India Healthcare Outlook 2018 – 2022

Shifting burden of disease, transforming demographics and disruptive technologies are poised to change the Indian healthcare landscape

LSI Financial Services Pvt. Ltd.
Creating Value, Partners in Growth

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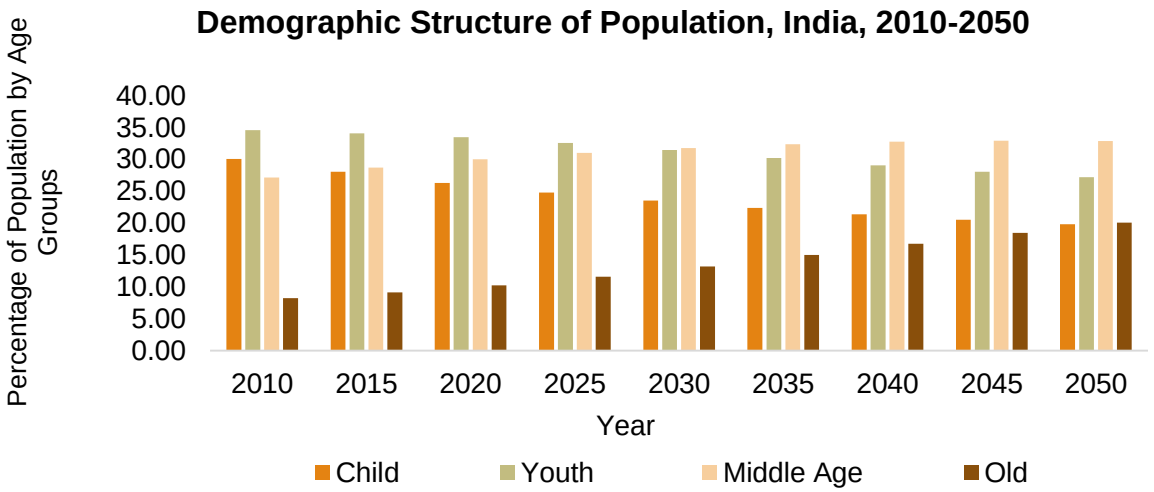
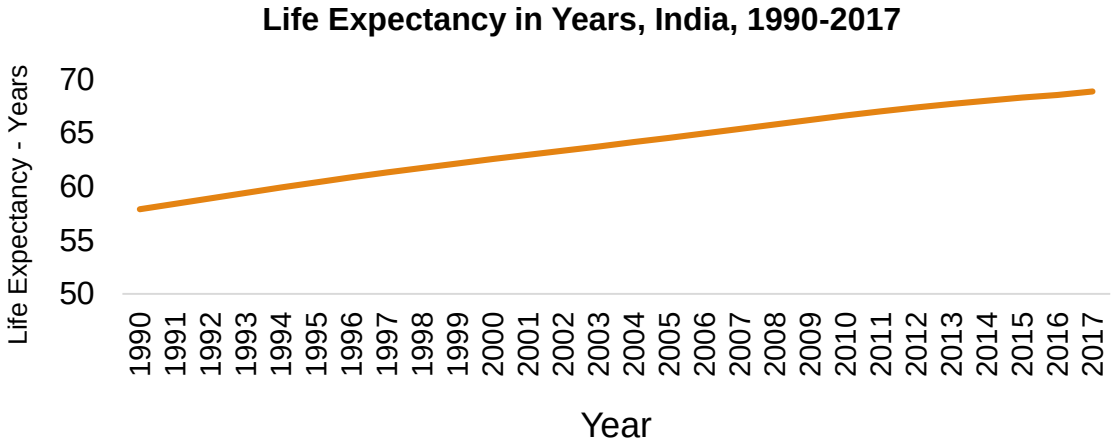
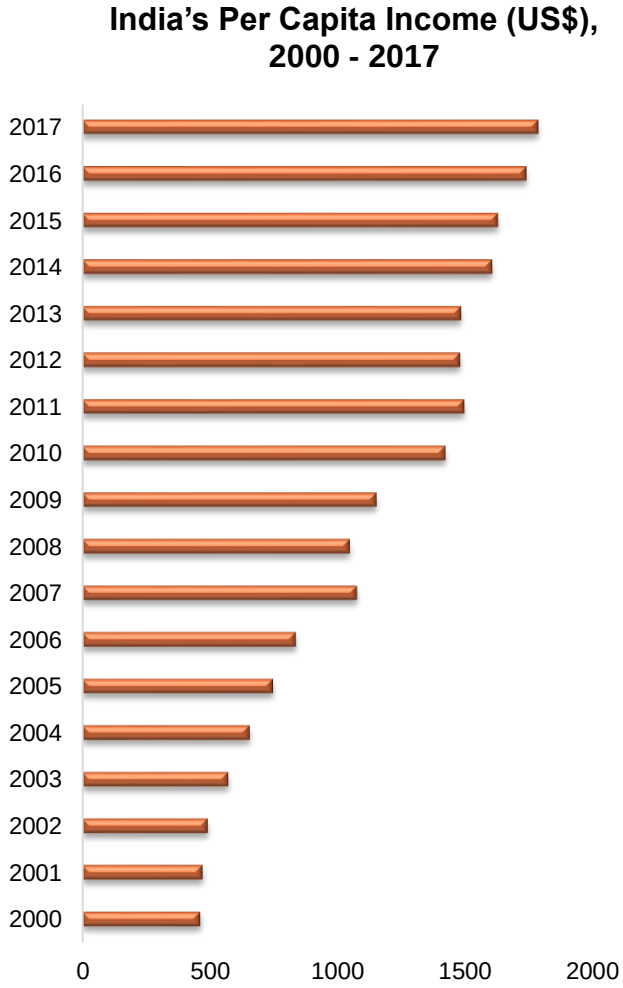
Executive Summary

Driving Factors of Healthcare in India

- Changing demographic, rising life expectancy, growing income and public awareness are contributing to higher demand for healthcare products and services in India







Source: World Bank, World Health Organization (WHO)

Findings on the Healthcare Sector

Strong Demand

- Healthcare revenue in India is set to reach US$ 330.7 Billion by 2022 from US$ 280 billion in 2017.
- Current per capita healthcare expenditure will reach US$117.8 by 2022 from US$ 86.8 in 2017.
- It is estimated that India will require 2.07 million more doctors by 2030 in order to achieve a doctor-to-population ratio of 1:1,000.

Attractive Opportunities

- Investment in healthcare infrastructure is set to rise, benefiting both 'hard' (hospitals) and 'soft' (R&D, education) infrastructure
- India is the largest exporter of formulations with 14 per cent market share and ranks 12th in the world in terms of export value. Double-digit growth is expected over the next 5 years

Quality & Affordability

- Availability of a large pool of well-trained medical professionals in the country
- India has an advantage over its peers in the West and Asia in terms of cost of high quality medical services offered

Policy Support

- The government aims to develop India as a global healthcare hub
- Policy support in the form of reduced excise and customs duty and exemption in service tax
- Creation of new drug testing laboratories and further strengthening of the 31 existing state laboratories

Source: IBEF, LSI Research

Major Healthcare Indicators, India, 2017

Topic	Indicator	Data
Human Development Index (HDI)* Facts	HDI Rank	131
	HDI Score	0.624
	HDI Score - Female	0.549
	HDI Score - Male	0.671
Demographic Facts	Population, total (millions)	1324.2
	Population, female (millions)	637.9
	Population, male (millions)	686.3
	Population ages 0-14 years, total (%)	28.2
	Population ages 15-64 years, total (%)	66.0
	Population ages 65 and above, total (%)	5.8
	Age dependency ratio, old	8.8
	Rural population (%)	66.9
	Urban population (%)	33.1

Topic	Indicator	Data
Health Facts	Birth Rate (per 1000 population)	20.4
	Death Rate (per 1000 population)	6.4
	Life expectancy at birth (years)	68.3
	Life expectancy at birth, female (years)	69.9
	Life expectancy at birth, male (years)	66.9
	Fertility rate (total births per woman)	2.33
	Adolescent birth rate (births per 1,000 women ages 15-19)	24.5
	Infant mortality rate (per 1,000 live births)	37.9
	Under-five mortality rate (per 1,000 live births)	47.7
	Male child mortality rate	41.9
	Female child mortality rate	44.2
	Neonatal mortality rate (per 1,000 live births)	25.4
	Maternal mortality ratio (deaths per 100,000 live births)	174

*HDI is a metric developed by United Nations to assess four principal areas: mean years of schooling, expected years of schooling, life expectancy at birth and gross national income per capita.

Source: World Bank ,United Nations Development Programme

Shifting Burden of Disease in India

Concept of Different Types of Diseases and Income Groups

- In order to check the shifting burden of diseases in Indian States and relate their disease burden to the State income level, we have divided the diseases in two buckets namely Communicable Diseases (CDs) and Non-communicable diseases (NCDs).
- 2017 Per capita income at current prices have been used to segregate the Indian States in High, Medium and Low Income States.
- The hypothesis to be tested is that with rising income level the disease burden shifts from communicable to non-communicable diseases.

➢ **Communicable Disease (CD)**

These diseases are spread either by direct contact of the affected individual or by the indirect sources (Airborne microorganisms, e.g. bacteria, viruses; bite from insects; or contaminated food or water).

➢ **Non-Communicable Disease (NCD)**

These diseases are non-infectious but last for long duration. Affected patients require proper care as these diseases do not resolve quickly. In many cases, absolute remedy is not achieved.

➢ **DALY (Disability- Adjusted Life Year)**

DALY is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.

[DALY = YLL (Years of Life Lost) + YLD (Years Lived with Disability)]

29 Indian States were divided into three income groups based on their 2017 per capita income at current prices.

➢ **Low Income States** –. Per Capita Income less than INR 1.00 Lac

➢ **Middle Income States** – Per Capita Income from INR 1.00 Lac to 1.49 Lac

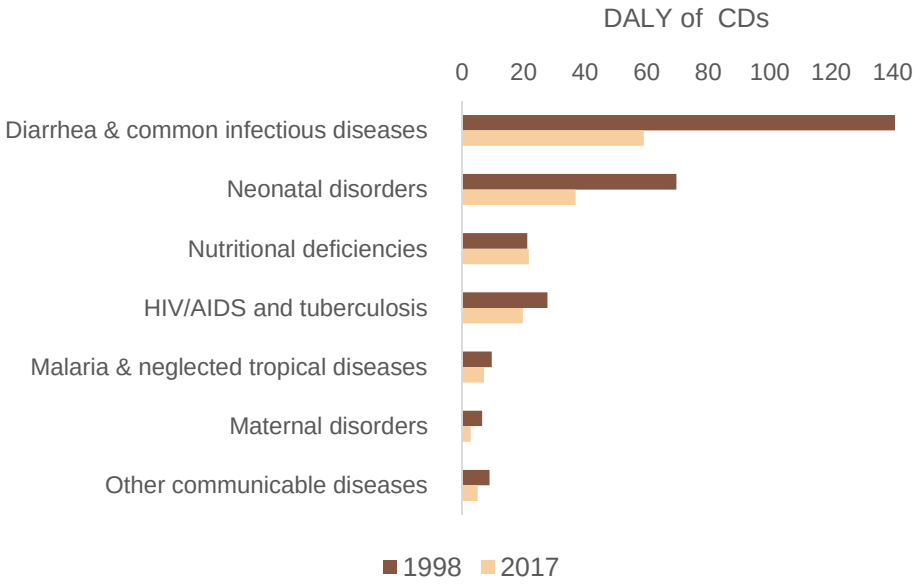
➢ **High Income States** – Per Capita Income more than INR 1.50 Lac

Source: LSI Research

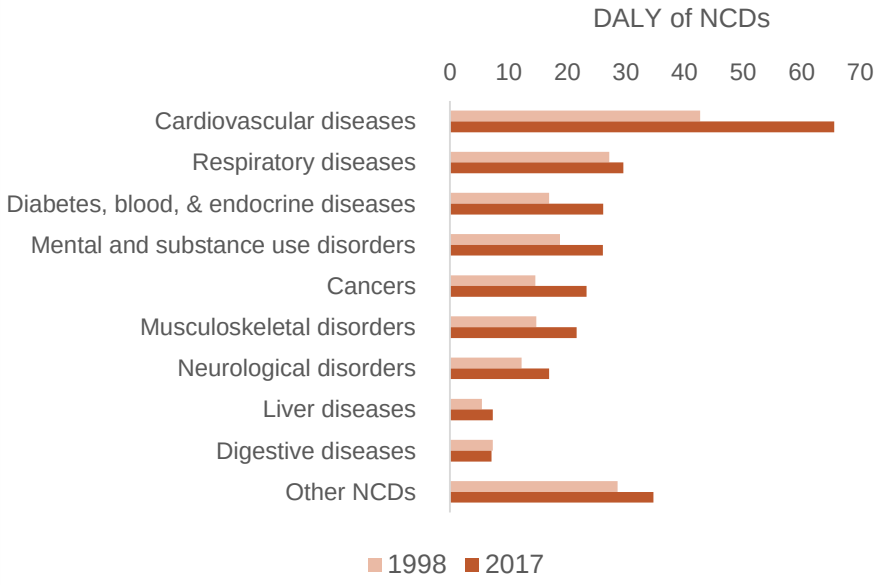
Shifting Burden of Disease in India

- India has seen a major transformation in its disease burden from 1998 to 2017.
- The numbers of DALYs dropped substantially for most communicable, maternal, neonatal and nutritional diseases between 1998 and 2017 across all Indian States, but rates of reduction for those were slowest in the low income group.
- By contrast, numbers of DALYs increased substantially for NCDs in all State income groups. The all-age prevalence of most leading NCDs increased substantially in India from 1990 to 2016.
- The major risk factors for NCDs, including high systolic blood pressure, high fasting plasma glucose, high total cholesterol, and high body-mass index, increased from 1990 to 2016, with generally higher levels in higher income states; ambient air pollution also increased and was highest in the high income group.

Transition of Communicable, Maternal, Neonatal & Nutritional Diseases in India from 1998 to 2017



Transition of Non - Communicable Diseases in India from 1998 to 2017



Source: WHO and LSI Analysis

Communicable Diseases – Prevalence Across Indian States by Income Group, 2017

- The DALY of communicable diseases is much less than the country average in the high and middle income Indian States. The low income States still possess a higher than country average of DALY due to communicable diseases.

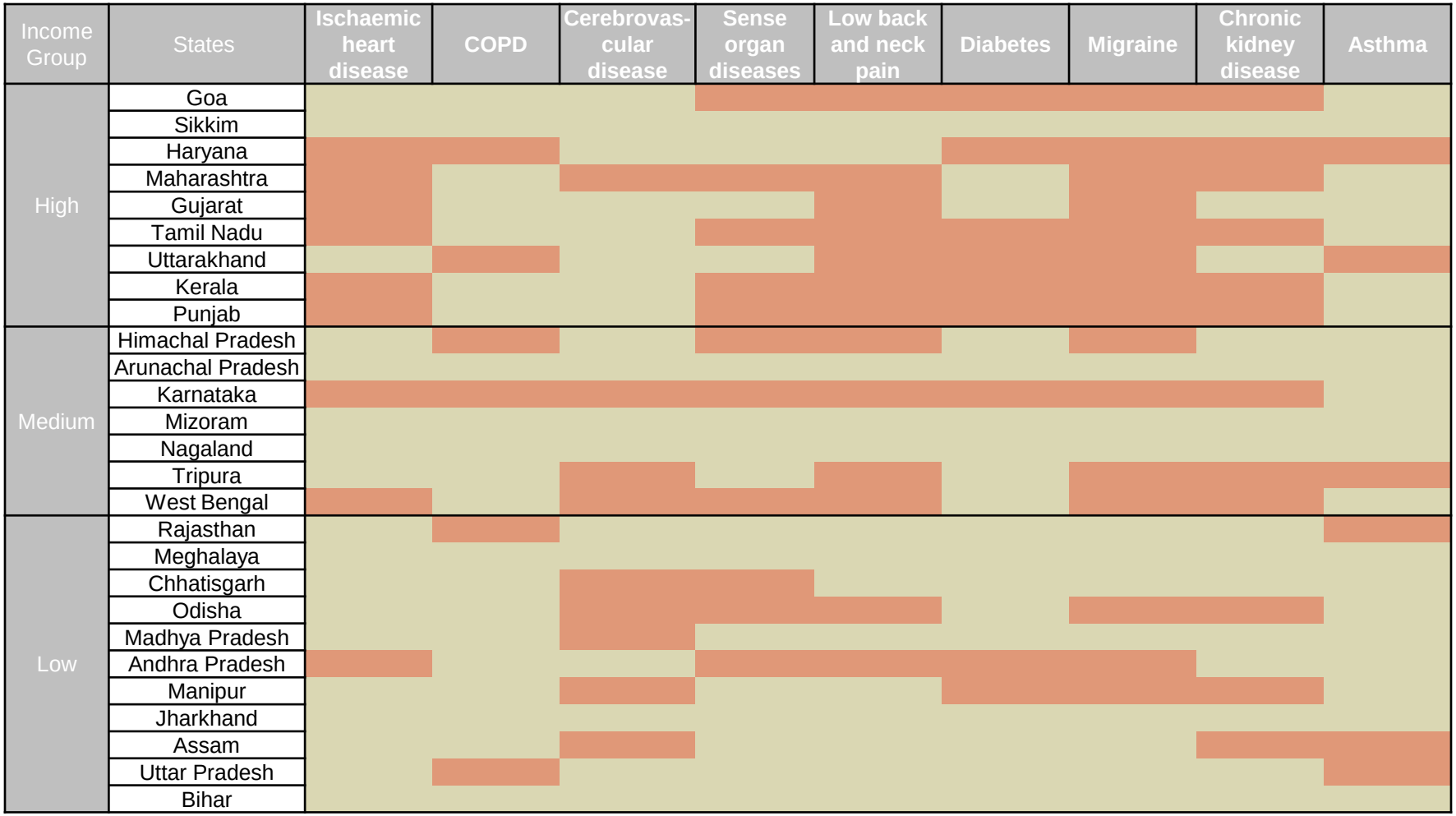
Income Group	States	Diarrhoeal diseases	Lower respiratory infections	Tuberculosis	HIV/AIDS	Meningitis	Protein-energy malnutrition
High	Goa						
	Sikkim						
	Haryana						
	Maharashtra						
	Gujarat						
	Tamil Nadu						
	Uttarakhand						
	Kerala						
	Punjab						
Medium	Himachal Pradesh						
	Arunachal Pradesh						
	Karnataka						
	Mizoram						
	Nagaland						
	Tripura						
	West Bengal						
Low	Rajasthan						
	Meghalaya						
	Chhatisgarh						
	Odisha						
	Madhya Pradesh						
	Andhra Pradesh						
	Manipur						
	Jharkhand						
	Assam						
	Uttar Pradesh						
	Bihar						

LEGEND DALY less than country average | DALY more than country average

Source: LSI Analysis

Non-Communicable Diseases – Prevalence Across Indian States by Income Group, 2017

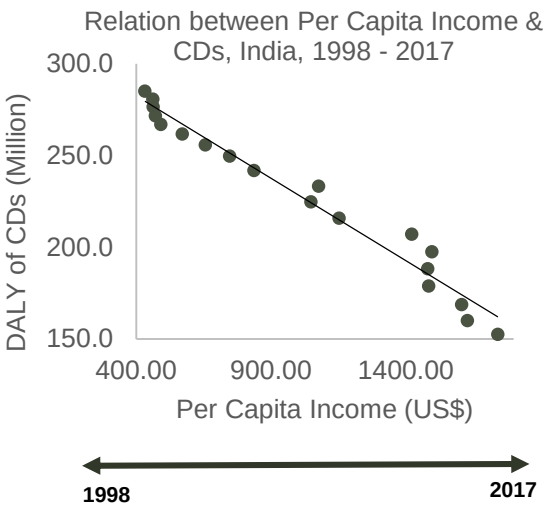
- The DALY of non-communicable diseases is less than the country average in the low income Indian States. The high income States have a higher than country average of DALY due to communicable diseases.

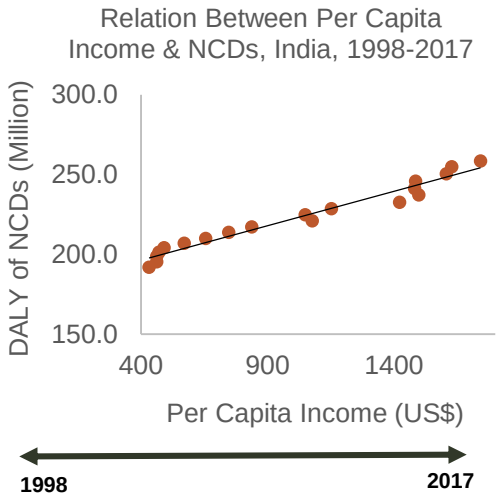


LEGEND DALY less than country average | DALY more than country average

Source: LSI Analysis

Relation of Shifting Disease Burden to Changing Income





- ✓ In the last 20 years with rising per capita income the DALY of communicable diseases have gone down significantly and that of non-communicable diseases rose at an increasing rate.
- ✓ India has the gigantic share of DALY from both types CDs and NCDs among the middle-income countries. In case of CDs, the share of that DALY was 39% in 1998 and 34% in 2017. For NCDs, it grew from 22% to 24% between 1998 and 2017.
- ✓ Between 1998 to 2017, the CDs have reduced at a CAGR of 3.30% and NCDs have increased at CAGR of 1.68%.
- ✓ The number of deaths from Lung & Heart Diseases, Low Birth Weight, Oral Cancer, Rheumatoid Arthritis, Dengue are highest here across the globe.

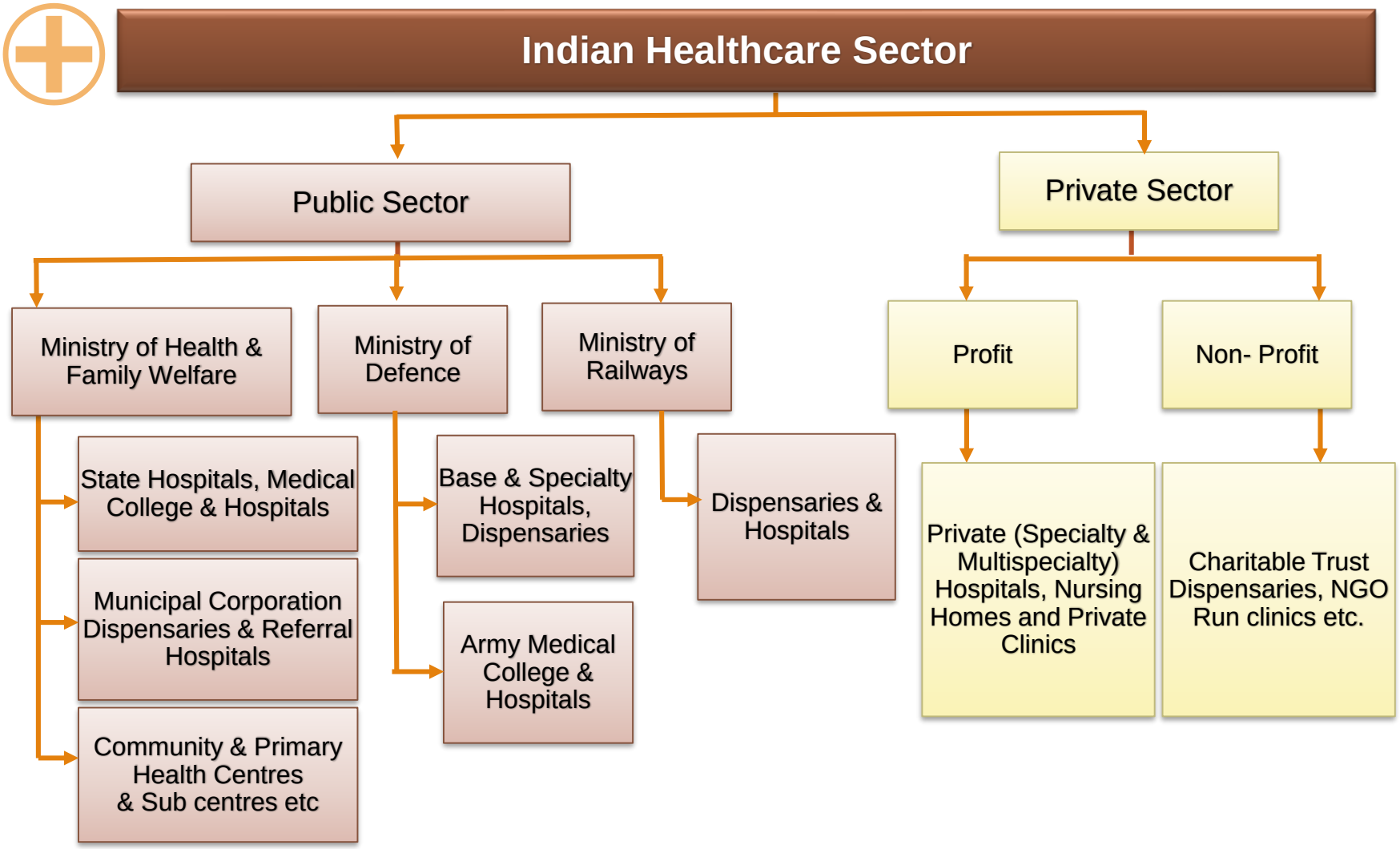
Top 10 Diseases Causing Death in India

Rank	Cause of Death	% Of Total Deaths	Cause
1	Cardiovascular Diseases	24.80%	Excessive use of tobacco, High cholesterol & high blood pressure
2	Respiratory Diseases	10.20%	Smoking, Air pollution
3	Tuberculosis	10.10%	Contagious viruses
4	Malignant and Other Tumours	9.40%	Exposure to Chemical/ toxic compound/ radiation, Genetics
5	Ill-Defined Conditions	5.30%	Lack of regular medical care
6	Digestive Diseases	5.10%	Unhealthy food and diet system
7	Diarrhoeal Diseases	5%	Food poisoning, Unhygienic food and water consumption
8	Unintentional Injuries	4.60%	Accidents/ disasters
9	Intentional Self-Harm	3%	Suicide, Depression
10	Malaria	2.80%	Parasite transmission by mosquitoes

Source: IMF, WHO; LSI Research

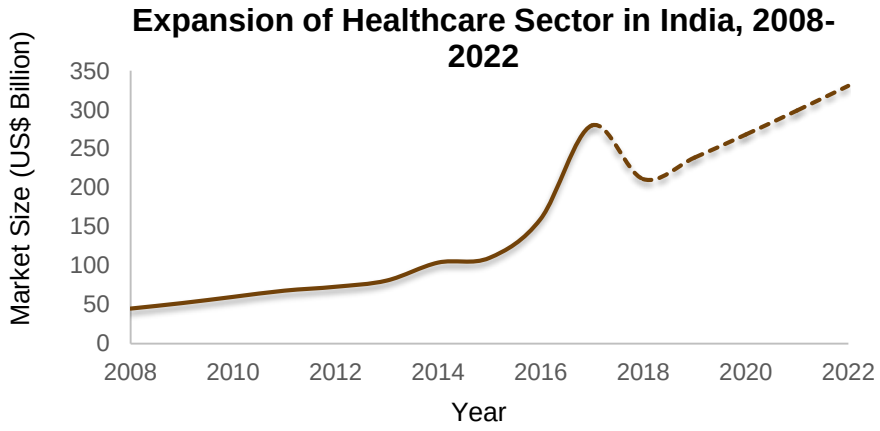
Indian Healthcare Sector Overview

Structure of Indian Healthcare Sector



Source: LSI Research

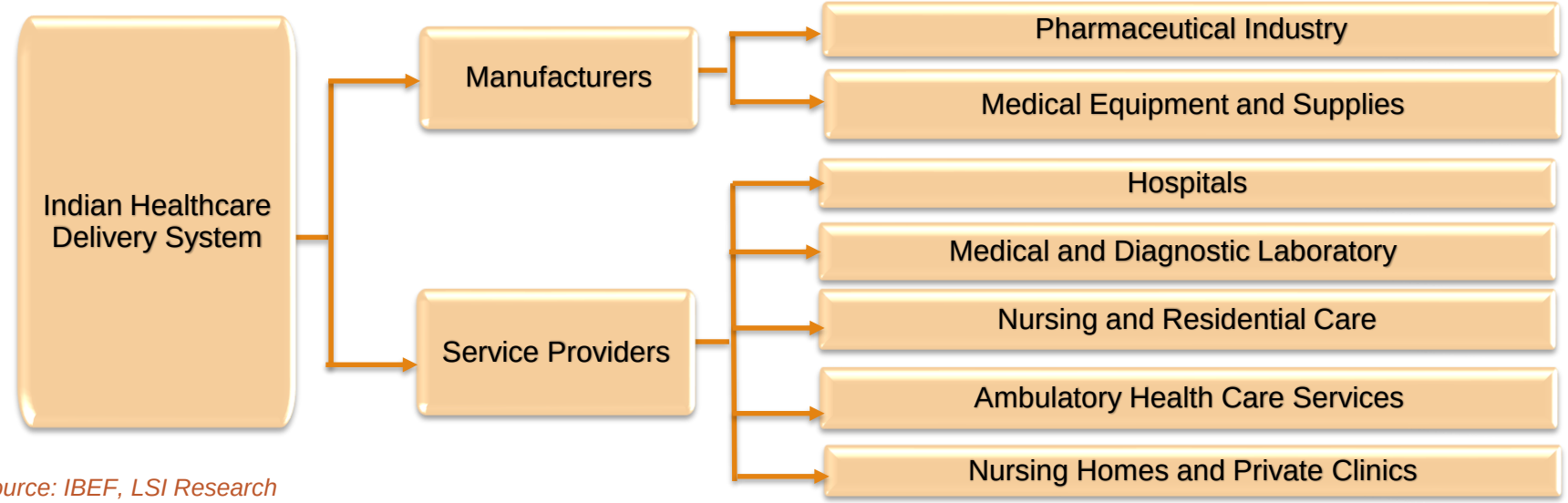
Healthcare Market Overview



Note: Dotted line denotes forecasts

- The Indian Healthcare Sector has grown significantly in the last few years. The Value of the Indian Healthcare market was US$ 160 Billion in 2016.
- The total industry size is expected to be US$ 330.7 Billion by 2022.
- The CAGR of the market is expected to reach 15.3% between 2008-2022.

Structure of Indian Healthcare Delivery System

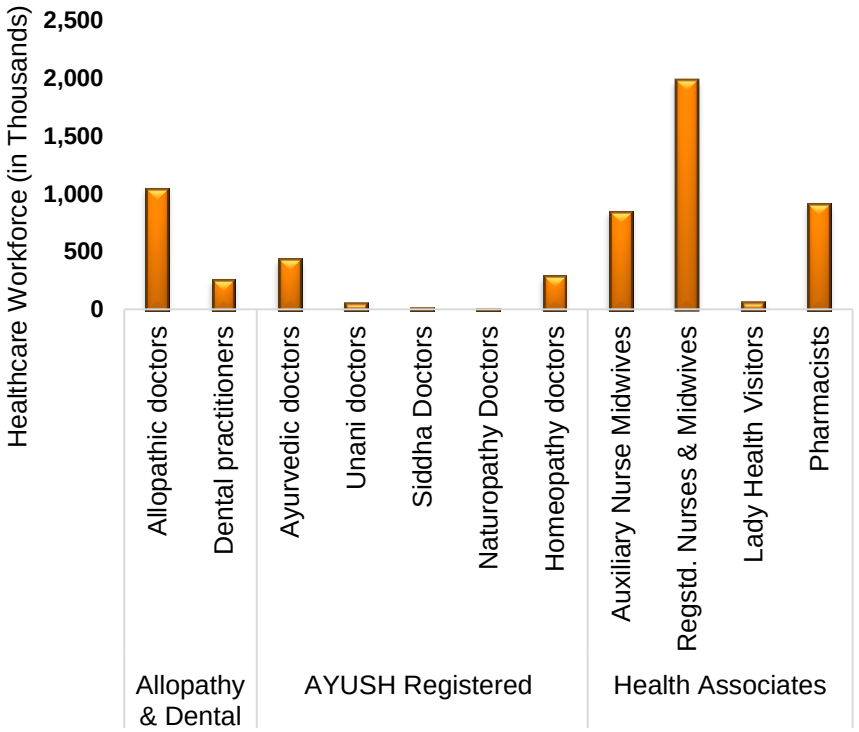


Source: IBEF, LSI Research

Healthcare Workforce

Community Health Workers (per 1000 people), 2017	Births Attended by Skilled Health Staff (% of total), 2017	Density of Physicians (per 1000 people), 2017	Density of Nursing & Midwifery Personnel (per 1000 people), 2017	Density of pharmacists (per 1000 people), 2017
0.581	81.4	0.8	2.1	0.6

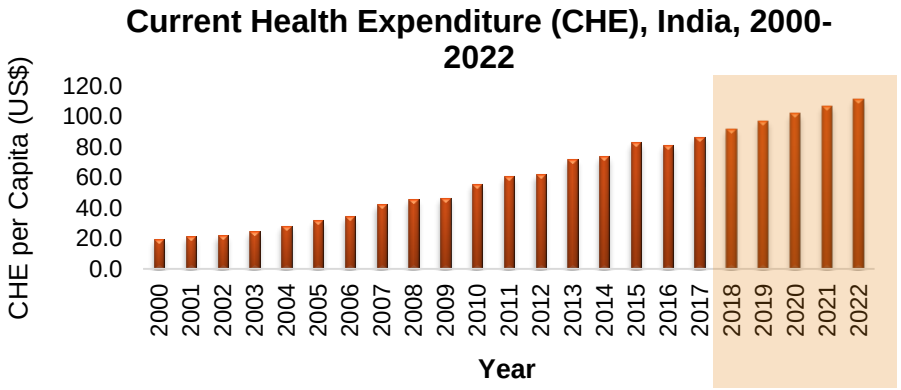
Healthcare Workforce, India, 2017



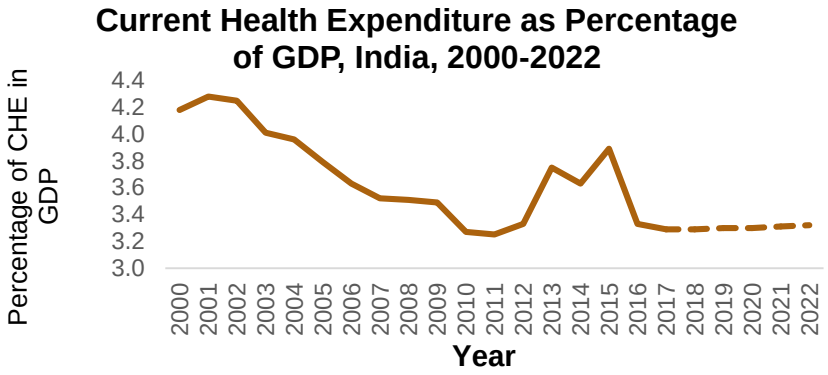
- There is acute shortage of health workforce in India. According to the World Bank report, India will require 2 million doctors by 2030.
- Till 2017, the allopathy doctor-patient ratio was 1: 1,286 in India. The same ratio for the average Ayush registered doctors and health associates were 1:1,57,924 and 1:6,876 respectively.
- For fulfilling this requirement the health ministry has taken several initiatives. Since 1990, the number of medical colleges and the capacity of admissions in them have increased at a CAGR of 4.5% and 5.3% respectively.
- It is believed, the steps would help to fill the gap a lot by 2022 by producing 67,972 graduate and 30,228 post-graduate doctors per year.

Source: National Health Policy 2018, World Bank, LSI Research

Healthcare Financing



Note: Shaded portion denotes forecasts



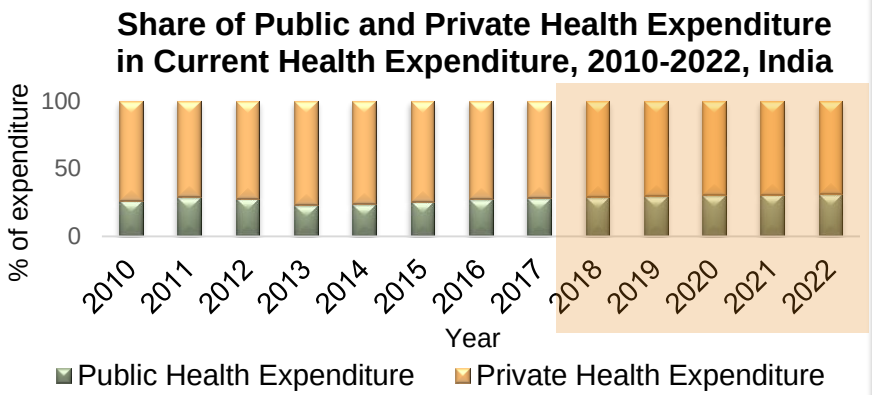
Note: Dotted line denotes forecasts

Source of Health Expenditure in India

- Current Health Expenditure (CHE)
  - Public Health Expenditure
    - Central & State Government
    - Government Health Insurance Schemes
    - Individuals, Companies, NGOs, Authorised Bodies who pay through governmental agencies etc.
  - Private Health Expenditure
    - Out of Pocket Expenditure
      - Direct Payment from the Household Expenditure
      - Payment from the Household in the form of insurance premium
    - Individuals, Companies, NGOs, Authorised Bodies who pay through private agencies etc.

Source: World Health Organization, World Bank, LSI Research

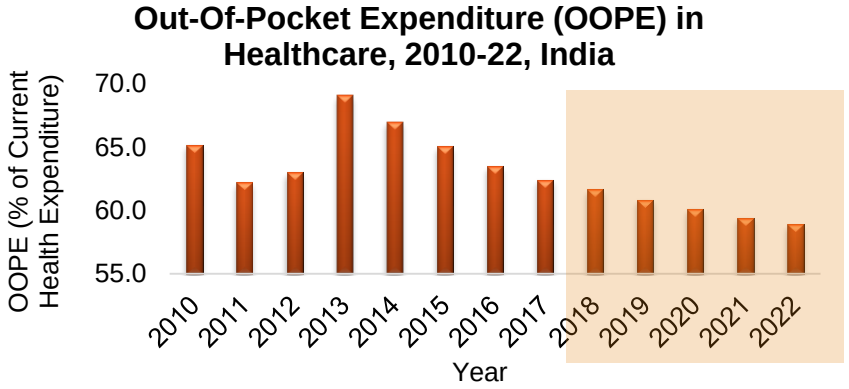
More on Healthcare Financing



Note: Shaded portion denotes forecasts

- In India, expenditure in public hospitals are less but the infrastructure of these places is poor.
- In many cases, the patients prefer to shift to private hospitals which provides quality healthcare service but at a much higher cost.
- Between 2000-15, the Current Health Expenditure grew at a CAGR of 10.1%. Still, in 2015, it was only 3.9% of the GDP. The percentage is quite low compared to many developed countries like United States (16.8%), Canada (10.4%) etc. and the developing countries like Zimbabwe (10.3%) , Brazil (8.9 %), China (5.3%), Kenya (5.2%) etc..

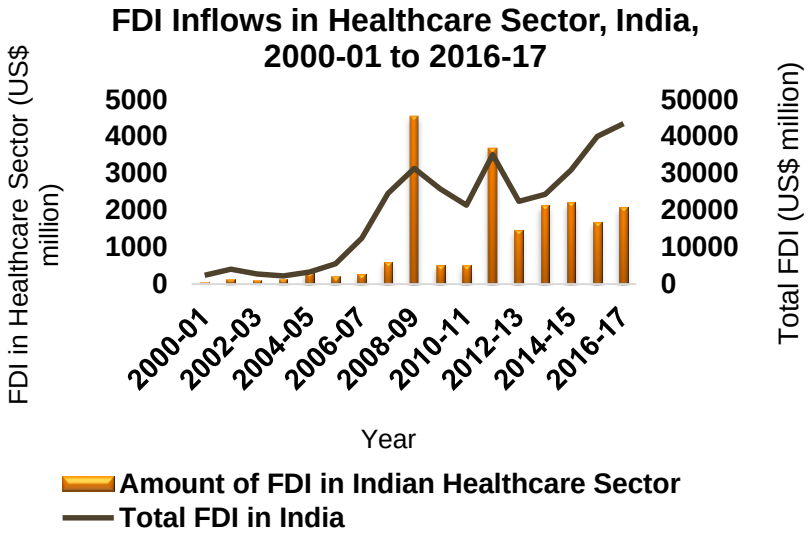
Source: World Bank, National Health Policy 2018, LSI Research

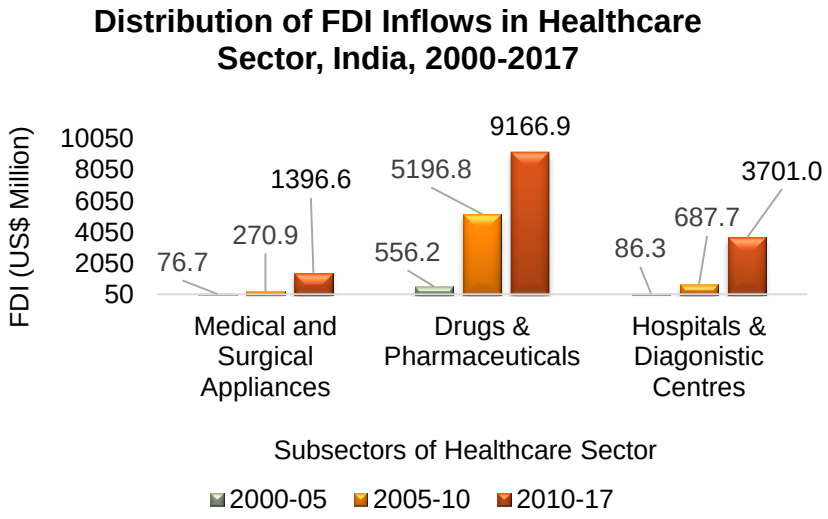


Note: Shaded portion denotes forecasts

- After increasing at a CAGR 1.9% between 2000-2017, the government health expenditure was still 1.19% of GDP in 2017-18. Whereas, the world average healthcare is at 5.99%.
- Government contributes only 29% of the total health spending. So, majority of people are able to access essential health services only by incurring high out-of-pocket expenses. In 2015, proportion of out of pocket expenditure in India was 65% and forecasted to be 58.9% in 2022.
- Major sources of hospitalisation expenditure are household income/ savings, borrowings, sale of physical assets, contribution from friends and relatives etc

FDI Inflows in Indian Healthcare Sector



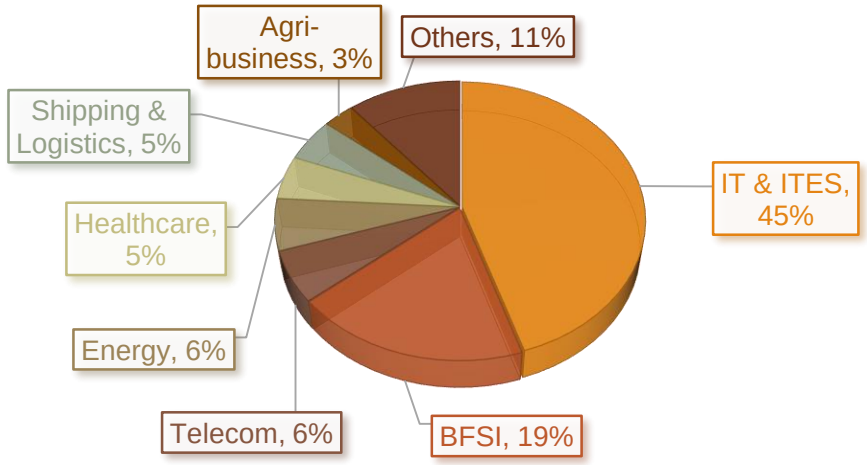


Source: Department of Industrial Policy and Promotion; LSI Research

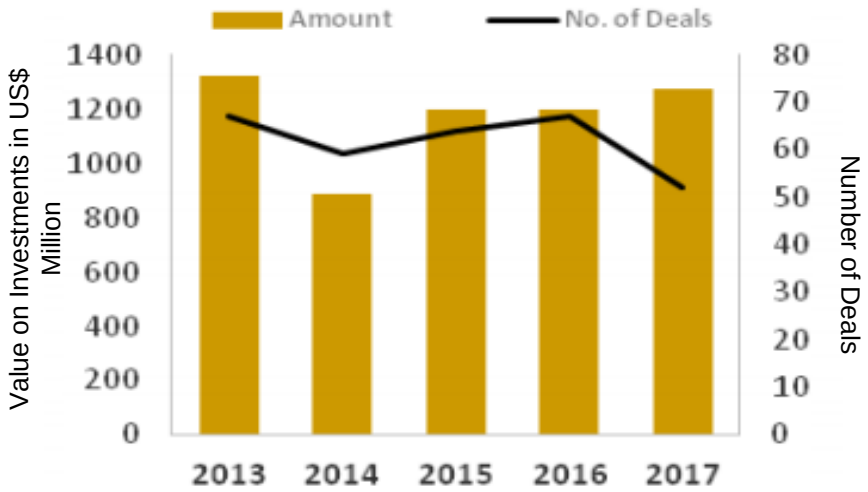
- Between 2000 to 2017, the amount of FDI in Indian healthcare sector has increased at a CAGR of 29.9%.
- Between 2000 and 2017, the FDI has risen in the healthcare sub sectors like Medical and Surgical Appliances, Drugs & Pharmaceuticals, Hospitals & Diagnostic Centres at a CAGR of 21.3%, 20.5% and 28.5% respectively.
- United Kingdom, United States, Singapore, Malaysia, Australia, etc. countries are the chief sources of FDI in India.
- After the inflow of total FDI from different nations, specific amount gets transferred to separate industries according to the decision of government. Moreover, foreign investors/NRIs invest directly to different Indian hospitals. Medical tourism is also a good source of bringing in foreign investments.
- Since 2012, Government of India has allowed 100 % FDI under the automatic route for Greenfield projects. Besides, for Brownfield project investments, up to 100 % FDI is permitted under the government route.

Private Equity (PE) Investments in Healthcare

SECTORAL SHARES OF PE INVESTMENTS, INDIA, 2017



PE INVESTMENTS IN HEALTHCARE, INDIA, 2013 - 2017



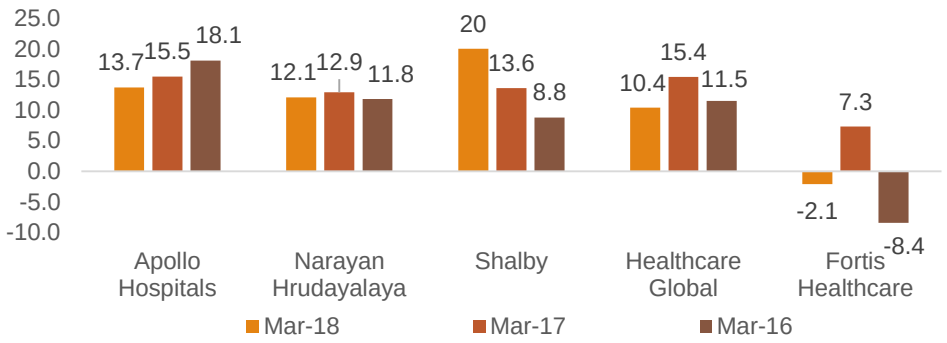
SECTOR WISE PE DEALS IN INDIA, 2016 AND 2017

Industry	Volume / No. of Deals		Value / Amount (US$ M)	
	2016	2017	2016	2017
IT & ITES	325	422	10,668	4,719
Healthcare & Life Sciences	52	67	1,273	1,198
BFSI	61	63	4,406	2,809
Energy	18	21	1,456	1,594
Shipping & Logictics	16	12	1,231	403
Agri-business	9	11	711	112
Telecom	7	3	1,486	1,683

Source: Venture Intelligence; LSI Research

Revenue Growth and Investments in Hospital Sector

Revenue Growth in Leading Hospital Chains, FY16 – FY18



PE Deals in Hospital Sector, 2017

Company	Amount (million USD)	Investors	Date
Radiant Life Care	200	KKR	July '17
Condis Healthcar	200	India Value Fund	Mar '17
Manipal Health Enterprises	171	Temasek	Mar '17
Max Healthcare Institute	75	IFC	May '17
Paras Healthcare	43	Creador Capital	July '17
Asian Institute of Medical Sciences	21	CDC Group	Dec '17
Regency Hospital	14	IFC, Healthquad, Kois Invest	Feb '17

IPO Listing, Hospitals, 2016 - 2018

Year	Company	Amount raised (crore INR)	At an approx. valuation (crore INR)
FY18	Shalby Hospitals	504.8	2,678
	Aster DM Healthcare	725	9,600
FY17	Thyrocare	482	2,412
FY16	Narayana Health	613	5,109
	HCG	650	1,854
	Dr. Lal Pathlabs	670	4,500

- Since January 2010, more than 110 private equity and venture capital investors have invested in healthcare delivery space.
- The interest of the private equity fraternity continued in the year 2017 with multiple companies in the healthcare sector raising funds.
- Like FY 16 and FY 17, FY 18 also witnessed continued investor interest in healthcare IPOs, with Shalby and Aster DM getting listed

Source: Money Control, Venture Intelligence, LSI Analysis

Health Budget 2018-19

Budget Announcement	Impact
❑ **National Health Protection Scheme worth ₹ 5 Lakh to 10 crore poor and vulnerable families.**	• It will help to reduce Out of Pocket Expenditure of the masses. • Accessibility of secondary and tertiary healthcare services will be easier to them.
❑ **₹ 1,200 Crore for Ayushman Bharat Programme**	• 1.5 lakh health and wellness centres will be there to provide free essential drugs and diagnostics, and preventive health services. • It will increase the government spending on primary health care infrastructure.
❑ **Allocation of additional Rs.600 crore.**	• It will provide nutritional support to all TB patients at the rate of Rs.500 per month for the duration of their treatment.
❑ **Upgradation of existing district hospitals to establish 24 new government medical colleges and teaching hospitals**	• Establishment of new medical institutions will increase the availability of doctors in the rural parts of India. • There is also initiative to establish at least 1 hospital in the 3 parliamentary constituencies • Opportunity for private players to engage with the government for opening up of new medical colleges and hospitals.

Source: LSI Research

Stakeholders of Indian Healthcare Sector

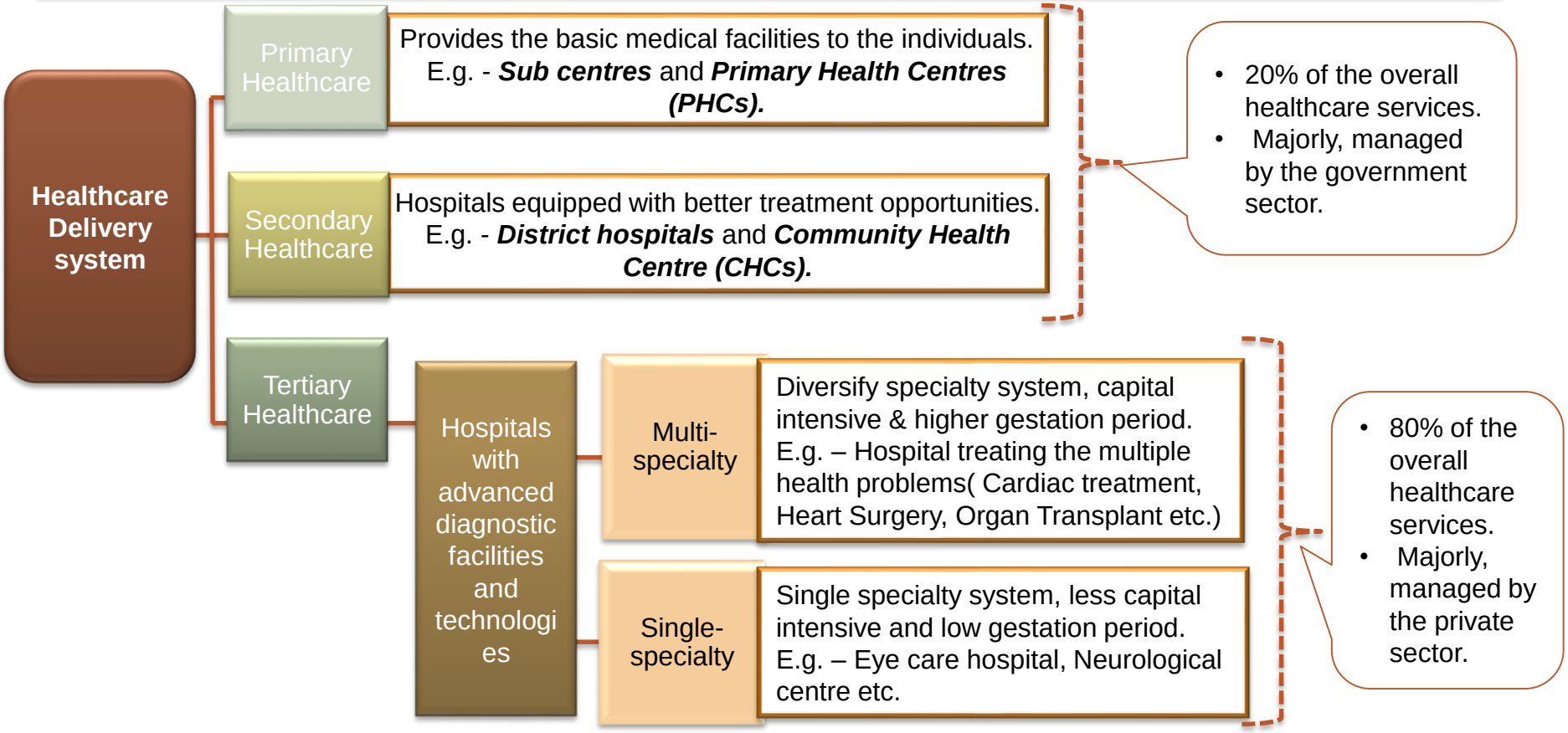
Various Segments of Healthcare Sector

Hospitals	Public: It includes healthcare centres, district hospitals and general hospitals
	Private: It includes nursing homes and mid-tier and top-tier private hospitals
Pharmaceuticals	It includes manufacturing, extraction, processing, purification and packaging of chemical materials for use as medications for humans or animals
Medical Devices	It includes establishments primarily manufacturing medical equipment and supplies, e.g. surgical, dental, orthopaedic, ophthalmologic, laboratory instruments, etc
Diagnostics	It comprises businesses and laboratories that offer analytical or diagnostic services, including body fluid analysis
Medical Insurance	It includes health insurance and medical reimbursement facility, covering an individual's hospitalisation expenses incurred due to sickness
Telemedicines	Telemedicine has enormous potential in meeting the challenges of healthcare delivery to rural and remote areas besides several other applications in education, training and management in health sector

Source: IBEF

Healthcare Delivery System

Levels of Healthcare Delivery in India

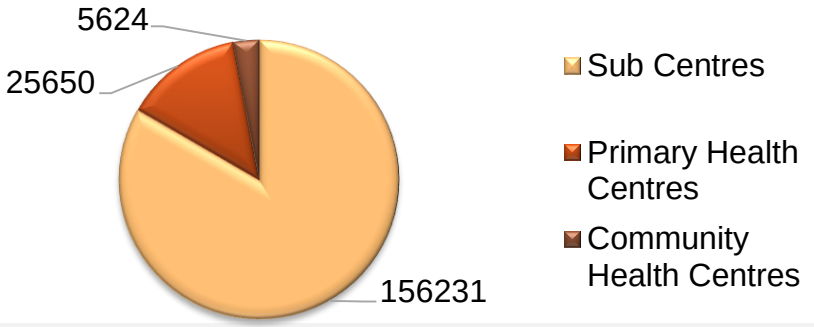


- ✓ Rate of hospitalisation in public sector is 42% in Rural India and 32% in Urban parts.
- ✓ Whereas, Hospitalised cases in the private sectors in Rural and Urban areas are 58% and 68% respectively.

Source: NSSO, LSI Research

Infrastructure – Public Sector

Numbers of Sub Centres, Primary & Community Health Centres, India, 2017



- The public healthcare system in India is quite subsidised.
- People can avail different types of treatment, medicines and regular health check-ups at cheaper rate or at free of cost sometimes.
- Participation of the public sector in the healthcare industry is inadequate.
- The availability of Hospital beds per 1000 population was 0.6 in 1960 which increased to 0.9 in 2015.
- The healthcare system in the rural areas hugely depend on Primary Health Centres (PHC), Community Health Centres (CHC), Sub Centres (SC) etc.

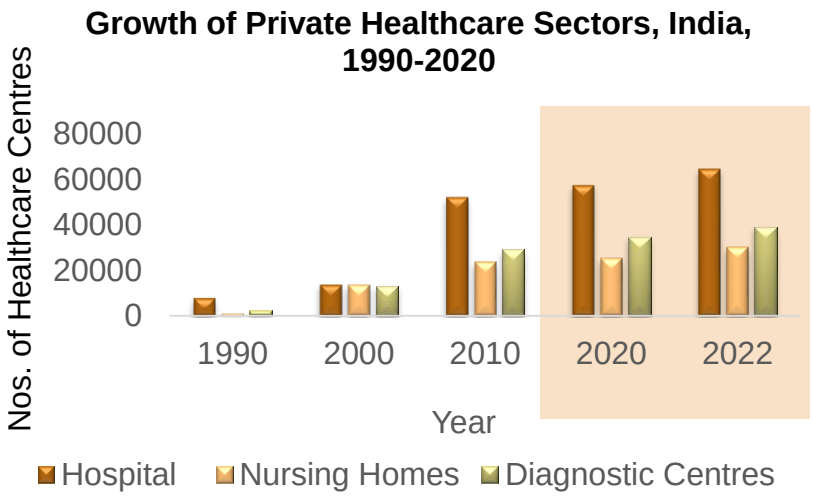
Numbers of Public Hospitals, India, 2017

Area	Hospitals	Beds
Rural	19,810	2,79,588
Urban	3,772	4,31,173
Total	23,582	7,10,761

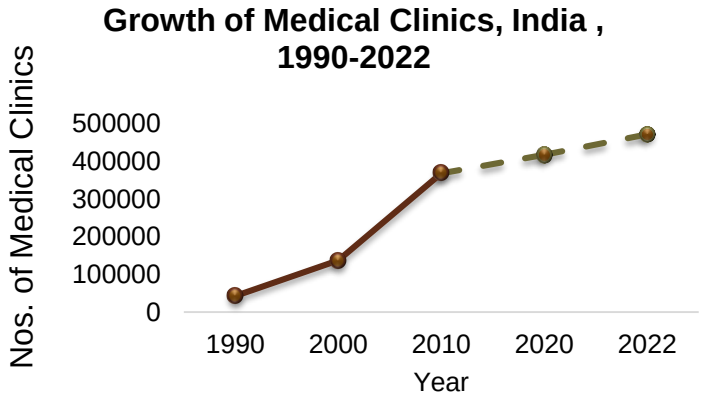
- Between 1990 and 2015, the population has increased at a CAGR of 1.54%. Overall, PHCs, CHCs and SCs have increased at a CAGR of 1.22%, 4.24% and 0.67% respectively and these numbers are not sufficient to meet the healthcare service demands.
- High medical expenses of the private sectors divert the people to the public healthcare system.
- However the poor administration, lesser maintenance of hygiene & sanitation, lack of initiatives towards health policies have still kept this sector incompetent to serve the healthcare delivery system completely.

Source: National Health Policy 2018, LSI Research

Infrastructure – Private Sector



Note: Shaded portion denotes forecasts



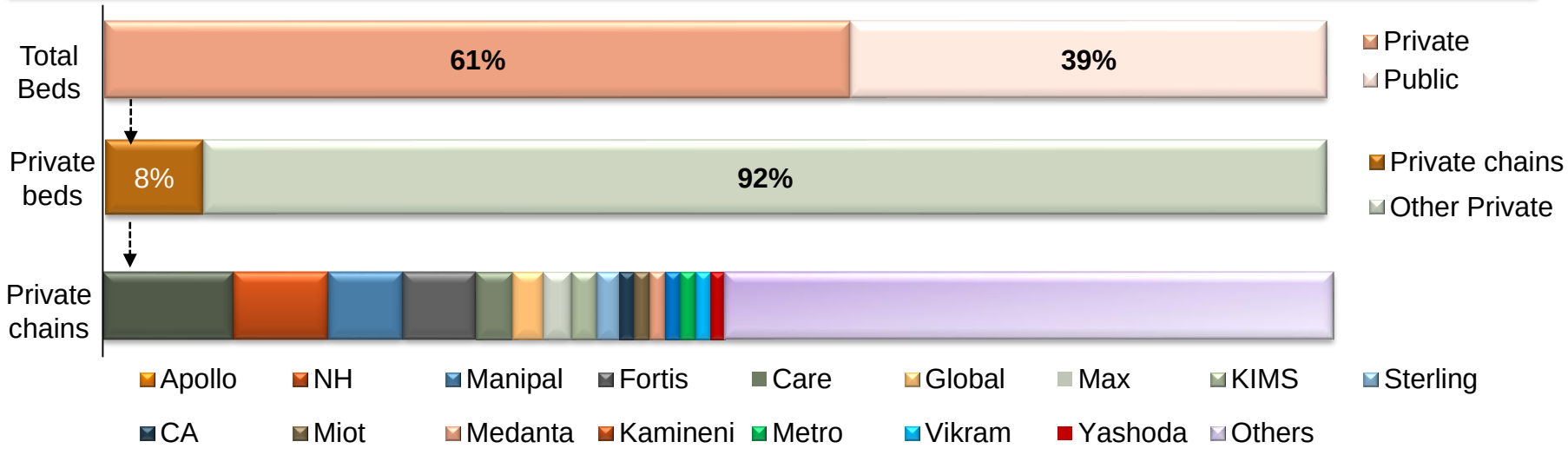
Note: Dotted line denotes forecasts

- Over the years the private health sector in India has expanded significantly. It provides world class quality of health care service.
- During the time of independence, the presence of this sector in the healthcare industry was only 8%. The inability of the public sector to provide proper healthcare services to the common people triggered the emergence of private sector in Indian healthcare system.
- Between 1990 to 2022, all the private healthcare institutions are expected to grow at CAGR of 5.1%. The numbers of hospitals, nursing homes, diagnostic centres are expected to increase at the CAGR of 6.7% ,10.8% and 9.2% respectively.
- The CAGR of the expansion of the private medical clinics are 7.8%. Private sector growth has always been consistent. The share of these clinics have always been maximum in the overall private healthcare system. Number of these clinics which were 42,847 in 1990 are expected to become 4.72 lakhs in 2022.

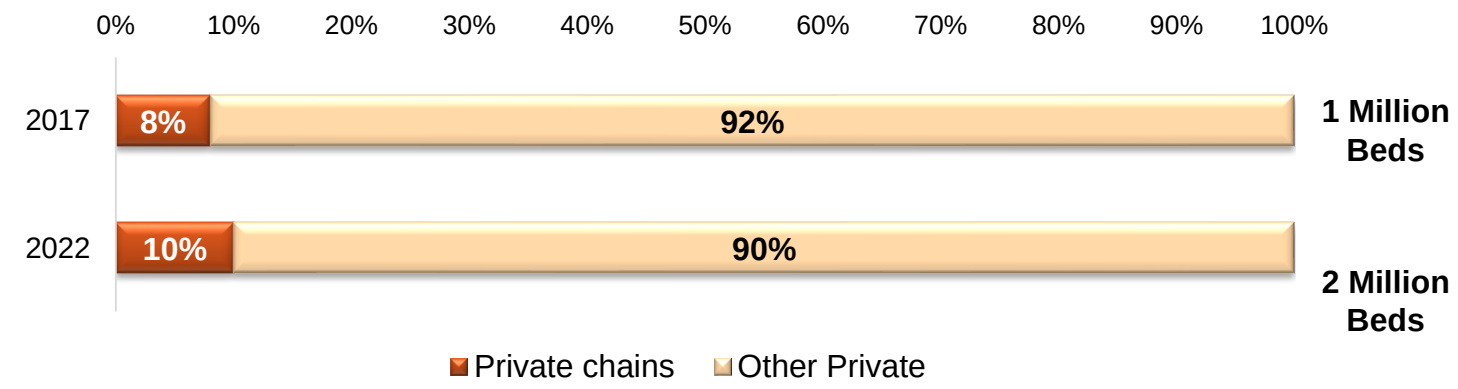
Source: NSSO, Institute for Studies in Industrial Development, LSI Research

Infrastructure – Private Sector (continued)

Private Hospital Bed Landscape, 2017



Projected Private Bed Landscape, 2022



Source: ASSOCHAM, LSI Research

- *Private chain growth : **20%***
- *Growth of other private Hospitals/ Nursing Homes: **8-10%***

Structure of Pharmaceutical Industry in India

Pharmaceutical Industry

Active Pharmaceutical Ingredients

The ingredients in the pharmaceutical drugs which add benefits to health effects.

Drug intermediates

Drugs which are used as the raw materials for the production of bulk drugs.

Formulations

In this part of the pharma industry, production of the final medical drug takes place by combining several medical compound.

Branded

Medicines patented by multinational pharmaceutical companies to prevent them from being copied by other companies.

Generic

Copy of the original branded medicines having the same effect for curing diseases. The chemical compositions of these medicines are same as the branded ones.

Pseudo – Generic

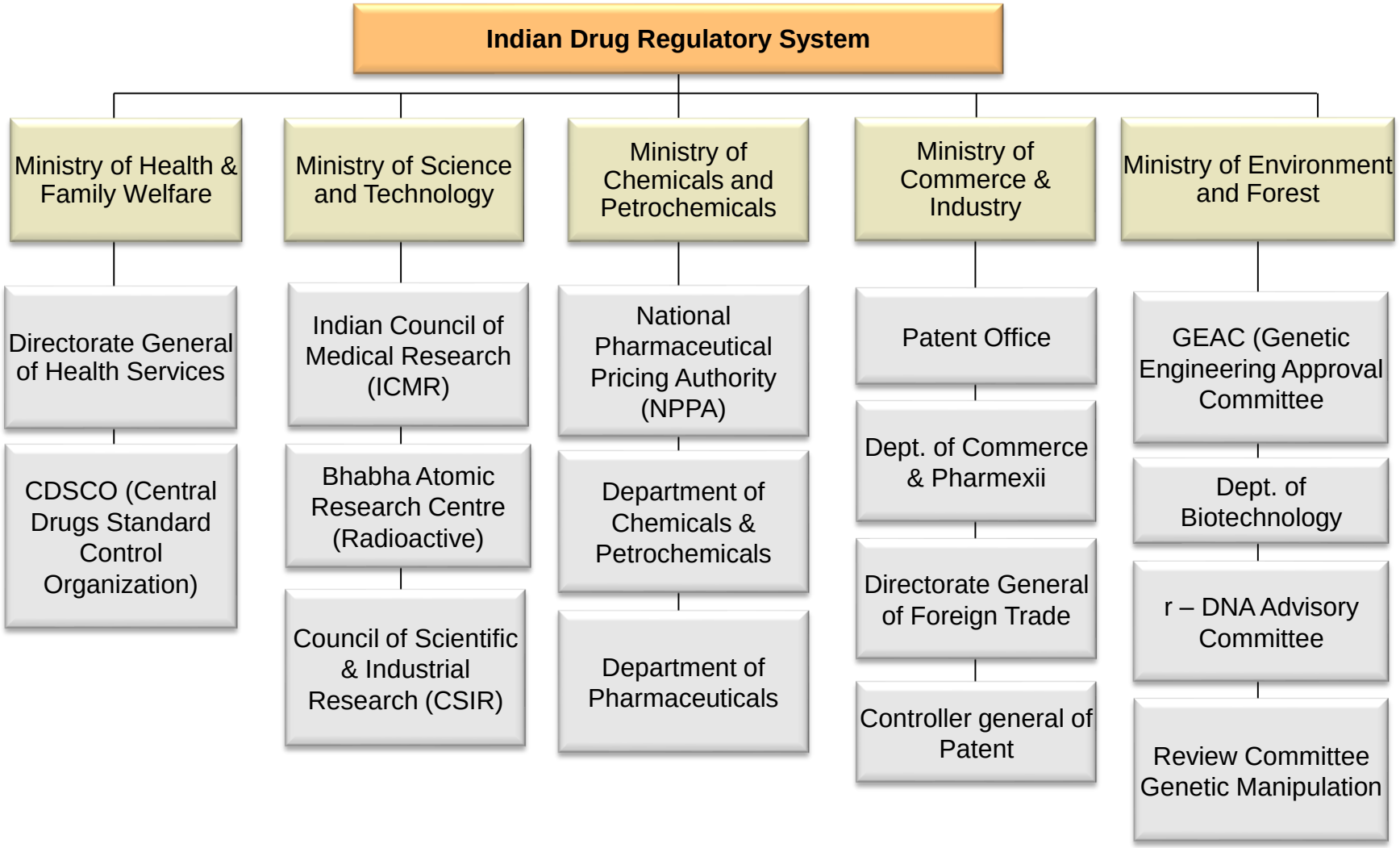
Exact replica of the original product except the name and packaging.

Fillers, binders and lubricants

The inactive ingredients of these medicines could be different than the original ones. But, it does not change the effectiveness of medicines

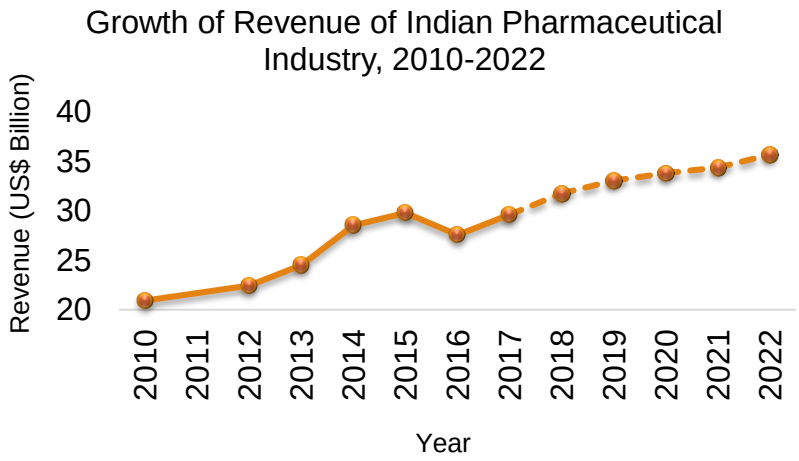
Source: LSI Research

Drug Regulatory Bodies of India



Source: LSI Research

Pharmaceuticals — Market Overview

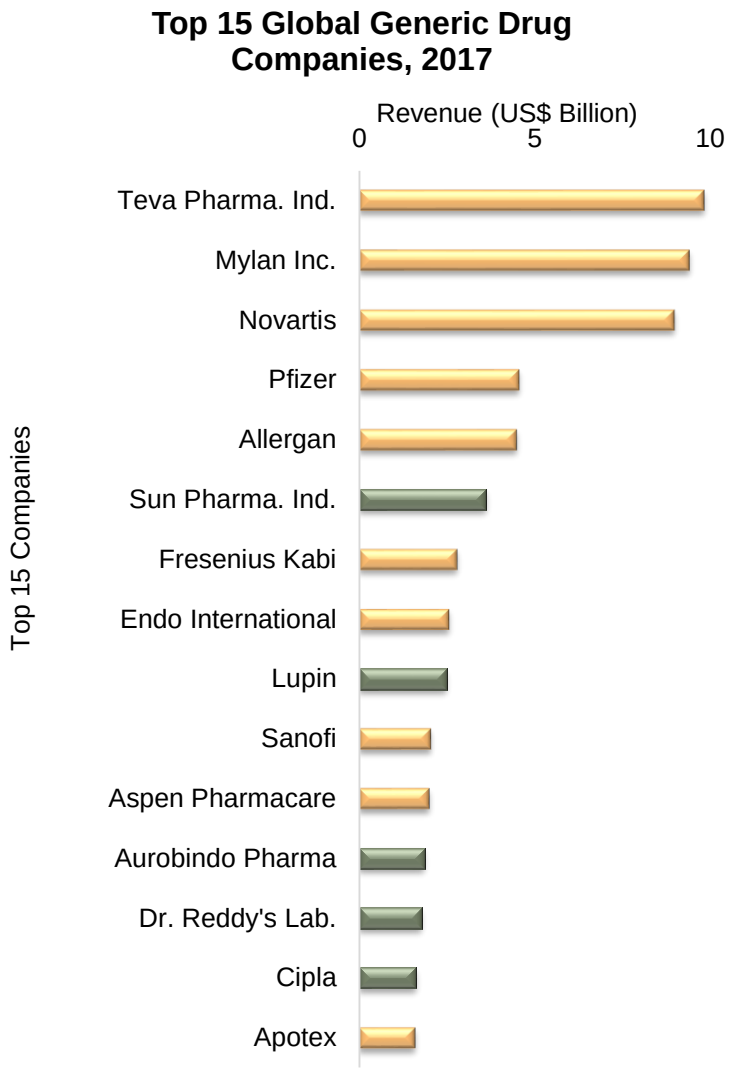


Note: Dotted line denotes forecasts

Source: IBEF, Intracen, LSI Research

- Between 2010-22, the Indian pharma industry is expected to grow at a CAGR of 4.53%. It accounts for approx.1.5% of the global pharmaceutical industry in value terms.
- It is likely to be in the top 10 global markets in value term by 2022.
- The market is dominated majorly by generics, which constitutes nearly 70% of the overall market. Over the counter (OTC) medicines and patented drugs constitute 21% and 9% respectively.
- The process of patenting any medicine in India is critical. The system is applicable on drug compounds, formulation, synergic and polymorphic combination, used technology, bio-technological involvement; i.e. on every particle and procedure related to drugs.
- After being a signatory of the international legal agreement like GATT (General Agreement on Tariffs and Trade) and TRIPs (Trade-Related Aspects of Intellectual Property Rights), India started to patent drugs since 1995.
- The cheaper cost for manufacturing the drug actually has made India a medicine production hub.
- Between 2000-15, the import value of drugs had fallen at a CAGR of 18.7% but the export value of it grew at a CAGR of 19.6%.
- A large amount of the revenues in Pharma industry comes from the export of generic drugs.
- Indian drugs are exported to more than 200 countries in the world like United States Australia, Germany, France, Netherlands, Canada Belgium etc.

Generic Drug – Market Overview

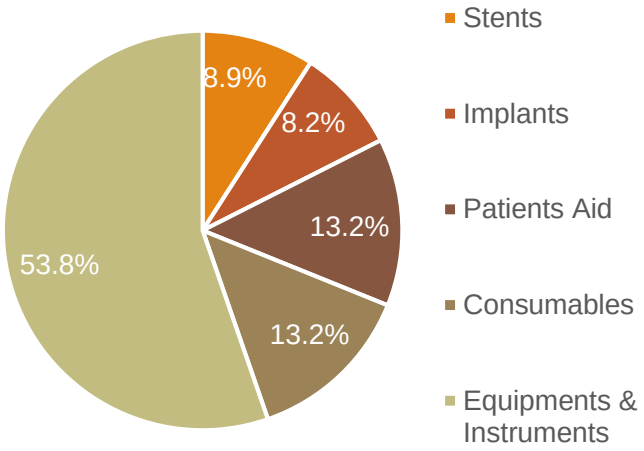


Source: Questweb, Lupin, LSI Research

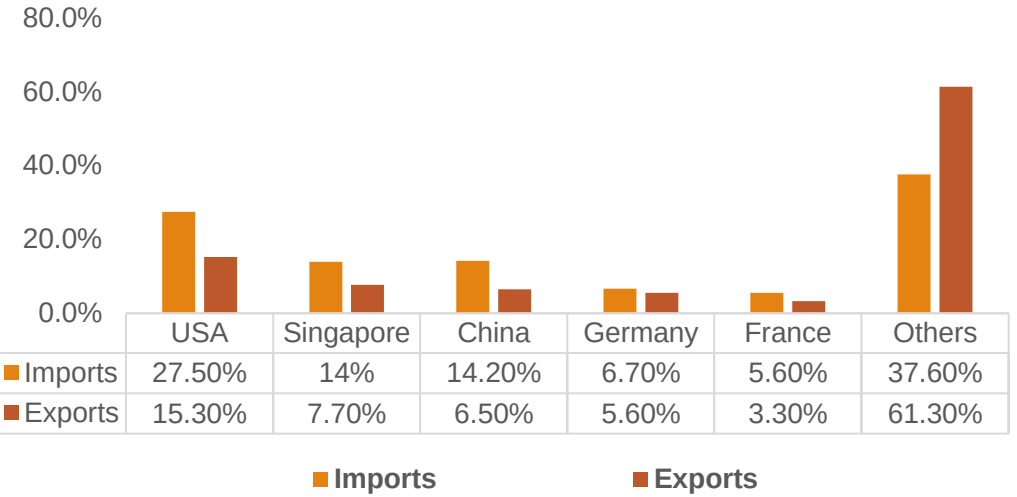
- India is one of the largest sources of low cost medicines globally. Its share in the international export market of the generic medicine is 20%. In 2017, India was the world's largest exporter of generic drugs, with $16.4 billion sold abroad in 2016.
- Latin America, United States, several places of Africa are key markets of Indian generic drugs.
- Low cost of production, strong base of technology and abundant supply of human resources have helped the country to get that competitive advantage in the global generic drugs market.
- Till 2022, the ranking of India in the world generic drug market is expected to be 2nd with a market share of 23%.
- Expenses on medicine is a major component of the overall health expenditure in India. Out of the total spending, the cost on medicine is 72% in rural areas and 68% in urban areas. So, the adoption of generic drugs could be helpful to control costs.
- Various Indian generic drug companies are globally recognized. Five of the top 15 global generic drug companies are Indian.
- More than 300 Indian pharma companies are approved by US FDA. USFDA (United States Food and Drug Administration) is a federal agency responsible for protecting the public by overseeing the manufacturing and distribution of food, pharmaceuticals, medical devices, tobacco and other consumer products and veterinary medicine.

Medical Devices — Market Overview

Indian Medical Device Market Segments, 2017



Percentages of Imports and Exports of Medical Devices to and from Various Countries, 2017

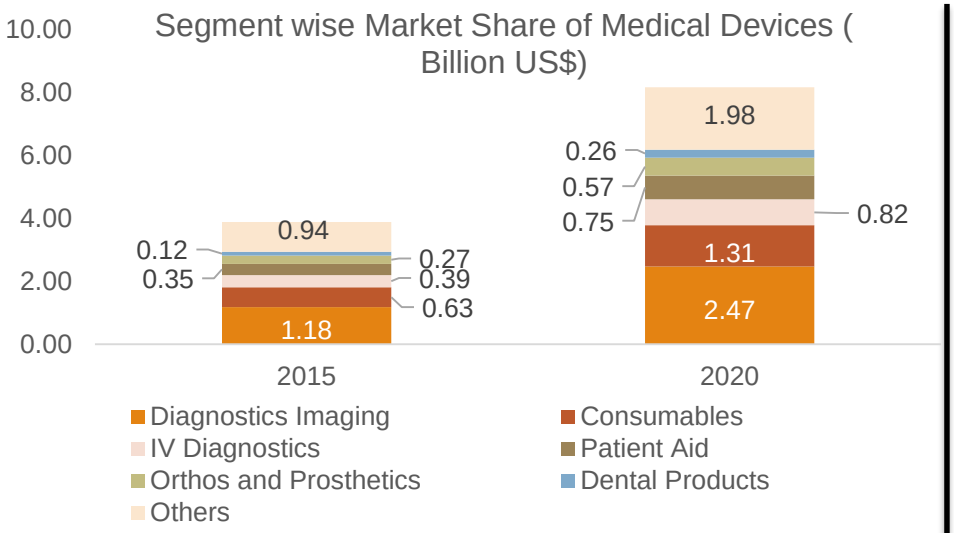


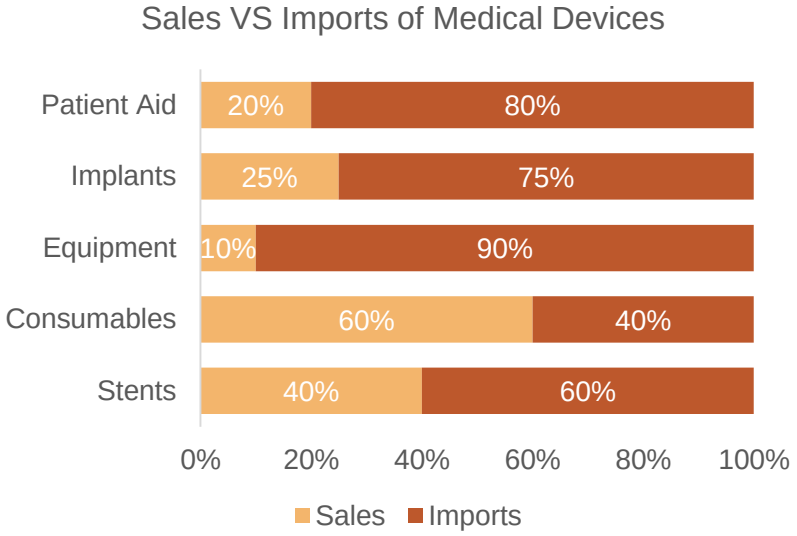
	USA	Singapore	China	Germany	France	Others
Imports	27.50%	14%	14.20%	6.70%	5.60%	37.60%
Exports	15.30%	7.70%	6.50%	5.60%	3.30%	61.30%

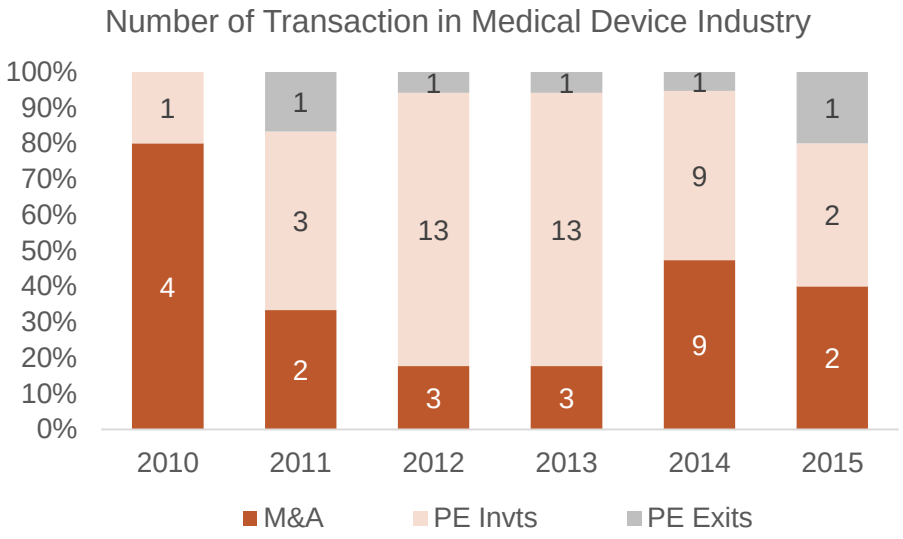
- The medical device industry is presently valued at USD 6 billion and contributes to 4%-5% to the Indian healthcare industry.
- India has about 750–800 medical device manufacturers in the country
- The industry has grown from USD 2.02 billion in 2009 to USD 3.9 billion in 2015 at a CAGR of 15.8%.6 As per industry estimates, the Indian medical devices market will grow to USD 8.16 billion by 2020.
- Currently, India is counted among the top 20 global medical devices market and is the 4th largest medical devices market in Asia after Japan, China and South Korea
- An increasing number of multinational companies are setting up their manufacturing bases in India since government permits to 100% FDI medical devices through the automatic route.
- There are a range of Medical Device Clusters that have emerged due to supportive state-level policies as well as the availability of skilled labour. There are a few Medical Device Parks planned across India, including Andhra Pradesh MedTech Zone Limited (AMTZ), a park in Sultanpur village (Telangana) and HLL Lifecare Mediparks in Tamil Nadu, Maharashtra and Gujarat.

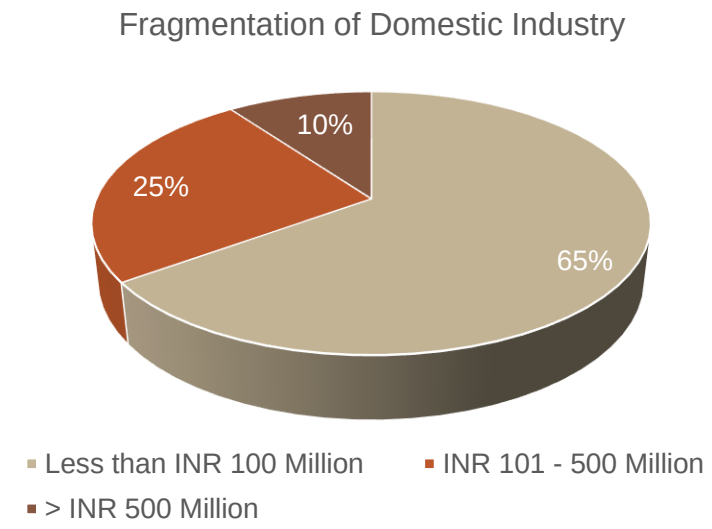
Source: Make in India Sector Survey (Medical Devices); LSI Research

Medical Device – Industry Structure









Source: Association of Indian Medical Device Industry; LSI Research

Growth Drivers & Challenges for Medical Devices Industry

Drivers

- ✓ With the increased media reach and coverage, public awareness level is increasing. There is increase in diagnosis and treatment as people are becoming more aware about advancements in medical technology.
- ✓ Increase in insurance coverage has led to better affordability and accessibility
- ✓ With increase in healthcare spending, improvements are driven in healthcare infrastructure and access
- ✓ Medical devices have been classified as one of the priority sectors in Make in India campaign
- ✓ There has been increase in medical tourism due to availability of affordable treatments
- ✓ Increased adoption of technological upgradation skilled healthcare professionals is taking place

Challenges

- ✓ The per capita spending on medical devices at US$ 3 is significantly low when compared to US$ 7 in China and US$ 42 in Russia
- ✓ Uneven distribution of population and healthcare facilities with 66% people living in rural areas with 73% qualified consulting doctors live in urban areas. 8% qualified doctors live in rural areas and 19% in semi-rural areas
- ✓ Non-alignment with global standard and the lack of quality product testing infrastructure hinder sectoral progress
- ✓ Real estate prices and high capital costs limit the growth of delivery infrastructure
- ✓ Insufficient attention of policymakers and complex tax regime

Source: LSI Research

The Shift in the Medical Device Sector After Regulatory Changes

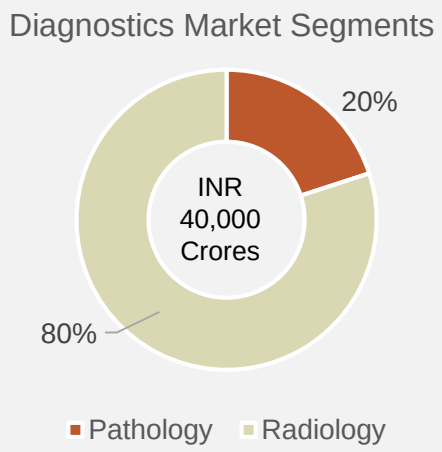
	Structure	Conduct	Performance
Before	✓ Nascent regulatory framework ✓ Lack of a conductive environment for technological innovations ✓ Inverted duty structure	✓ MNCs preferred to import and be distributors ✓ Domestic companies continued to focus on low-end products and refrained from investment in R&D ✓ No investments made in manufacturing and R&D infrastructure	✓ MNCs fetch high margins focusing on high-end products ✓ Domestic players focus on low-cost products resulting in low margins ✓ Domestic players could never build competency in R&D

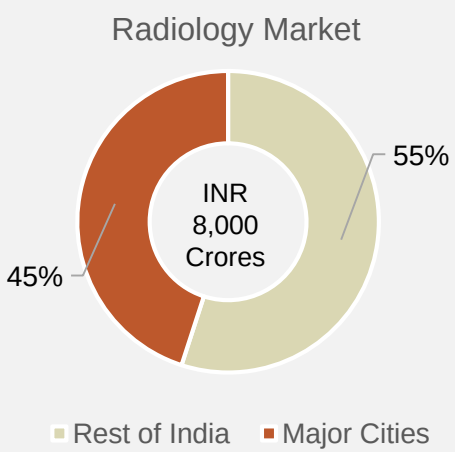
Regulatory and Policy Framework Changes

After	✓ Robust regulatory framework ✓ Conductive environment for technological innovations. ✓ Focus on manufacturing and research in India	✓ MNCs to manufacture in India and expand their presence across segments ✓ Domestic companies to focus on raising quality standards and technological upgradation ✓ MNCs and domestic companies to customise products for Indian needs ✓ MNCs and domestic companies to collaborate with each other through joint ventures or associations	✓ Companies who demonstrate quality standards simultaneously with cost efficiencies to survive ✓ Difference in margins of MNCs and domestic players to gradually narrow down due to better quality products and new product developments by the domestic players.

Source: LSI Research

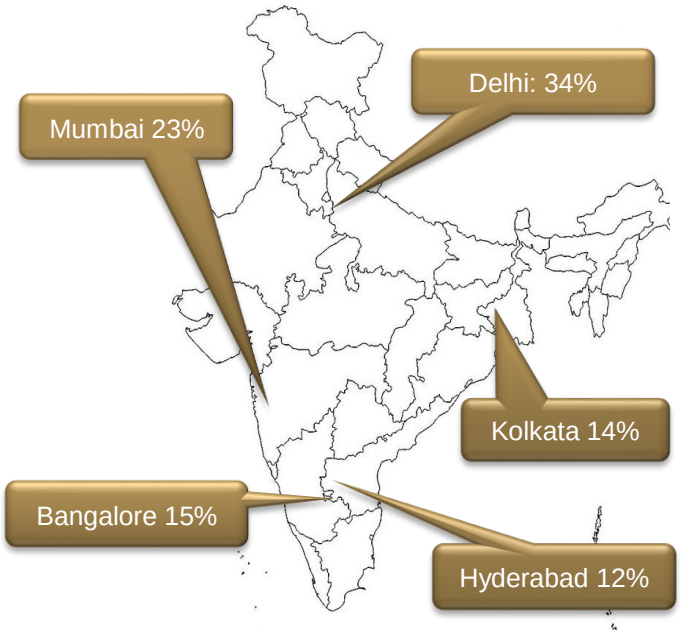
Diagnostics Market





- Market for diagnostic services has been growing in India over the past couple of years at a rate of 15% -20% and is at nearly ₹ 40,000 Cr. as of 2016. Pathology accounted for nearly 80% of the market while Radiology accounted for the remaining 20%.
- The distribution and utilization of the MRI/CT machines across 5 major cities shows that the utilization largely lies between 40-60% with differences noted in micro-markets within the cities.

Percentage presence of Radiology Centres in Major Cities of India

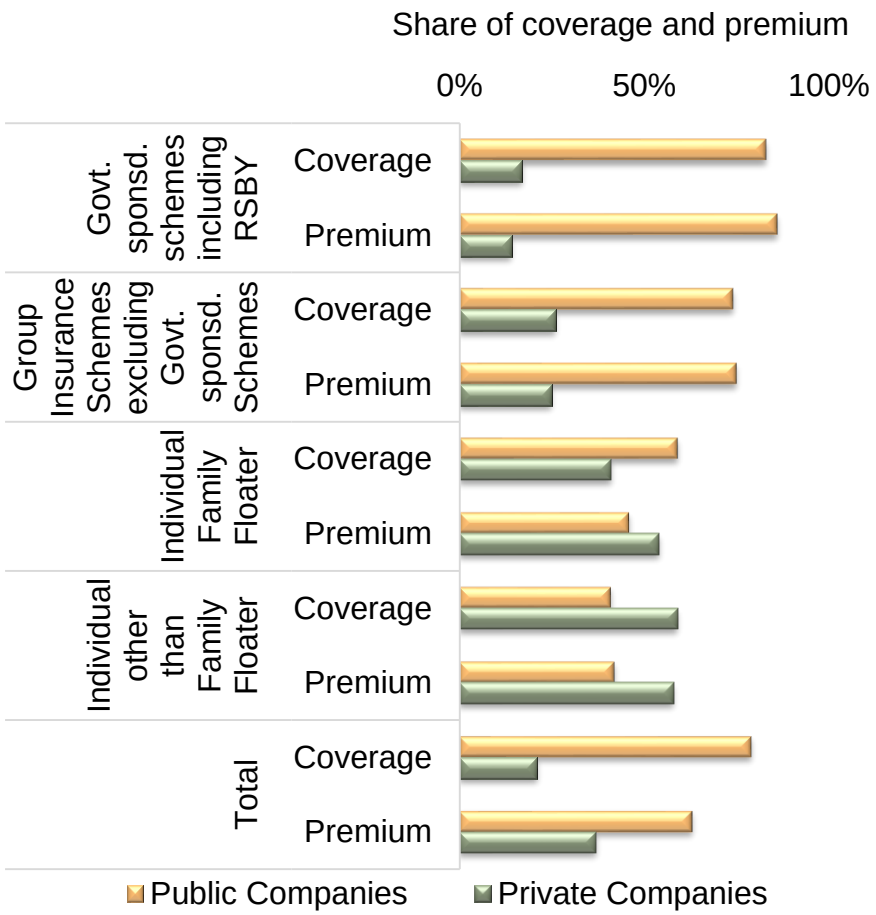


Drivers	Rising lifestyle diseases	Improving per capita Income	Increasing Awareness	Increasing Payer Coverage
Restrains	Lack of Access	Lack of Specialists	Lack of Standardization	Concern of Affordability

Source: LSI Research

Insurance in Healthcare Sector

Share of coverage* and Premium By Health Insurance Type and Provider, 2017-18



*Share of coverage shows the percentage of people covered by the health insurance

Source: National Health Policy 2018,United Nations, LSI Research

- Both the public and private sectors fund a number of health insurance schemes in India. Most of these cover only in-patient care, mainly at the tertiary level.
- Schemes like Employee State Insurance Scheme (ESIS) and Central Government Health Scheme (CGHS) provide comprehensive health care. Rashtriya Swasthya Bima Yojana (RSBY) provides only hospitalization cover with a benefit limit of INR 30,000 (US$ 500 approximately) per enrolled household per year.
- Between 2012-17, the collected premium of health insurance has increased at a CAGR of 18.4%.
- In 2017-18, the number of different existing health insurance schemes were 13 million in India which covered 437 million people and collected the premium of 303 billion.
- Between 2012 -17, the number of insurance holder has increased at a CAGR of 15.6%. Despite of several existing schemes, the penetration rate of health insurance is only 27% amongst the Indian population.
- Lack of awareness programme for helping the people to understand the features of health insurance is a crucial reason for lack of participation.

Universal Health Coverage (UHC)

- Financial constraint is the reason for which 57.4% of rural and 68.3% of urban population hesitate to take medical insurance coverage.

- The Indian Health ministry is on the way to adapt the UHC completely. By following the policies of UHC, a flagship programme of the WHO (World Health Organization), people of our country will be able to access essential quality health services without facing financial challenges.

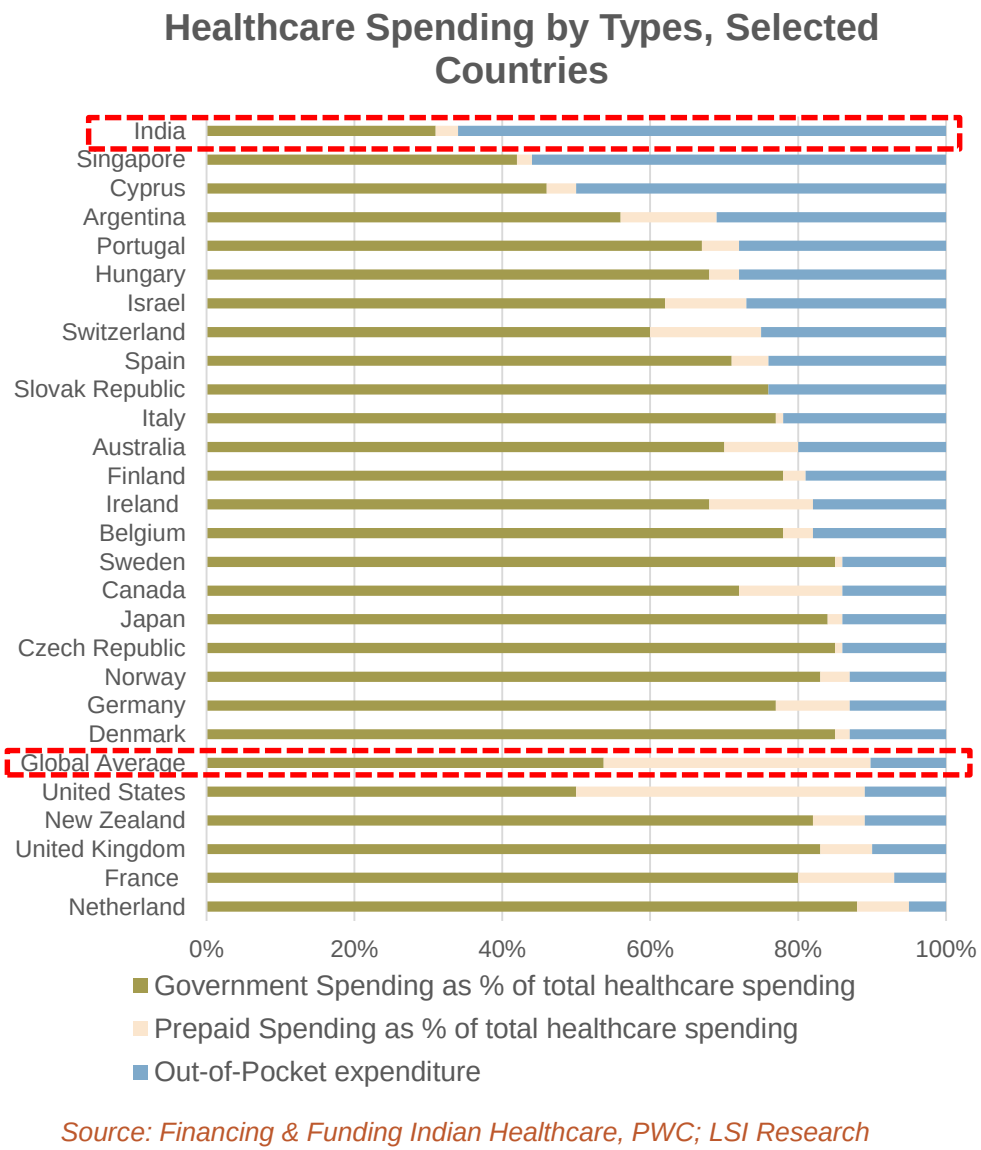
- Moving towards UHC helps the country to strengthen the overall health system. Access to essential quality health-care at affordable price not only enhances people's health and life expectancy, but also protects countries from epidemics and reduces poverty, creates jobs, drives economic growth. As a part of SDGs (Sustainable Development Goals), all the United Nations Member States have decided to achieve UHC by 2030.

- Under the health expenditure pattern of India, majority of the people pay for the cost of their health services out of their pockets. Out-of-pocket expenditure accounts for nearly 63% of the country's total health expenditure. Not only it creates problem for the poor to obtain the required healthcare services but also rich people experience the same thing in the case of severe or long-term diseases.

- The Union Budget 2018–19 has taken a serious step towards Universal Health Coverage. The Ayushman Bharat scheme, world's largest government-funded healthcare scheme under UHC, has already been launched on 23rd September,2018. It is an initiative toward wide ranging health coverage, especially for the under-privileged and vulnerable section of the society.

Source: WHO

Challenges to Attain UHC



Source: Financing & Funding Indian Healthcare, PWC; LSI Research

- India has a commitment to achieve Universal Health Coverage (UHC) as part of Sustainable Development Goals.
- High performing countries have used different methods for healthcare financing to achieve UHC
- A significant challenges remain in India, especially related to healthcare expenditure, which is less than 5% of the GDP as compared to the world average of ~10%.
- This has impacted India's stride towards UHC, with Out-of-pocket expenditure (OOPE) being above 60%. The global average of OOPE is 11%.
- Countries which have performed relatively well on UHC generally have high government spending on healthcare.

National Health Protection Scheme (NHPS)

Features of the National Health Protection Scheme 2018

- 0.5 billion beneficiaries
- Beneficiaries will be identified based on 2011 Socio Economic Census
- Proposed Aadhaar linkage
- 5,00,000 INR family floater cap
- Premium to be borne 60:40 by Centre and state
- Additional source of funding for government: 1% cess
- New institutional structures proposed –National Health Agency and State Health Agency
- Both public and private hospitals to be empanelled
- Focused on the most vulnerable population

How will NHPS Evolve?

Short term steps

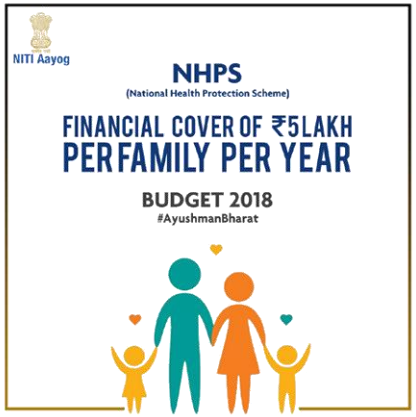
- ✓ Set up governance mechanism
- ✓ Increase hospital empanelment
- ✓ Define the benefits under the scheme

Medium term steps

- ✓ Price discovery and financing
- ✓ Right targeting of beneficiaries
- ✓ Expand scheme coverage
- ✓ Merge different schemes

Long term steps

- ✓ Benefits to include Outdoor patient department and Primary care
- ✓ Build in system efficiencies



Source: Financing & Funding Indian Healthcare, PWC; LSI Research

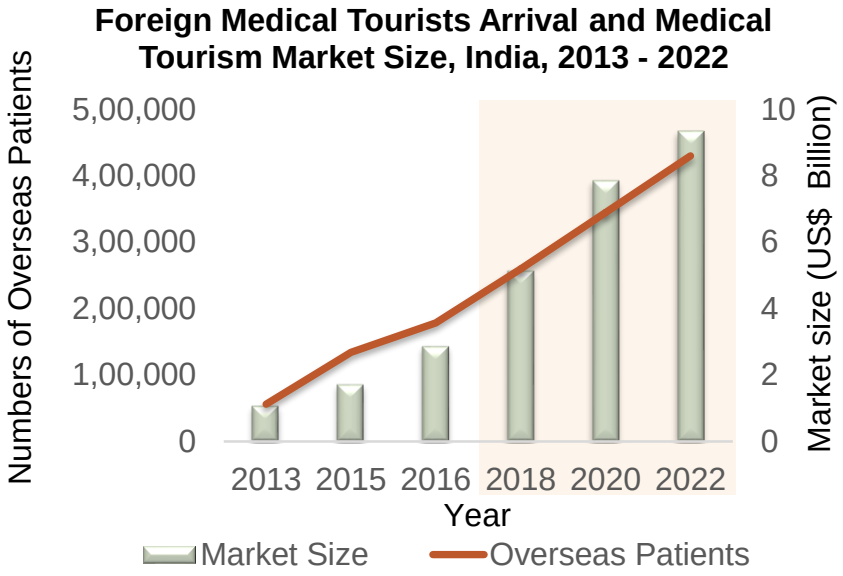
Stakeholder Implication of NHPS

Stakeholder	Implication of National Health Protection Scheme
Hospitals	• Push for package rates • Focus on quality • Focus on accreditation
Pharmaceuticals and diagnostic companies	• Focus on low-cost drugs and quality • Focus on centralised procurement • Focus on supply-side shortages
Insurance companies	• Build capacities to handle large claims and identify frauds, abuse and misuse • Empanel hospitals in tier 2 and 3 areas • Negotiate package rates • Improve system automation • Build actuarial capacities, clinical audit capacity and hospital scrutiny
Digital and IT service providers	• Develop IT architecture to link patient data, hospital data and insurance company data with Socio Economic Classification (SEC) and Aadhaar data
Central and state government and sector regulators	• Identify sources of financing • Build in system automation for monitoring and grievance redressal • Ensure fair competition

Source: Financing & Funding Indian Healthcare, PWC; LSI Research

Emergence of Medical Tourism in India

Medical Tourism in India – Market Size



Note: The shaded portion denotes forecasts

- India's medical tourism industry stood at $2.86 billion in 2016 and is expected to grow up to $9.35 billion.
- India issued more than 1.78 lakh medical visas in 2016, including for follow up treatment, as against 1.34 lakh in 2015. India now has a simplified e-medical visa facility which allows three visits to the country. By 2022 around 4.30 lakh medical tourists are expected to arrive in India.
- India receives medical tourists from across the globe, however developing and underdeveloped countries form a major portion of the pie.
- Bangladesh accounts for the highest number of medical tourists owing to the lack of quality healthcare infrastructure and unavailability of skilled manpower in their country. Moreover, India is a convenient option because of its physical proximity and similarity in culture, food and language.

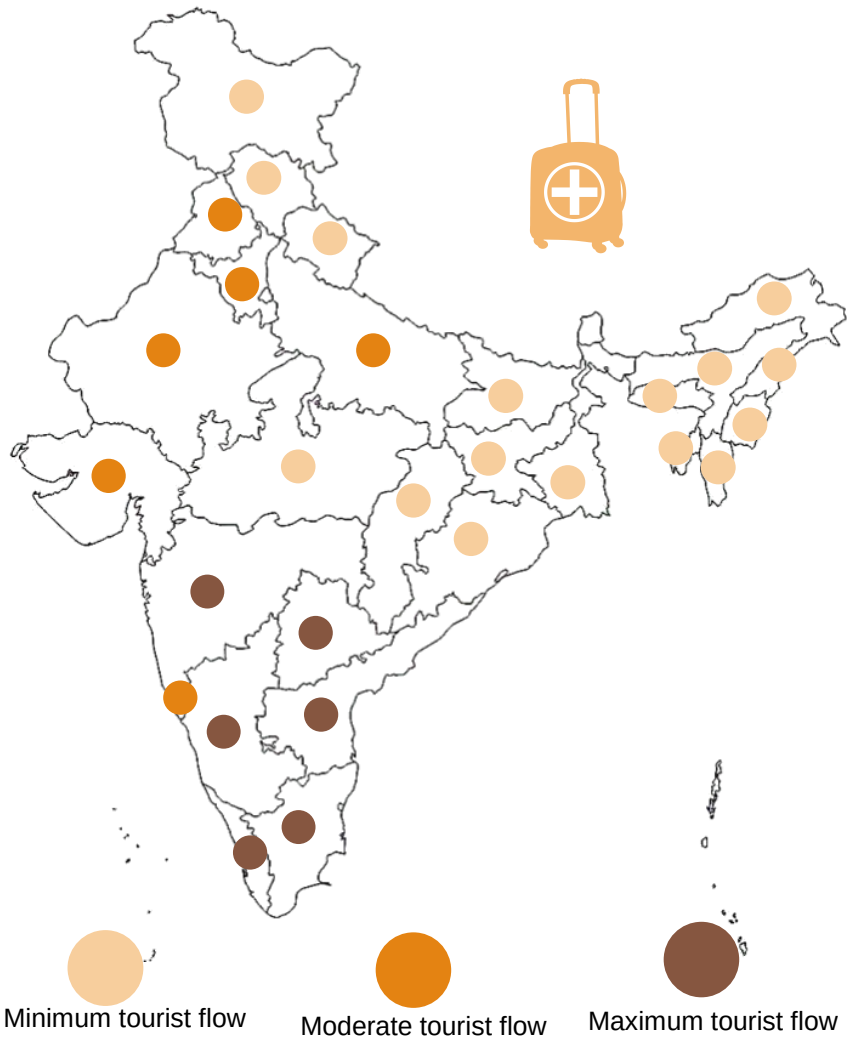
Cost Comparison of Medical Procedures among Various Countries, US$

Type	USA	S.Korea	Singapore	Costa Rica	Malaysia	Mexico	Thailand	India
Heart Bypass	1,23,000	26,000	17,200	27,000	12,100	27,000	15,000	7,900
Hip Replacement	40,364	21,000	13,900	13,600	8,000	13,500	17,000	7,200
Knee Replacement	35,000	17,500	16,000	12,500	7,700	12,900	14,000	6,600
Spinal Fusion	1,10,000	16,900	12,800	15,700	6,000	15,400	9,500	10,300
Dental Implant	2,500	1,350	2,700	800	1,500	900	1,720	900
Face Lift	11,000	6,000	440	4,500	3,550	4,900	3,950	3,500
Liposuction	5,500	2,900	2,900	2,800	2,500	3,000	2,500	2,800
IVF Treatment	12,400	7,900	14,900	N/A	6,900	5,000	4,100	2,500

Source: Research Gate; LSI Research

Medical Hubs in India

Medical Tourism Pockets in India by Patient Flow



Source: KPMG; LSI Research

- Some of the prominent medical hubs in the country are Chennai, Bengaluru and New Delhi. Concentration of better facilities in the south is an observable trend.
- In many cases, the medical tourists are the NRIs who once migrated to other countries and came to India seeking proper medical treatment
- Chennai alone accounts for 40% of India's medical tourist inflow and more than six lakh tourist visits per annum. Better connectivity, MoUs between hospitals and important government initiatives are a few reasons for high medical tourist inflow.
- Bengaluru sees only around 10%-15% international patients a day due to the less favourable flight connectivity and lesser industry initiatives.
- In an effort to promote medical tourism in the state, the government has planned a 300 acres medicity at New Chandigarh.
- Gujarat announced its medical tourism policy in 2006, with developing a medicity as one of the objectives.
- Goa, India's most popular tourist destination is yet to make a mark as the most popular medical tourist destination. Lack of direct flights from most parts of the world along with less experienced private hospitals add to the woes.

Government Policies to Promote Medical Tourism

Incredible India	An app titled 'Incredible India' for International and domestic tourists to access and discover information about Indian tourism more easily.
11th Plan Strategy on Tourism	Increase per capita spending and length of stay of international visitors and by reducing seasonality.
International Event for Medical Tourism Promotion	Different worldwide fairs and events participation like as Health & Medical Tourism Show(London), World Travel Mart 2009 (Europe) etc.
MVISA (Medical VISA) & MX VISA	Granted miscellaneous visa co-terminus with the 'M Visa' of the patient.
MDA Schemes (Marketing & Development Assistance)	Medical Tourism administered by the Ministry of Tourism, Government of India.
Production of publicity materials	Distribution of brochure, CDs, films ect in target markets.
Country Level Workshops	Workshops on promotion of wellness tourism from the Department of Ayush, Ministry of Health & Family Welfare and Accreditation Board for Hospitals & Healthcare Services (NABH).

Source: IBEF, LSI Research

Technological Adoptions in Indian Healthcare

How Technology is Revolutionizing Healthcare in India

Technology as a Game Changer

- Technology will be a game changer in the manner in which healthcare services will be delivered in India. The private sector will be the major driving force behind technology adoption in the Indian healthcare segment.
- IT solutions will become an integral part of process management, patient care and the management information system (MIS) in hospitals.
- Increasing demand from health insurance sector for more efficient systems for storage and retrieval of information will put pressure on hospitals and other healthcare providers to imbibe technology to modernize existing infrastructure.

Technological Adoption

- The coming years are expected to witness greater deployment of cloud based tools such as telemedicine, teleradiology, hospital information systems (HIS)/hospital management information systems (HMIS), online or electronic medical records (EMR), etc.
- The various benefits that can be derived, such as easy accessibility irrespective of geographical location, fewer errors, fast response in times of emergencies, patient convenience, among others, will drive increased adoption.
- More hospitals are likely to seek automation for their workforce management, administration, finance, billing, patient records and pharmacies.

Source: LSI Research

Key Group of Technologies Defining Healthcare of Future

Mobility

- Smartphone owners are being encouraged to exercise, lose weight, and improve the monitoring and management of their health via an astounding range of mobile health and fitness applications. From chronic care management to complex population analysis, mHealth is enabling a shift in healthcare towards a patient-centric, outcome-based delivery model.

Wearables

- Driven by a demand for personalised care and precision medicine, we are seeing a steady growth in wearable technology. This not only includes fitness bands, but also digital hearing aids, blood pressure monitors and devices for diabetics. Demand is rising for devices that are unobtrusive, easy-to-use and non-interfering.

Cloud

- Almost 90% doctors are now storing all their patient records in digital format and then moving them to the cloud. With this patients and doctors can access their information anytime, anywhere. This ensures complete picture of a patient's medical history to doctors.

Analytics

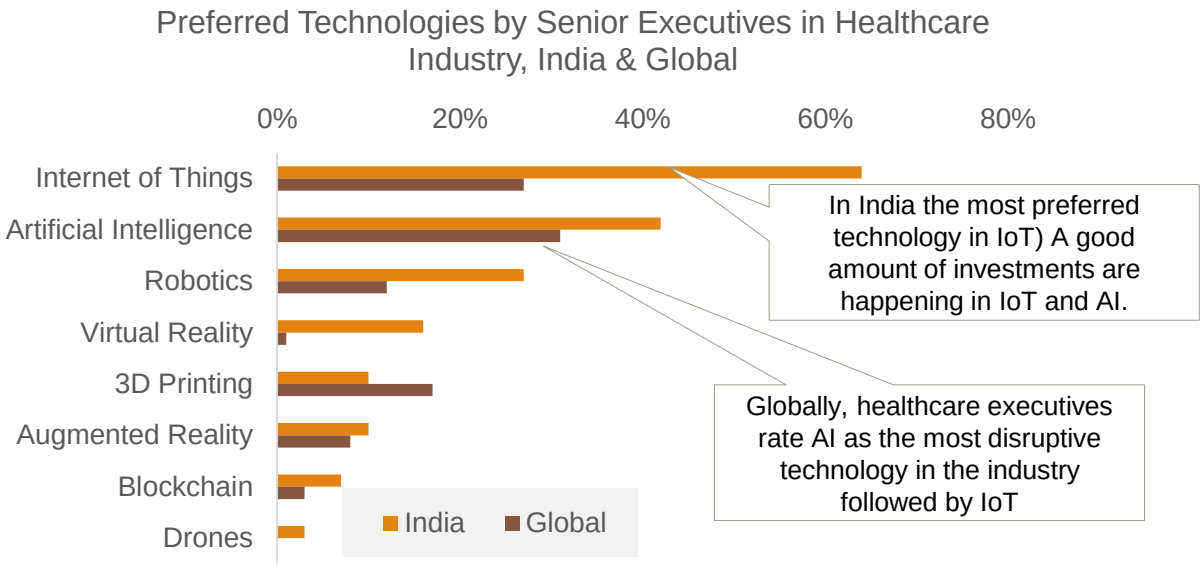
- Using predictive algorithms, doctors can diagnose their patients more accurately. Some companies are looking at big data analytics based solutions for more rapid and accurate detection, diagnosis, and treatment of cancer. With this tele-medicine will become possible, enabling patients to get the most rapid and accurate diagnosis from anywhere in the world.

Source: LSI Research

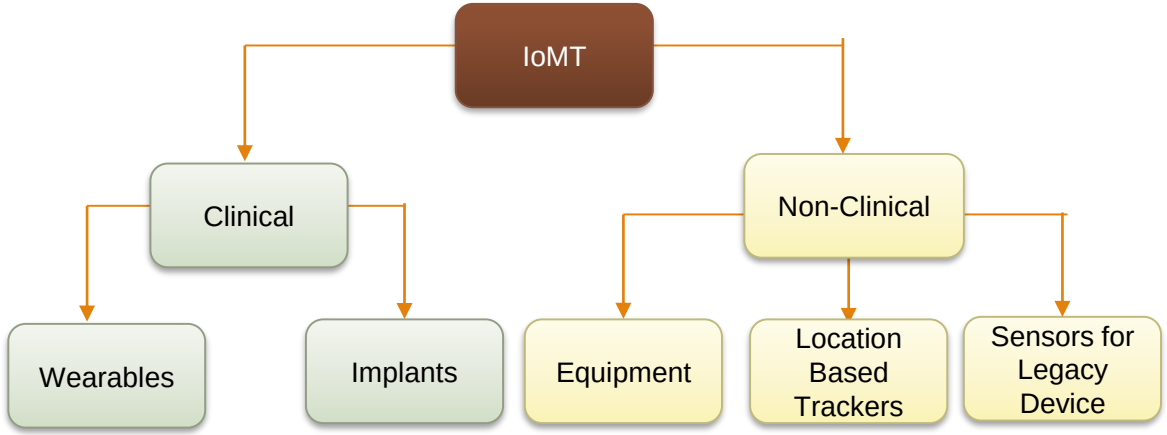
Disruptive Technologies in Healthcare

Top Trending Healthcare Technologies

- Less Invasive diagnostics
- Digital platform integration
- Ancillary services
- Connected devices for home
- Patient-facing mobile app
- Surgical robotics tools
- 3D Printing
- Artificial intelligence
- Remote monitoring solutions
- Smaller Implants



Uses of Internet of Medical Technologies (IoMT)



Source: PWC; LSI Research

Drivers & Challenges and The Way Forward

Key Growth Drivers of Indian Healthcare Sector

Demographic Factors	• Growing population and increasing need for better wellness and diagnosis accordingly.
Financial Factors	• Increase in the income and affordability lead to higher requirement of better medical treatment.
Disease Pattern	• Shift of disease burden from Communicable to Non – Communicable ones (example – Cardiac Diseases, Cancer etc.) increases the necessity of extended healthcare facilities.
Medical Tourism	• In recent years, the country has witnessed 22-25% growth in medical tourism. In 2018, this is expected that the market size of medical tourism will reach to $6 billion in this country.
Expansion of Private Sectors	• Expansion of private hospitals in small and less populated cities along with the establishment of single specialty & wellness centres.
Encouraging Policies	• Increasing flow of FDI for healthcare sector, reduction in custom duty on several medical equipment and , increase in the numbers of versatile sources of health insurance
Research & Development	• Budding opportunities for the growth of research facilities in the country.

Source: LSI Research

Issues and Challenges of the Indian Healthcare Sector

Healthcare Expenditure

- The public expenditure on health is only 1.2 % of the total health expenditure.
- Lack of government facilities force the people to seek private healthcare which is very expensive.
- It triggers the growth of Out-of-pocket healthcare spending (63% in 2015.)

Healthcare Education & Workforce

- Graduate doctors are forced to work as junior resident doctors due to lesser number of post-graduate medical seats. 18,000/year seats are available for post graduation whereas around 50,000 doctors graduate each year .In long term, it creates the scarcity of specialised doctors and surgeons.

Medical Errors

- More than 5 million incidents of medical errors happen due to the absence of skilled doctors and health assistants.
- Irrelevant medical test procedures instructed by unskilled staff lead to higher medical expenses.

Inadequate Medical Infrastructure

- Hospitals struggling with outdated technology, lower number of beds and other quality workforce, are unable to deliver proper healthcare service to patients.

Rising Dual Disease Burden

- Spurt of Non Communicable Diseases along with the continuous increase in Communicable ones is the reason behind majority of deaths.

Expensive Procurement System

- Supply of drugs, vaccines and necessary medical equipment constitute a huge share of cost in the hospitals' total operating expenses.
- In 2017-18, 41% expenditure was spent on procurement of drugs, vaccines and medical supplies.

Source: LSI Research

Indian Healthcare Sector Outlook 2022

Category	Indicator	2012	2022	CAGR (2012-2022)
Demography	Population (Billion)	1.3	1.4	1.2%
	Life expectancy at birth (years)	67.4	70.4	0.4%
	Crude death rate (per 1,000 people)	7.40	7.20	-0.3%
	Infant mortality rate, (per 1,000 live births)	41.6	24.0	-5.4%
	Neonatal mortality rate (per 1,000 live births)	29.8	18.7	-4.5%
Disease	Communicable (DALY, Million)	188.0	97.0	-6.4%
	Non – Communicable (DALY, Million)	241.0	284.0	1.7%

Category	Indicator	2012	2022	CAGR (2012-2022)
Market Overview	Healthcare market (US$ Billion)	73.0	330.7	16.3%
	Pharmaceutical market	22.5	35.7	4.7%
Financing	Current health expenditure per capita (current US$)	49.0	93.6	6.7%
	Public expenditure per capita (current US$)	13.7	20.9	4.3%
	Private health expenditure per capita (current US$)	34.9	71.8	7.5%
	Out-of-pocket expenditure (% of total current healthcare expenditure)	63.0	59.0	-

Source: LSI Research

Recommendations

What needs to be improved

✓ Maintenance of hygiene and cleanliness for controlling the communicable diseases.	✓ Share of government in the current health expenditure.
✓ Government authorized medical service for maternal and child health care	✓ Subsidised healthcare system (especially for the deprived ones).
✓ Infrastructure of the hospitals (e.g. increase in the number of hospital beds)	✓ Opportunities of expansion to domestic generic drug & medical device industries.
✓ Graduation and Post-graduation admission seats in the medical colleges.	✓ Supply chain of healthcare centres for keeping proper stocks of medicines and healthcare equipment always.
✓ Training method of healthcare professionals (Doctors and health assistants)	✓ Features of medical & health insurance coverage.
✓ Availability of primary healthcare services (PHC, CHC, Sub centres etc.) in the rural areas	✓ Complexity of the drug regulatory framework of India.

What needs to be reduced

✓ Unhealthy food habits, addiction toward harmful drugs and tobacco, higher stress level for controlling the NCDs.	✓ Acute shortage of healthcare workforce (Esp. Rural areas)	✓ Investment structure for the foreign investors for investing in Indian healthcare market.
✓ Poor sanitation and unhygienic waste disposal system in the hospitals (Esp. in public hospitals)	✓ Out of Pocket Expenditure	✓ Dependence on the MNCs for the production of medical devices, branded medicines etc.

What needs to be implemented

✓ United Health Coverage (predicted to be achieved by 2022.	✓ Electronic Health Record	✓ Public Private Partnership of healthcare institutes
✓ Regulation about the distribution of medicines & other medical equipment at affordable costs.	✓ Rural Health Development Programme	✓ Regular awareness Program about all types of diseases across the nation.

Source: LSI Research

Trends That Will Govern Future Indian Healthcare

An ecosystem of collaborators with interrelated value drivers

Pharmaceuticals and life sciences

- Renewed focus on generics
- Healthcare trackers and wearables

Consumers

- Rise in consumerism
- Enhanced customer/patient experience
- Tailored health plan

Healthcare providers

- Shift from sickness to wellness
- Operational efficiency
- Better quality at lower cost
- Physician engagement model

Technology players

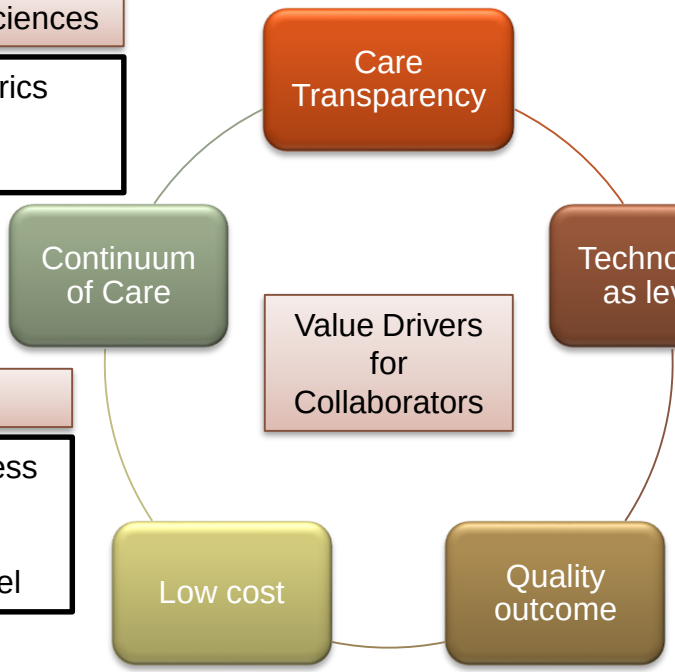
- Digital health
- Integration with telecom
- Artificial intelligence
- Robotics

Insurance companies

- Increase insurance penetration
- Focus on quality outcomes
- Decrease frauds

Government

- NHPS implementation
- Effective finance mechanism



Source: PWC; LSI Research

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