world generally come from deprived backgrounds. In India, the problem could be addressed by converting 763 district hospitals into medical, nursing, and paramedical institutions,¹⁴ which will cost roughly US\$15 million. About 5% of the seats in these colleges could be reserved for local students, which would enable them to study in their own region and improve the quality of service in their home districts.

Across the world, especially in the United States of America (U.S.) and Europe, any practicing medical specialist with over five years of experience is able to become a medical teacher who can train doctors, nurses, and paramedics. As per guidelines from the Medical Council of India, a medical practitioner must work for more than 10 years in a medical college hospital to be considered as a medical teacher.

There are medical colleges in the Caribbean region that have low overhead costs using small rental spaces to train medical students that will work in the United States. Many pre-medical students and medical residents undergoing specialist training programs in the United States are from one of these Caribbean

medical colleges. If India adopts these norms for training medical students, the overall cost of medical education will decrease significantly.

Healthcare is poised to become one of the largest employers and carries huge potential for foreign exchange earnings through medical tourism. With a large youth population, India could also become a skilled health workforce provider for the aging and shrinking population of the developed countries. Policymakers must carefully consider all of these aspects to build a balanced program for education.

Healthcare—improving affordability in India

While a heart surgery in India used to cost US\$3,500 about 30 years ago, it is performed for less than US\$1,500 today. This drastic cost reduction has been possible because of physician and hospital entrepreneurship. To achieve further reductions in the cost of healthcare, we need to dramatically change the way doctors, nurses, and medical technicians are trained and also how hospitals are built and managed.

While the developed world focuses more on cutting-edge research, we in India have a unique opportunity to develop innovative processes to democratize healthcare.

To foster a culture of research and excellence, specialized research—in robotics-led remote surgeries, basic medicine, and provisions—should be encouraged and incentivized to reward innovators for their time and effort.

More than innovation in products, India needs process innovations and a major change in regulations to embrace technology in healthcare. Technology enables a specialist anywhere in the world to instantly access patient reports, view monitors attached at the patient's bedside, and take clinical decisions immediately.

Despite the benefits that the adoption of technology offers, there are additional costs that will extend the time it takes for these technologies to become a reality. There are no clear-cut guidelines related to technology-led healthcare delivery in India. For example, a doctor cannot issue an electronic medical prescription because they are limited by regulations. Updating regulations, encouraging technology adoption, and mandating minimum standards for healthcare delivery, electronic medical records, and exchange of clinical data are some of the important changes needed in the country.

Once technology adoption becomes widespread, remote monitoring of patients using telehealth devices will become the norm. Hospitals will do away with wards and have 90% of beds for intensive care and 10% of beds for emergency or trauma. The healthcare delivery model will undergo a change where patients who would have otherwise been in hospitals will be tended to in patient care centers by nurses and remotely monitored by specialists.

Conclusion

Like Uber and Airbnb, information technology enabled services (ITES) will become the largest healthcare provider. There is already Microsoft's Kaizala platform, which allows patients to save their medical records on their phone and to have a Skype conversation with a doctor from any part of the world. Such platforms can dramatically change the way patient-doctor interaction happens, resulting in a significant cost reduction of healthcare.

Adoption of such technologies will lead to better care, which will not only reduce re-admissions but also improve the average length of stay. Due to the volume of patients that a healthcare delivery center can handle, enhanced efficiency in the system will bring down the costs.

The Government of India has embarked on an ambitious target of providing broadband connectivity to every village. Such high-speed data links would revolutionize the communication process—patients' pathological, radiographic, and other test data collected at primary health centers could be quickly shared with super specialty hospitals to enable the specialists to decide on diagnosis and treatment protocol. The aforesaid tech-enabled healthcare delivery models would transform the healthcare services sector in the country. In addition, the Indian Government's health coverage program will boost healthcare services. Such initiatives will pave the way for better access and affordability of quality care—the grand vision of any universal healthcare program.

Notes:

- 1 United Nations, n.d.
- 2 Government of India, Vice President's Secretariat, 2018.
- 3 Knoema, n.d.
- 4 World Health Organization, 2018.
- 5 National Health Systems Resource Centre, 2016.
- 6 India Brand Equity Foundation, 2018.
- 7 India Brand Equity Foundation, 2019.
- 8 Deloitte, 2019.
- 9 Meara et al., 2015.
- 10 National Portal of India, n.d.
- 11 Meara et al., 2015.
- 12 Ministry of Health and Family Welfare, 2018.
- 13 Seats offered for undergraduate admissions are 63,850 whereas graduate admissions are 25,000 across India. Further information about the number of seats for the said admissions is available at <https://www.mciindia.org/CMS/information-desk/college-and-course-search>
- 14 Ministry of Health and Family Welfare, 2016.

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