

An assessment of the healthcare delivery market in India with a focus on West India

April 2023

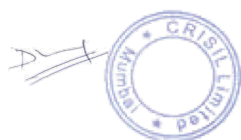


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1 Macroeconomic overview of India

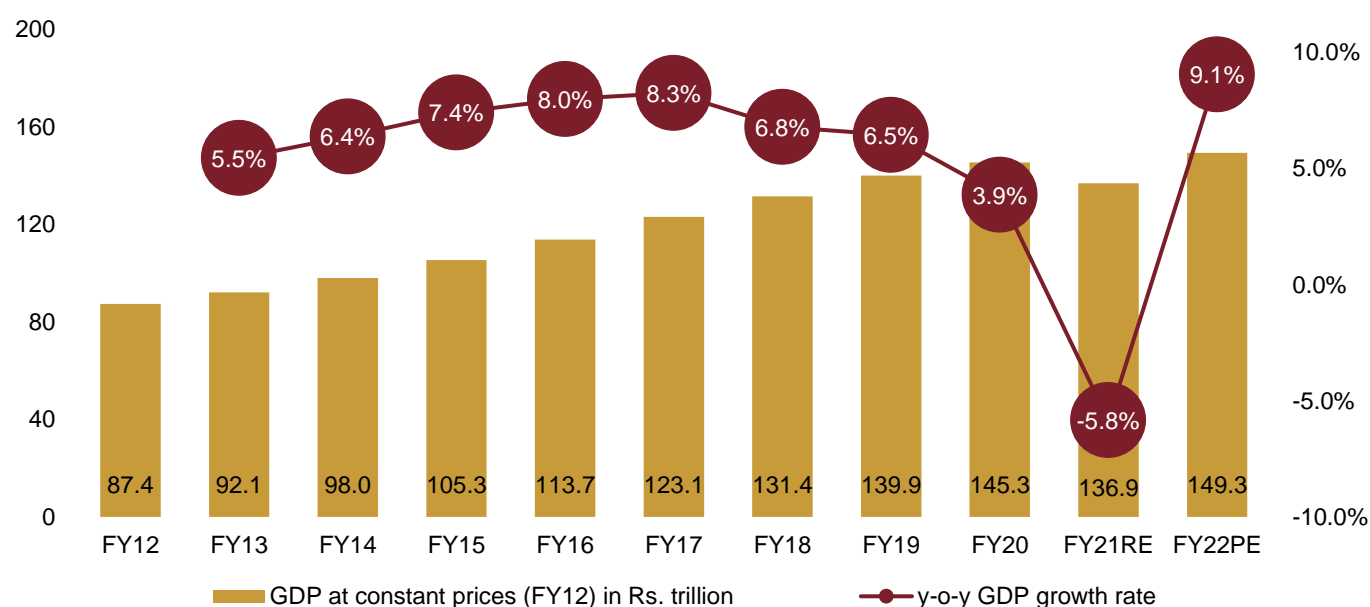
1.1 A review of India's GDP growth

GDP logged 5.5% CAGR between fiscals 2012 and 2022

In 2015, the Ministry of Statistics and Programme Implementation (MoSPI) changed the base year for calculating India's GDP between fiscals 2005 and 2012. Based on this, the country's GDP logged a ten-year CAGR of 5.5%, growing to Rs 149 trillion in fiscal 2022 from Rs 87 trillion in fiscal 2012.

Fiscal 2021 was a challenging year for the Indian economy because of the Covid-19 related distress, which was already experiencing a slowdown before the pandemic struck. GDP contracted 5.8% (in real terms) after growing 3.9% in fiscal 2020. India's GDP (in absolute terms) dropped to Rs 137 trillion in fiscal 2021.

Real GDP growth in India (new GDP series)



PE: Provisional estimates; RE: Revised estimates

Source: Provisional estimates of national income 2021-22, Central Statistics Office (CSO), MoSPI, CRISIL Research

GDP in fiscal 2022 grew at 9.1% on-year

As per the second advance estimates released by the National Statistical Office, India's real gross domestic product (GDP) grew at 9.1% in fiscal 2022, compared with 8.7% estimated in January 2023. This is largely a reflection of a lower base (as the economy had shrunk 5.8% in fiscal 2021). It is noteworthy that given the large output loss last fiscal, GDP is still only 2.7% above the pre-pandemic (fiscal 2020) level.

Impact of Union Budget 2023-24 on healthcare and wellbeing

Key budget proposals

Health and Wellbeing – Expenditure

Ministry/departments	Actuals FY21 (Rs. billion)	ACTUALS FY22 (Rs billion)	RE FY23 (Rs. billion)	BE FY24 (Rs. billion)
Healthcare	806.9	844.7	791.5	891.6
D/o health & family welfare	775.7	817.8	763.7	861.8
D/o health research	31.2	26.9	27.8	29.8
Well-being	181.0	686.1	628.8	808.7
M/o Ayush	21.3	23.6	28.5	36.5
D/o drinking water & sanitation	159.7	662.5	600.3	772.2
Overall (health and wellbeing)	987.9	1,530.8	1,420.3	1,700.3

BE: Budget Estimates; RE: Revised Estimates;

Source: Budget document

Key budget proposals for FY2023-24

- An estimated Rs. 892 billion has been allocated to the ministry of health and family welfare for the fiscal year 2024 from Rs. 764 billion revised estimates in fiscal 2023.
- National Health Mission saw an increase of 9.1% for fiscal 2024 with an allocation of Rs 368 billion from Rs 337 billion as per revised estimates in fiscal 2023

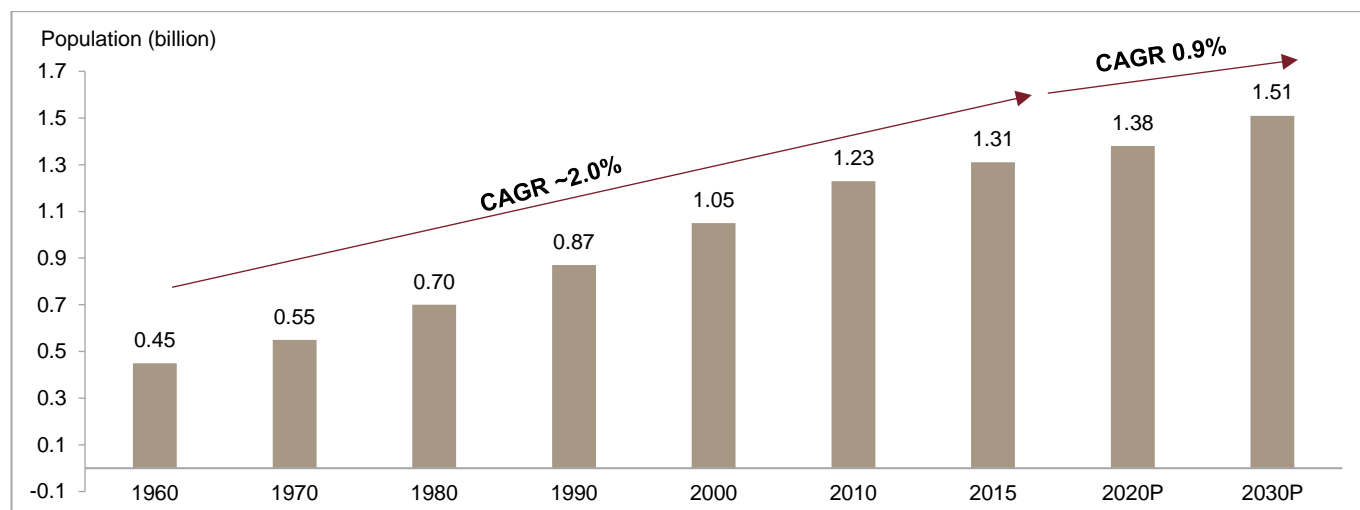
1.2 Fundamental growth drivers of GDP

By 2030, India's population is projected to touch 1.5 billion 

India's population clocked a ~1.6% CAGR from 2001 to 2011 to ~1.2 billion and comprised nearly 246 million households, as per Census 2011.

According to the 'World Urbanization Prospects: The 2018 Revision' by the United Nations, India and China, the top two countries in terms of population, accounted for nearly 37% of the world's population in 2015. As per the latest United Nations World Population Prospects Report 2022, India is projected to surpass China's population in 2023 to become the most populous country.

India's population growth



P: Projected

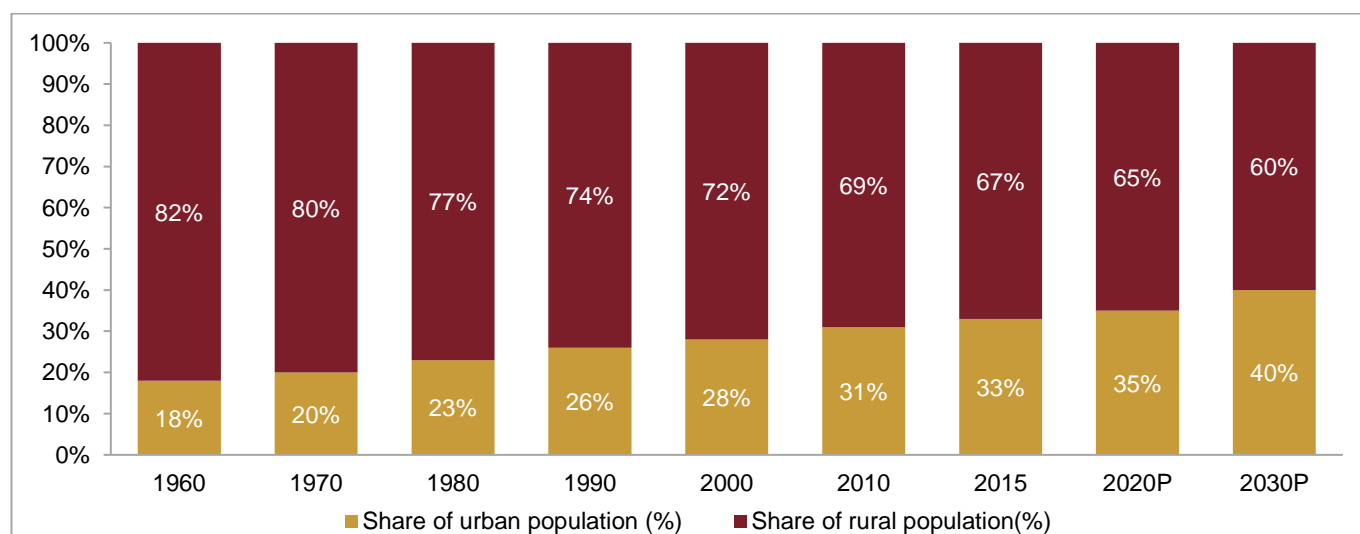
Source: World Urbanization Prospects: The 2018 Revision, United Nations, CRISIL Research

Urbanisation likely to reach 40% by 2030



According to 'World Urbanization Prospects: The 2018 Revision by the United Nations', in 2018, China had the largest urban population, with 837 million urban dwellers, accounting for 20% of the global total. China was followed by India, with 461 million urban dwellers, and the US, with 269 million urban dwellers. The share of India's urban population, in relation to its total population, has been rising over years and printed ~31% in 2010. This trend will continue, with the United Nations report projecting nearly 40% of the country's population will live in urban areas by 2030.

India's urban versus rural population



P: Projected

Source: World Urbanization Prospects: The 2018 Revision, United Nations, CRISIL Research

People from rural areas move to cities for better job opportunities, education and quality of life. The entire family or only a few individuals (generally an earning member or students) may migrate, while the rest of the family continues to live in the native, rural house.

India's per capita income rose at a healthy pace between fiscals 2012 and 2020

India's per capita income, a broad indicator of living standards, rose from Rs 63,462 in fiscal 2012 to Rs 94,420 in fiscal 2020, or at 5.1% CAGR. This growth was led by better job opportunities, propped up by overall GDP growth. Moreover, population growth remained stable at ~1% CAGR. However per capita income declined in fiscal 2021 owing to economic impact of Covid-19, per capita income declined by 8.9% on-year in fiscal 2021. The per capita income saw rise in fiscal 2022 growing at 7.6% on-year, but in absolute terms it is yet to recover to pre-pandemic levels.

Per capita net national income at constant prices

	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21RE	FY22PE
Per-capita net national income (Rs)	63,462	65,538	68,572	72,805	77,659	83,003	87,586	92,133	94,420	86,054	92,583
On-year growth (%)		3.3	4.6	6.2	6.7	6.9	5.5	5.2	2.5	-8.9	7.6

RE: Revised estimates; AE: Advance estimates

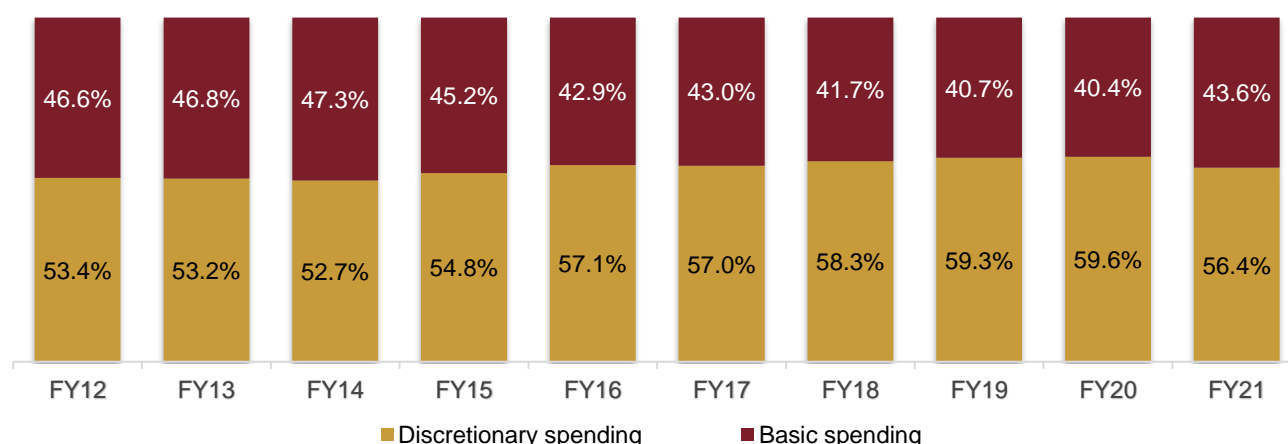
Source: Second Advance Estimates of Annual National Income, 2020-21, CSO, MoSPI, CRISIL Research

Review of private final consumption expenditure (PFCE)

Consumption expenditure to be driven by discretionary items

Basic items accounted for 40.4% of the total consumption expenditure of Indians in fiscal 2020, with discretionary items accounting for the remainder 59.6%. The share of basic items increased in fiscal 2021 to 43.6% as pandemic decreased the expenditure on discretionary items. It is worth noting that the share of discretionary items in consumption increased to 59.6% in fiscal 2020 from 53.4% in fiscal 2012. The increased spending on discretionary items suggests rising disposable income of households.

Broad split of PFCE consumption into basic and discretionary spending



Note: Basic items include food, clothing and housing. Discretionary items include education, healthcare, electricity, water supply, footwear, personal care products, processed foods, alcoholic and non-alcoholic beverages, tobacco, narcotics, fuel and gas, furnishing and household

equipment, vehicle and personal transportation, spending on recreation and culture, communication, restaurants and hotels, financial insurance and other financial services, and other items not elsewhere classified (n.e.c.)

Source: MoSPI, CRISIL Research

Health expenditure grew strong at 8.1% CAGR from fiscal 2012 to fiscal 2021

Health personal expenditure increased from Rs. 1,813 billion to Rs. 3,661 billion from fiscal 2012 to fiscal 2021 supported by rise in government schemes, health spending by state, rise in income levels, rise in disease incidence. Health expenditure in terms of current prices rose at 14.4% CAGR between fiscal 2012 and fiscal 2021 considering the rise in price of health products and services. Fiscal 2021 saw sudden jump in health expenditure as % of total PFCE, as total PFCE declined by 6.8% in fiscal 2021 on account of COVID-19 pandemic and closure of global travel and lockdown during last two to three months of the fiscal.

Health spending in PFCE

	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	CAGR FY12- 21
Health PFCE (Rs billion) (at constant 2021 prices)	1,813	1,987	2,167	2,484	2,735	3,085	3,218	3,481	3,738	3,661	8.1%
Share in total PFCE (%)	3.7%	3.8%	3.9%	4.2%	4.3%	4.4%	4.4%	4.4%	4.5%	4.7%	

Source: Source: Second Advance Estimates of Annual National Income, 2020-21, CSO, MoSPI, CRISIL Research

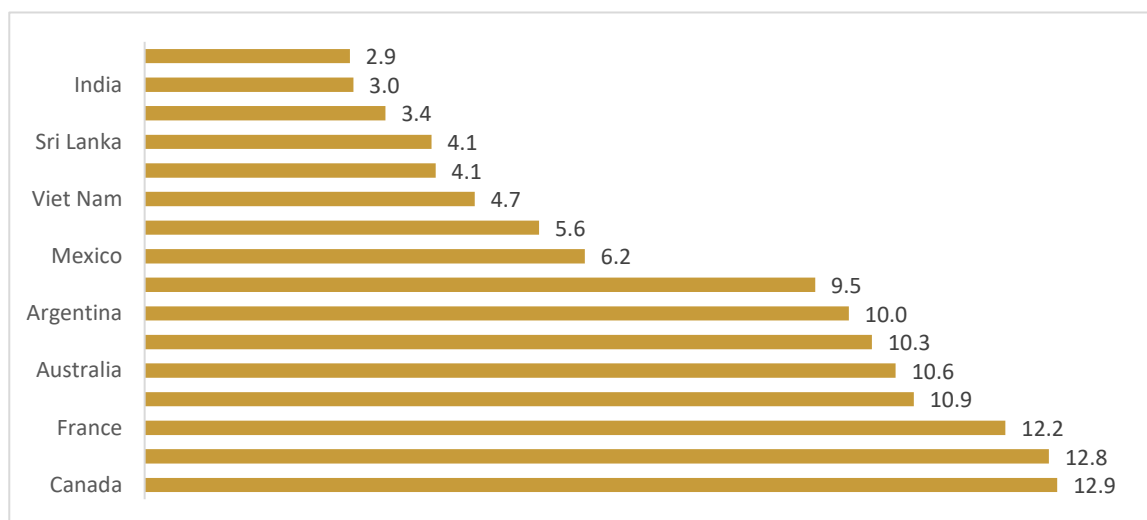
1.3 Social and healthcare related parameters

Along with the structural demand existing in the country and the potential opportunity it provides for growth, provision of healthcare in India is still riddled with many challenges. The key challenges are inadequate health infrastructure, unequal quality of services provided based on affordability and healthcare financing.

India lags peers in healthcare expenditure

Global healthcare spending has been rising faster in keeping with the economic growth. As the economy grows, public and private spending on health increases, too. Also, greater sedentary work is giving rise to chronic diseases, which is also pushing up healthcare spending. Fast-growing economies with low spending on health are seeing chronic diseases increase dramatically as they move up the income ladder. Developed economies such as United states, Germany, France, Japan, United Kingdom, spend higher on healthcare as compared to developing nations such as India, Vietnam, Indonesia, etc.

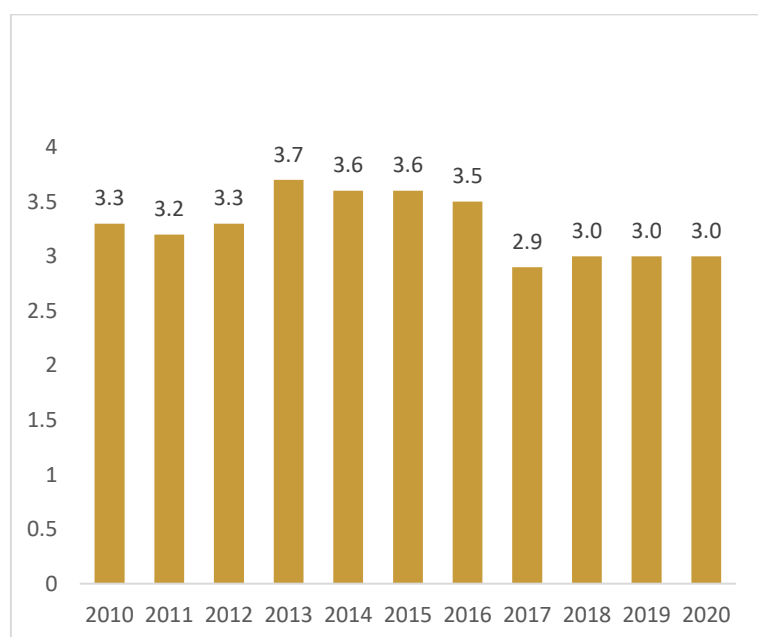
Total healthcare expenditure as % of GDP (2020)



Source: Global Health Expenditure Database accessed in March 2023, World Health Organization; CRISIL Research

India spends too little on healthcare

Current healthcare expenditure (CHE) as % of GDP in India (CY2010-CY2020)



Source: Global Health Expenditure Database accessed in March 2023, CRISIL MI&A Research

Per capita current expenditure on health in USD (2020)

India	56.6
China	583.4
Brazil	700.7
Korea	2,642.4
Singapore	3,537.0
United Kingdom	4,926.3
Japan	4,388.1
France	4,768.7
Australia	5,901.1
Germany	5,930.3
Canada	5,619.4
United States	11,702.4

According to the Global Health Expenditure Database compiled by the WHO, in CY2020, India's expenditure on healthcare was 3.0% of GDP. As of CY2020, India's healthcare spending as a percentage of GDP trails not just

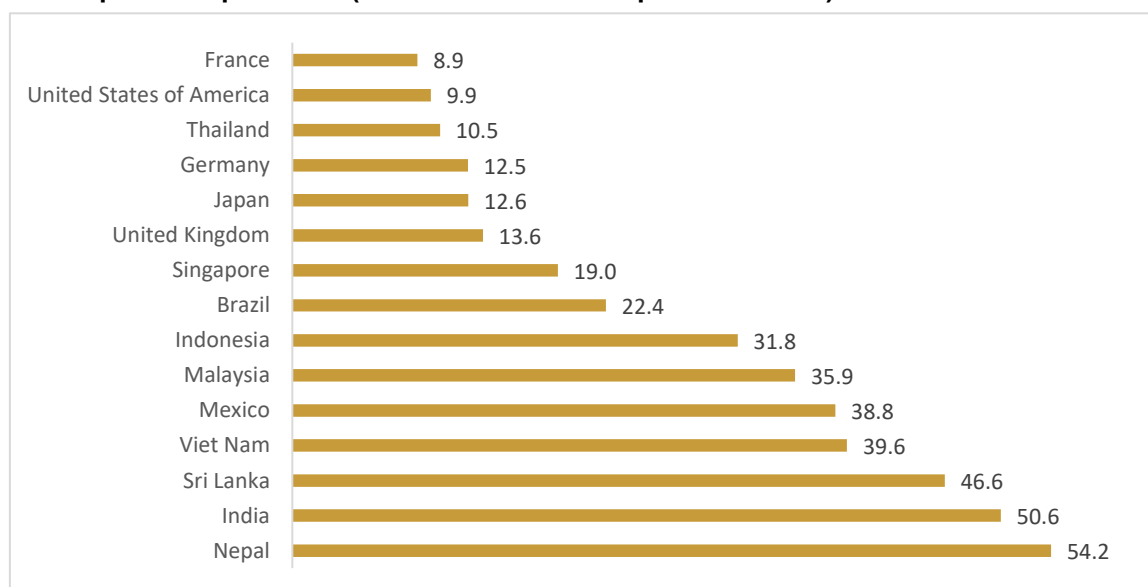
developed countries, such as the US and UK, but also developing countries such as Brazil, Nepal, Vietnam, Singapore, Sri Lanka and Malaysia.

Further, India's public spending on healthcare services remains much lower than its global peers. For example, India's per-capita total expenditure on healthcare (at an international dollar rate, adjusted for purchasing power parity) was only \$56.6 in CY2020 versus the US's \$11,702.4, the UK's \$4,926.3 and Singapore's \$3,537.0.

India has one of the highest shares of out-of-pocket expenditure in healthcare; however, the government aims to increase public healthcare expenditure to 2.5-3% of GDP by 2025 from the current ~2%, as per the National Health Policy.

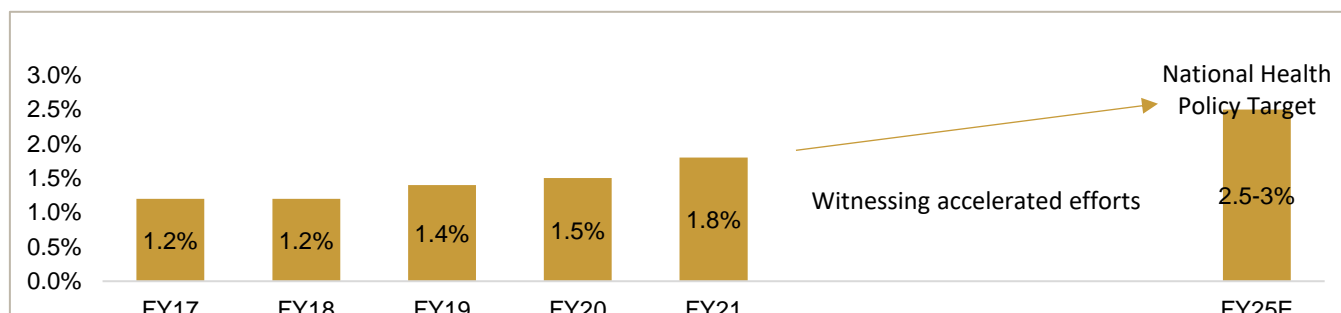
The Government of India spends little in healthcare given the size of the economy, which drives the higher out-of-pocket expenditure in India. Despite the decline in the past few years, India's OOP as percent of current health spending is 51% as of CY2020, significantly above the average for lower-middle income countries, and amongst the highest in the world. As per economic survey data for FY2021-22, 80-85% of the in-patient hospitalisations did not have any coverage. This explains the higher share of OOP in health care expenditure. The government of India has introduced schemes such as Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY), state sponsored health insurance (AB-PMJAY State Extension Schemes), Employees' State Insurance Scheme (ESIS), Central Government Health Scheme to increase the coverage of medical insurance.

Out-of-pocket expenditure (% of current health expenditure 2020)



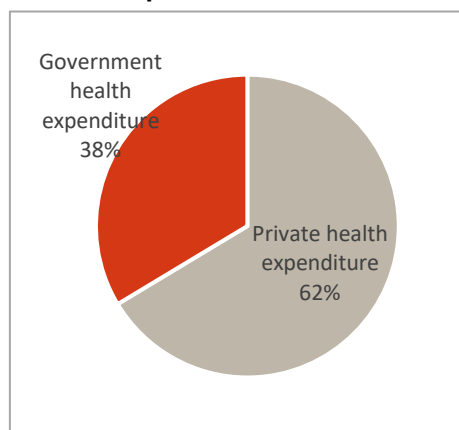
Source: Global Health Expenditure Database accessed in March 2023, CRISIL MI&A Research

Expenditure on health by center and state government as % of GDP in India (2017 onwards)



Source: National health profile, budget documents, CRISIL Research

Public healthcare expenditure is low, with private sector accounting for a lion's share
General expenditure on health as % of CHE (CY2020)



India's current healthcare expenditure (CHE) is skewed more towards private expenditure compared with public expenditure. Government expenditure on healthcare has remained range-bound at 20-30% of the current healthcare expenditure from calendar year 2010 to 2016. Government expenditure has crossed 30% since the last five years. The rest of the expenditure is private in nature (expenditure from resources with no government control such as voluntary health insurance, and the direct payments for health by corporations (profit, not-for-profit and non-government organisations) and households. However, the government aims to increase public healthcare expenditure to 2.5-3% of GDP by 2025 from the current 2%, as per the National Health Policy.

Source: Global Health Expenditure Database- World Health Organisation, CRISIL Research

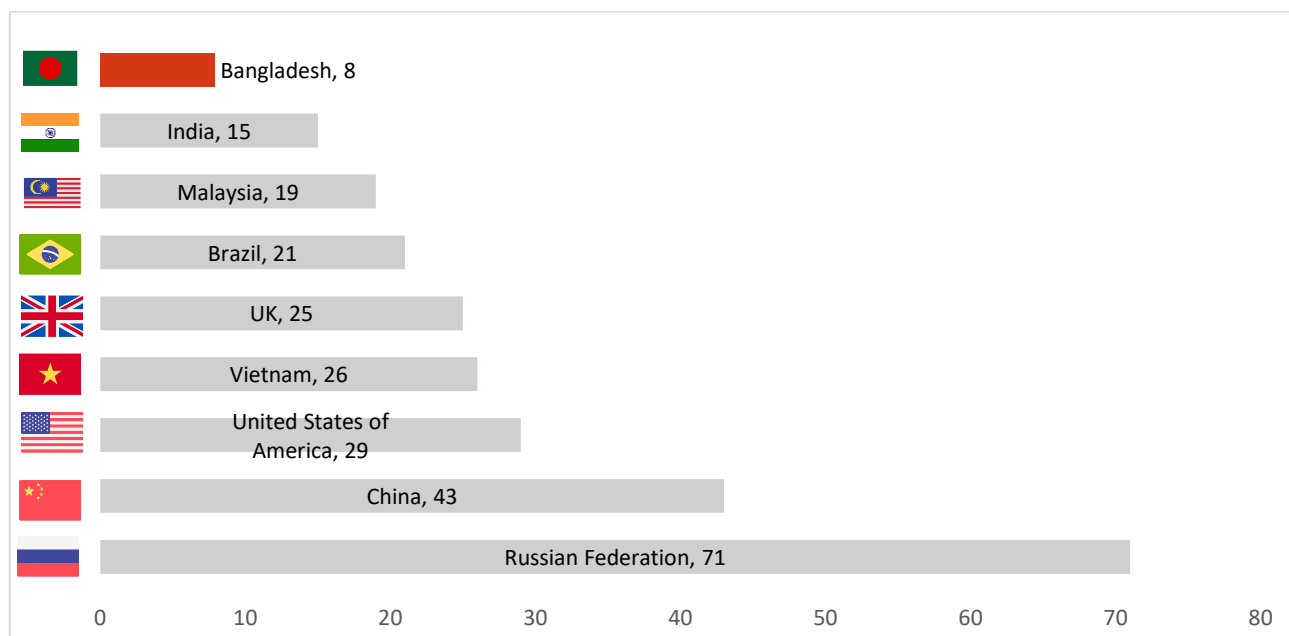
Nearly 17% of the rural population and 13% of the urban population are dependent on borrowings for funding their healthcare expenditure for July 2017- June 2018 as per NSS 75th Round Health in India Report. And nearly 80% of the rural population and 84% of the urban population use their household savings on healthcare-related expenditure as per "Health in India – 2018, NSS 75th Round. Health expenditure contributes to nearly 3.6% and 2.9% of rural and urban poverty, respectively. And annually, an estimated 60 to 80 million people fall into poverty due to healthcare-related expenditure. However, with Pradhan Mantri Jan Arogya Yojana (PMJAY), the affordability aspect of healthcare expenditure is expected to be taken care of to some degree, especially for the deprived population.

Though it represents a pain point in healthcare financing, it also means that there exists a substantial potential for those involved in provision of auxiliary healthcare services.

Health infrastructure of India in dire need of improvement

The adequacy of a country's healthcare infrastructure and personnel is a barometer of its quality of healthcare. India accounts for nearly a fifth of the world's population, but has an overall bed density of merely 15, with the situation being far worse in rural than urban areas. India's bed density not only falls far behind the global median of 29 beds, it also lags that of other developing countries such as Brazil (21 beds), Malaysia (19 beds), and Vietnam (26 beds).

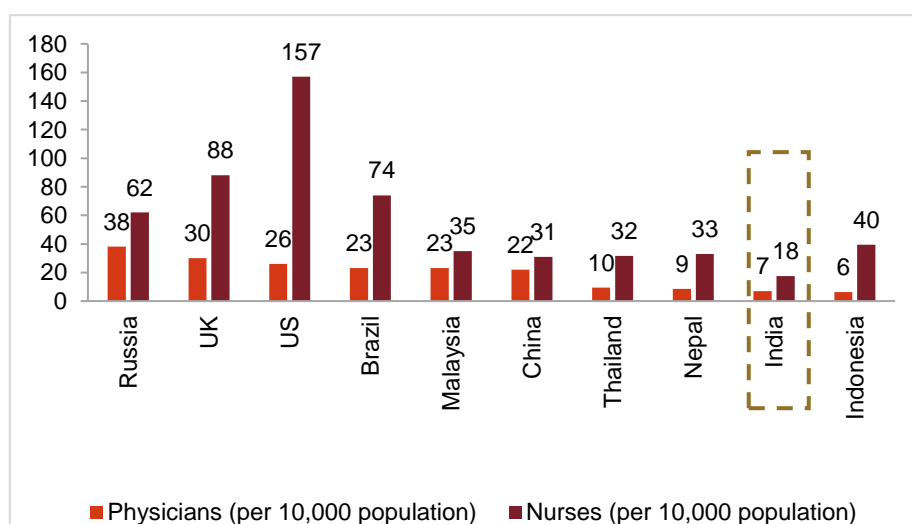
Bed densities across countries - hospital beds (per 10,000 population)



Note: India bed density is estimated by CRISIL Research for FY 2022, CY2016 figure for Bangladesh, CY2017 figures for Brazil, China, Malaysia and United States, CY2018 figures for Russian Federation, CY2019 figure for UK

Source: World Health Organization Database, CRISIL MI&A Research

Healthcare personnel: India vs other countries (aggregate CY2012-CY2020)



The paucity of healthcare personnel compounds the problem. At seven physicians and 18 nursing personnel per 10,000 population (CY2012-CY2020), India trails the global median of 16 physicians and 40 nursing personnel during the same period. Even on this parameter, India lags developing countries such as Brazil (23 physicians, 74 nurses), Malaysia (23 physicians, 35 nurses) and other Southeast Asian countries.

Source: WHO World Health Statistics 2022

Physicians (per 10,000 population) CY2012-CY2020

World average

India



~16



7

Nurses (per 10,000 population) CY2012-CY2020

World average

India



40



18

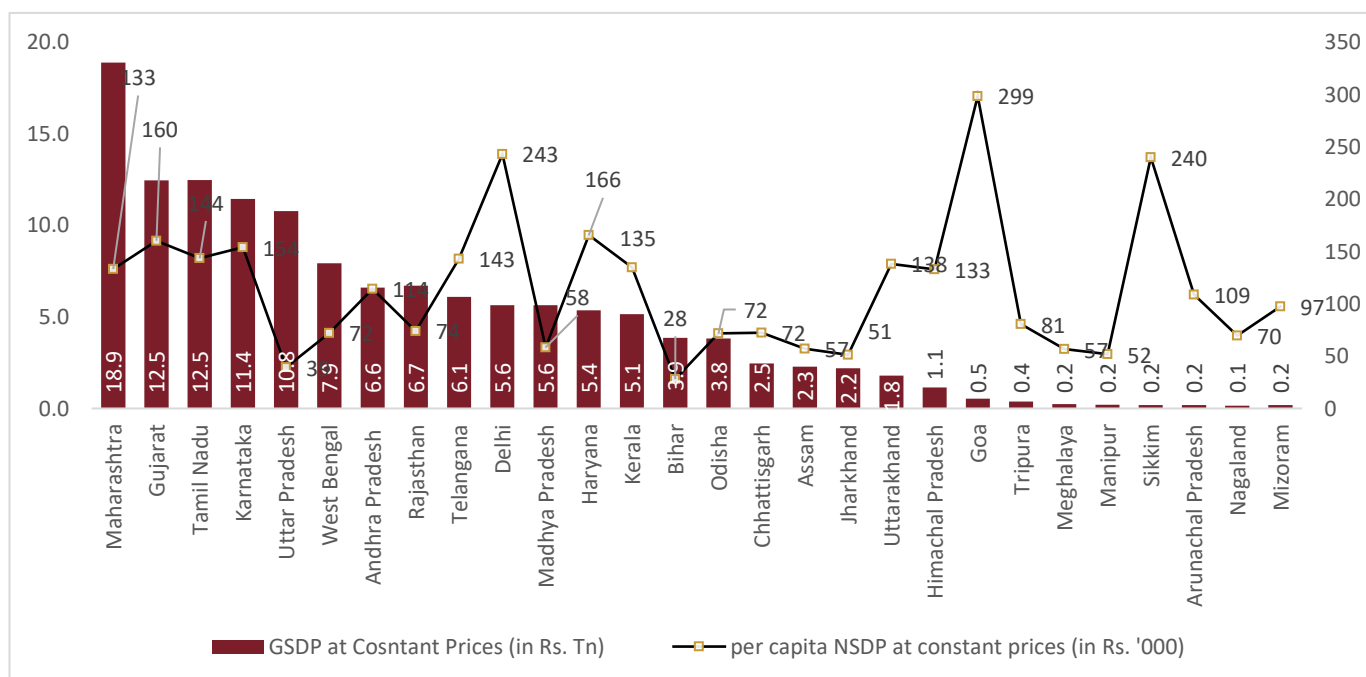
Source: WHO World Health Statistics 2022

1.4 State-wise macroeconomic indicators

Maharashtra and Gujarat top two states in the country in terms of GSDP as of fiscal 2021

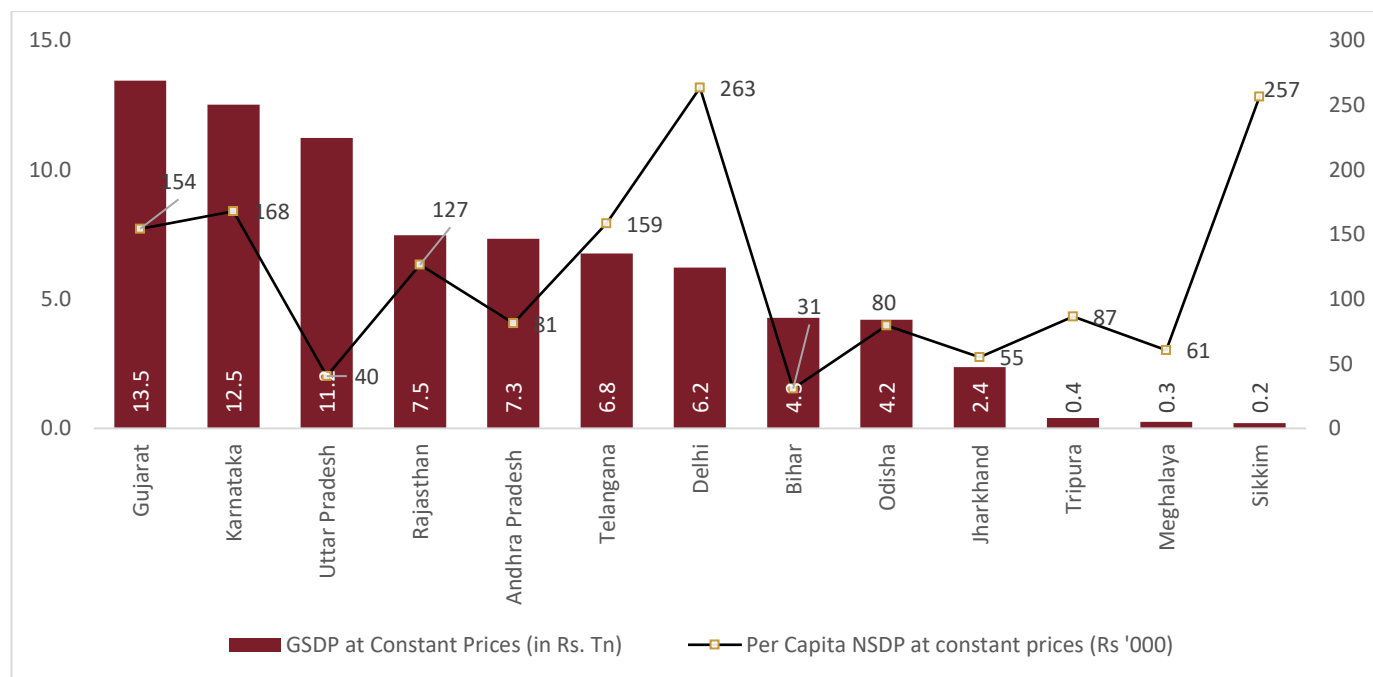
In fiscal 2021, Maharashtra, and Gujarat were top rankers in terms of gross state domestic product (GSDP) at constant prices. Also, in terms of per-capita net state domestic product (NSDP) at constant prices, Goa led all the states in India. Gujarat clocked highest CAGR in GSDP between FY12 and FY21 (8.2%) among all states.

State-wise GSDP and per capita NSDP at constant prices as of fiscal 2021



Source: CSO, CRISIL MI&A Research

State-wise GSDP and per capita NSDP at constant prices as of fiscal 2022



Source: CSO, CRISIL MI&A Research

Gujarat and Madhya Pradesh saw a lower decline compared to India GDP in FY21

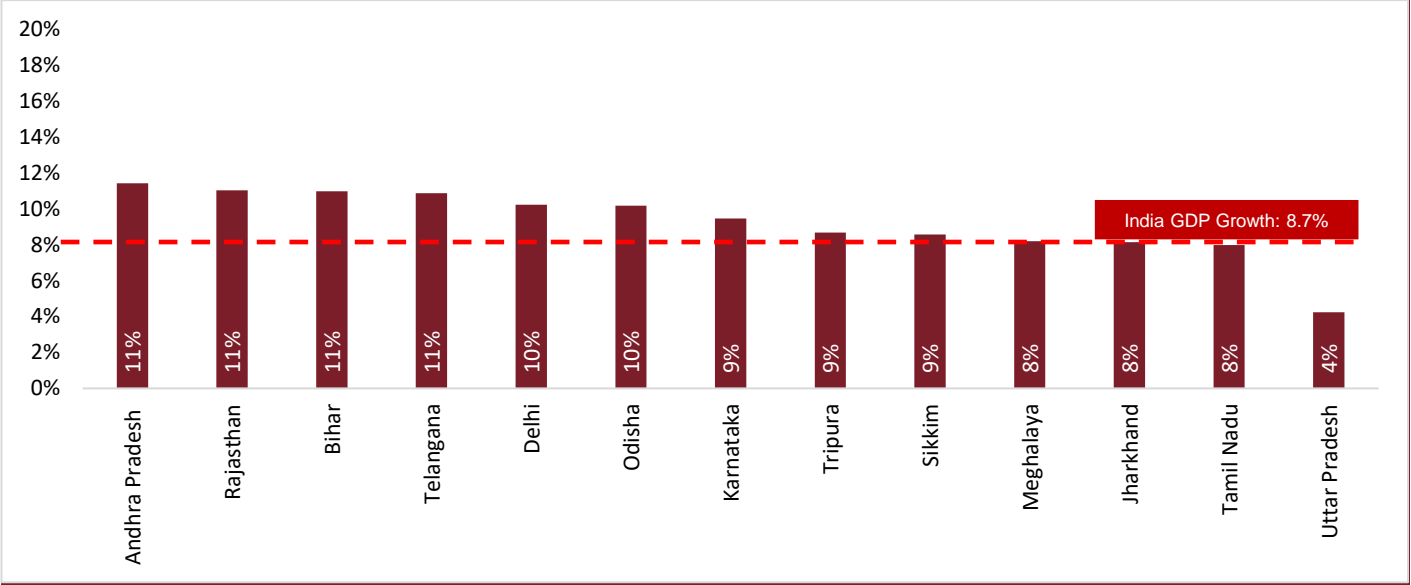
In fiscal 2021, western and central states of Gujarat and Madhya Pradesh registered a growth decline of 1.4% and 1.9% respectively. India GDP saw a decline of 6.6% in FY21,

GSDP growth across states in FY21



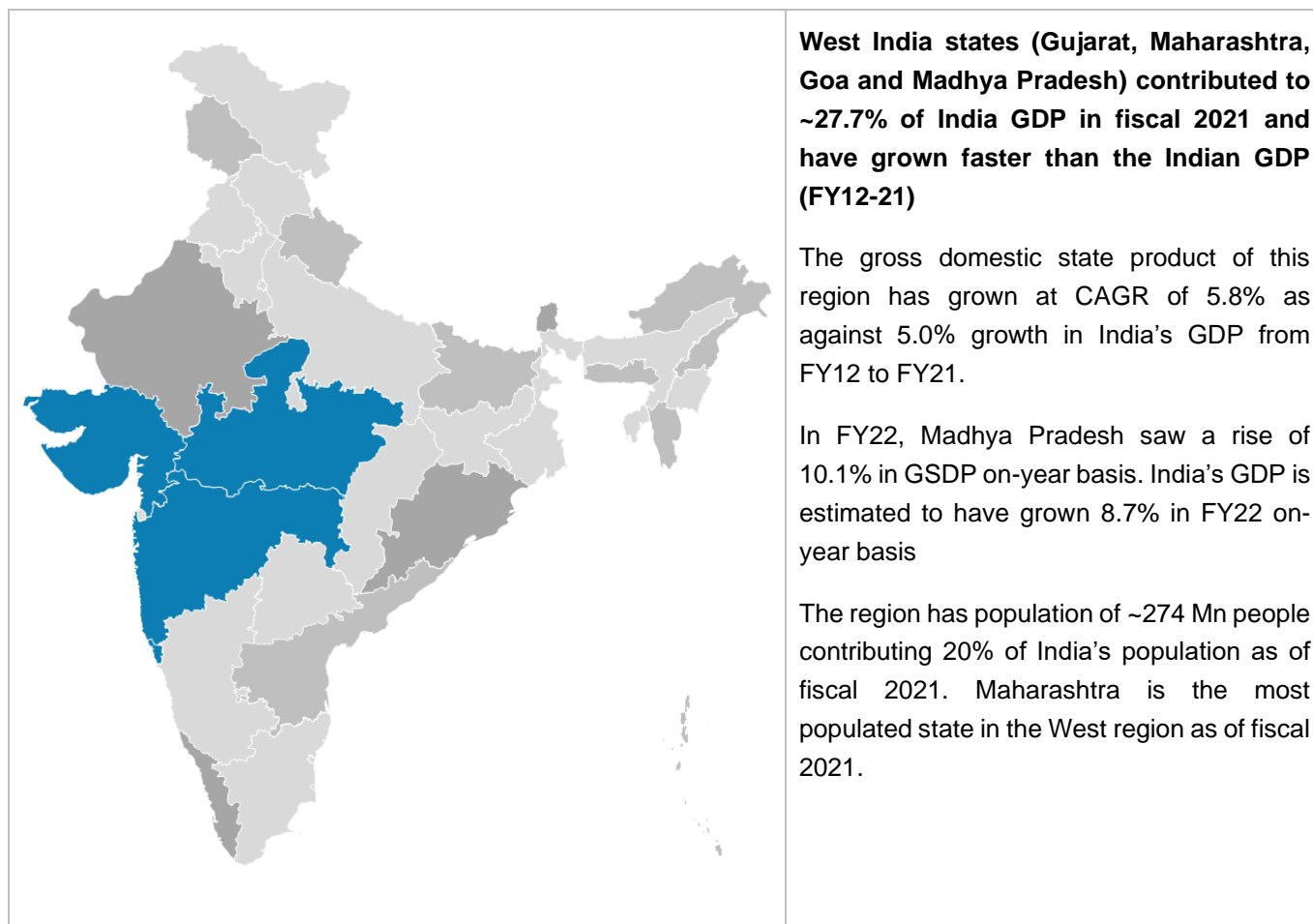
Source: CSO, CRISIL MI&A Research

GSDP growth across states in FY22



Source: CSO, CRISIL MI&A Research. FY22 data available for selected states

Overview of GDP of West India* states



Source: Ministry of Statistics Programme and Implementation (MOSPI), CRISIL MI&A Research

Population growth in Western India* states

States	Population growth CAGR FY11-FY21	Population FY21 Mn
Goa	~0.8%	1.6
Gujarat	~0.6%	63.9
Madhya Pradesh	~1.6%	85.4
Maharashtra	~0.9%	123.1
India	~1%	1,371

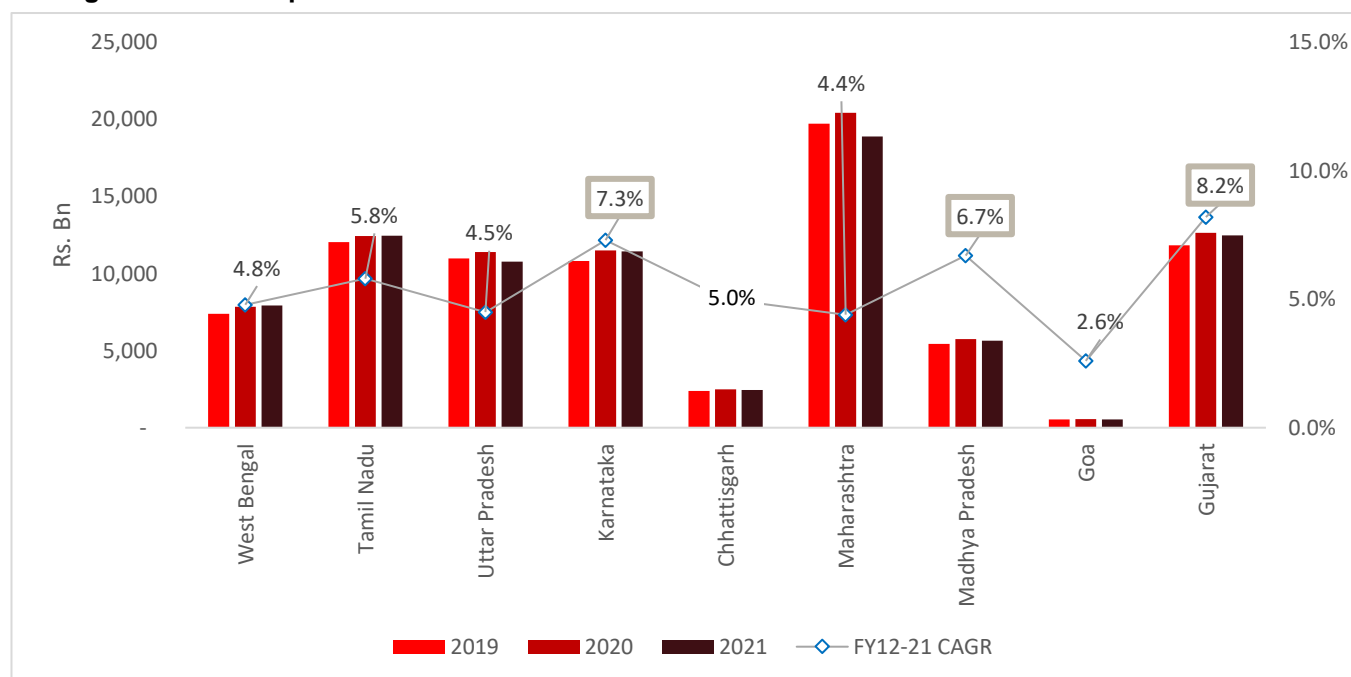
Note: *Western India for above section defined as Goa, Gujarat, Madhya Pradesh and Maharashtra

Source: Ministry of Statistics Programme and Implementation (MOSPI), CRISIL MI&A Research, UIDAI December 2020

Madhya Pradesh and Gujarat among the fastest growing states in West and Central India in terms of per capita net domestic product

In terms of per capita income, states such as Maharashtra, Gujarat and Goa are the top as of FY21. The three states have higher per capita income (current prices) as compared to the national average per capita income as of FY21, which is Rs. 1,26,855. Madhya Pradesh and Gujarat have seen fastest growth in per capita income between FY12 and FY21 in the central and western region. The economy of Maharashtra is largely driven by its service sector which contributed 56.1% of GVA in FY21, whereas economy of Gujarat is driven by its industry sector especially manufacturing and this sector contributed 49% of the GVA as of FY21, whereas Madhya Pradesh is driven by service sector and agriculture both, contributing 37% and 34% respectively to the economy.

State gross domestic product for select states in Bn



Note: Top three states with highest CAGR are highlighted

Source: Ministry of Statistics Programme and Implementation (MOSPI), CRISIL MI&A Research

Gujarat and Madhya Pradesh have shown the highest jump in healthcare budget for FY23 compared to previous year among the key West and Central India states

Gujarat's FY23 budget for Health and Family Welfare has been increased to Rs. 1,26,390 million, an increase of 18.8% compared to previous year's budgeted figures. Among the states mentioned below in the table, Goa spent one of the highest on healthcare compared to the total aggregate expenditure between FY2014-2021.

The Government of Madhya Pradesh has increased its health budget to ~Rs. 1,39,030 million in FY23, an increase of ~15.7% compared to FY22 budget.

State	FY 23 Health and Family Welfare Budget (Rs. Million)	Increase over FY22 budgeted (%)	Avg. spend on health care as a ratio to aggregate expenditure (2014-21)	Key provisions
Goa	19,660	-0%	6.4%	- Rs 8,040 million has been allocated towards Urban Health Services- Allopathy
Gujarat	1,26,390	18.8%	5.5%	- Rs 4,040 million has been allocated towards National Health Mission
Maharashtra	2,25,360	-13.4%	4.2%	- Rs 30,340 million has been allocated towards National Rural Health Mission
Madhya Pradesh	1,39,030	15.7%	4.3%	- Rs 11,800 million has been allocated towards district hospitals - Rs 10,330 million has been allocated towards primary health centres
India	8,62,010	0.2%	2.3%*	

Note: *Only FY23 spend is considered for India calculations

Source: State Budgets, CRISIL MI&A Research

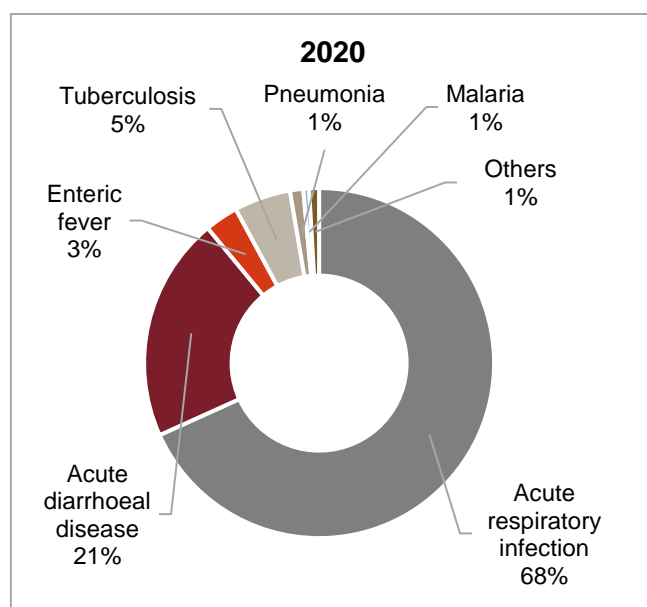
1.5 Disease profile in India

A review of communicable diseases in India

Overall, communicable diseases have been decreasing in India, especially with a considerable fall in cases and deaths due to malaria, dengue, chikungunya, chicken pox, encephalitis, and viral meningitis.

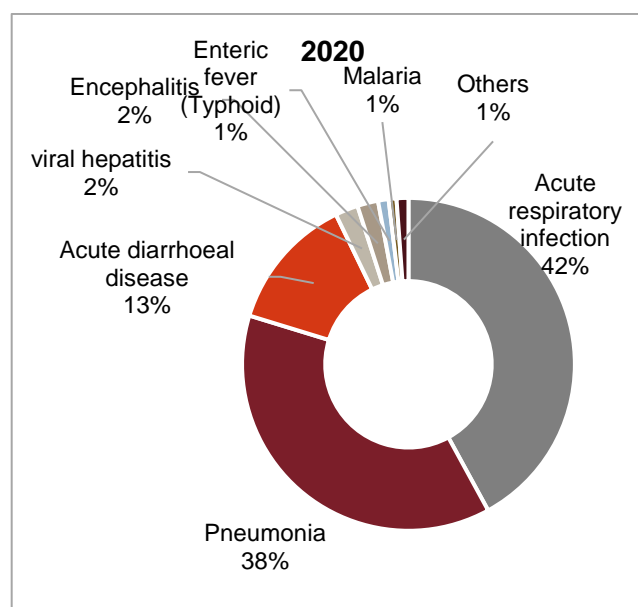
Morbidity reported on major communicable diseases

Among the various communicable diseases reported by states/union territories (UTs) in 2020, the following communicable diseases accounted for the maximum percentage of cases reported



Mortality reported on major communicable diseases

Among the various communicable diseases reported by states/UTs in 2020, the following communicable diseases accounted for the maximum percentage of deaths reported

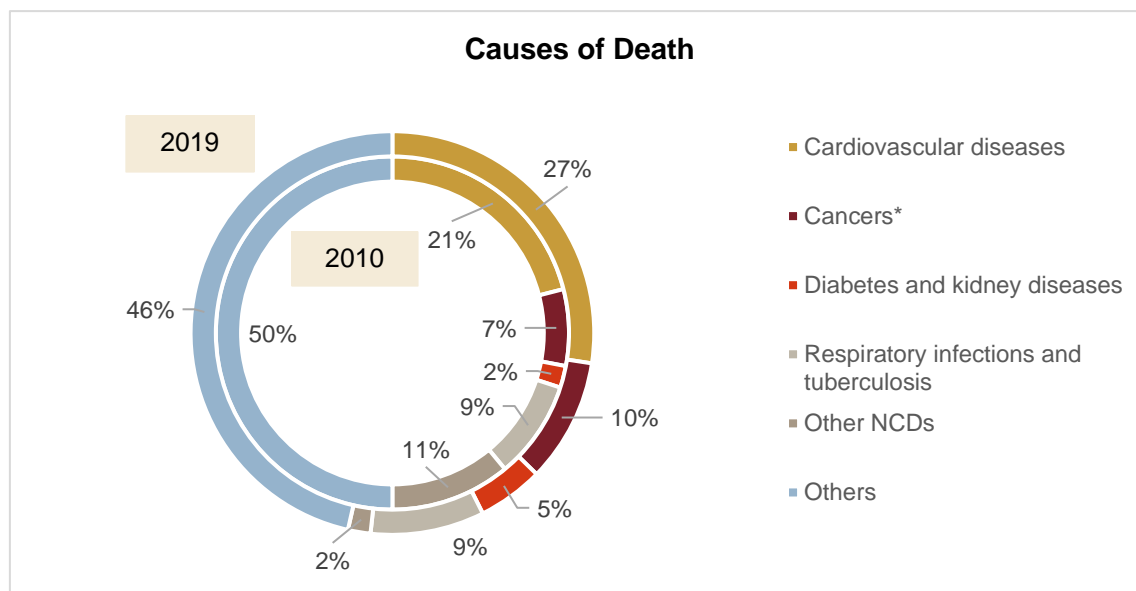


Source: National Health Profile-2021, CRISIL MI&A Research

Acute respiratory infection deaths were the highest in 2020. During the year, acute respiratory infection was one of the most prevalent diseases in India both in terms of morbidity as well as reason for deaths; it was followed by Pneumonia. Taken together, pneumonia, acute respiratory infection and acute diarrhoeal disease accounted for 93% of deaths during 2020. Communicable diseases such as enteric fever, tuberculosis, pneumonia, malaria and others formed a smaller share of the total morbidity reported during 2020.

A review of non-communicable diseases in India

Disease epidemiology shifting towards lifestyle diseases



Note: Inner pie represents 2010 data, while outer pie represents 2019 data; *Neoplasms which are tumors are considered as cancer in the above chart; Others include digestive diseases, HIV/AIDS, transport injuries, mental disorders, neurological disorders, sense organ diseases etc.

Source: WHO global burden of disease, CRISIL MI&A Research

As opposed to the decreasing rate in communicable diseases, lifestyle-related illnesses or non-communicable diseases (NCDs) have been increasing rapidly in India over the past few years. The contribution of NCDs to the disease profile rose from 30% in 1990 to 55% in 2016. Recent statistics show these illnesses accounted for nearly 66% of all deaths in India in 2019.

As per the World Economic Forum, the world will lose nearly \$30 trillion by 2030 for treatment of NCDs and India's share of this burden will be \$5.4 trillion.

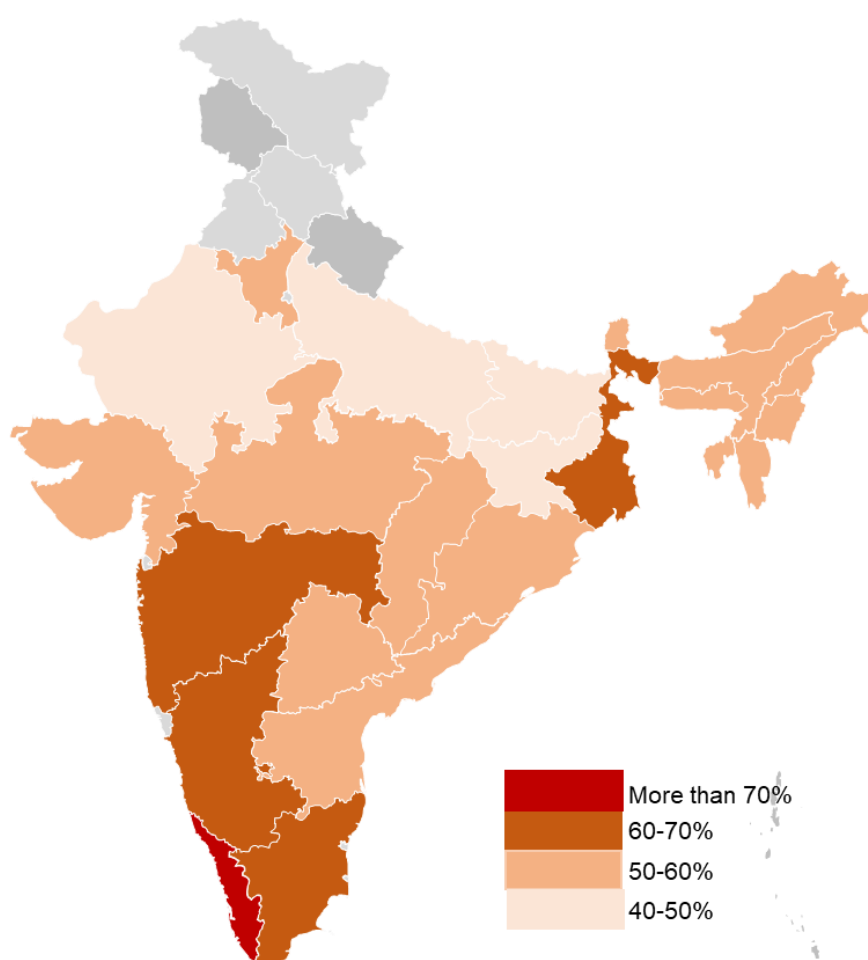
In 2019, of the total disease burden, the contribution of the group of risks (unhealthy diet, high blood pressure, high blood sugar, high cholesterol, and overweight) which mainly cause ischemic heart disease, stroke and diabetes rose to ~27%.

Western states of Goa and Maharashtra have high proportion of NCDs in the range of 60-75%

According to reports, the proportion of NCDs in the country's disease burden has increased. Disability-adjusted life years (DALYs) represent the total number of years lost to illness, disability, or premature death within a given population. Of the total disease burden in India measured as DALYs, the share of communicable, maternal, neonatal, and nutritional diseases (termed infectious and associated diseases in this summary for simplicity) dropped to 33% in 2016 from 61% in 1990. There was a corresponding increase in the contribution of non-communicable diseases from 30% of the total disease burden in 1990 to 55% in 2016, and of injuries from 9% to 12%. The wide variations between the states in this epidemiological transition are reflected in the range of the contribution of major disease groups to the total disease burden in 2016: 48% to 75% for non-communicable diseases, 14% to 43% for infectious and associated diseases, and 9% to 14% for injuries.

The contribution of most of the major non-communicable disease groups to the total disease burden has increased all over India since 1990, including cardiovascular diseases, diabetes, chronic respiratory diseases, mental health and neurological disorders, cancers, musculoskeletal disorders, and chronic kidney disease. Among the leading non-communicable diseases, the largest disease burden or DALY rate increase from 1990 to 2016 was observed for diabetes at 80% and ischaemic heart disease at 34%. In 2016, three of the five leading individual causes of disease burden in India were non-communicable, with ischaemic heart disease and chronic obstructive pulmonary disease being the top two causes and stroke the fifth leading cause.

State-wise proportion of total disease burden from NCDs in 2016



State	NCDs *
Kerala	74.60%
Goa	70.90%
Punjab	66.00%
Tamil Nadu	65.30%
Maharashtra	63.10%
West Bengal	62.70%
Karnataka	62.00%
Andhra Pradesh	59.70%
Manipur	58.50%
Telangana	59.20%
Haryana	58.80%
Sikkim	57.50%
Nagaland	57.20%
Tripura	57.00%
Gujarat	56.70%
Mizoram	55.50%
Arunachal Pradesh	52.90%
Meghalaya	52.30%
Odisha	52.10%
Assam	51.20%
Madhya Pradesh	50.50%
Chhattisgarh	50.40%
Rajasthan	49.30%
Jharkhand	48.30%
Uttar Pradesh	47.90%
Bihar	47.60%

* Proportion of total disease burden from NCDs in 2016.

Indian Council of Medical Research (ICMR), Public Health Foundation of India (PHFI), and the Institute for Health Metrics and Evaluation (IHME) published report titled 'India: Health of the Nation's States – The India State-Level Disease Burden Initiative'.

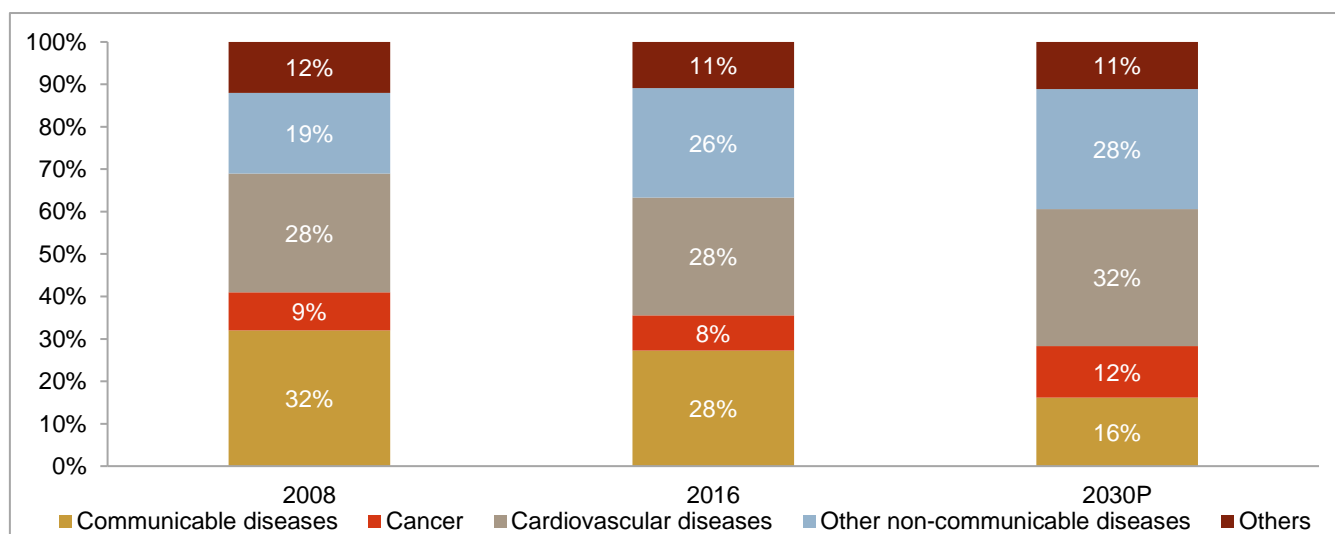
States considered for analysis include Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, West Bengal, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura

Source: ICMR, PHFI, IHME, MoHFW, CRISIL MI&A Research

Non-communicable diseases: A silent killer

CRISIL Research believes NCDs exhibit a tendency to increase in tandem with rising income levels. WHO projects an increasing trend in NCDs by 2030, following which CRISIL forecasts demand for healthcare services associated with lifestyle-related diseases such as cardiac ailments, cancer and diabetes to rise. Another emerging market in the country is orthopaedics, which currently comprises a very small proportion compared with NCDs, but has a potential market in the country. The orthopaedics market can be classified into four different segments, viz., knee, hip, trauma, and spine, of which the knee replacement market holds the biggest share, followed by trauma and spine. Hip replacement in India is still a very small segment compared with knee replacement in contrast to the worldwide trend.

Causes of death in India

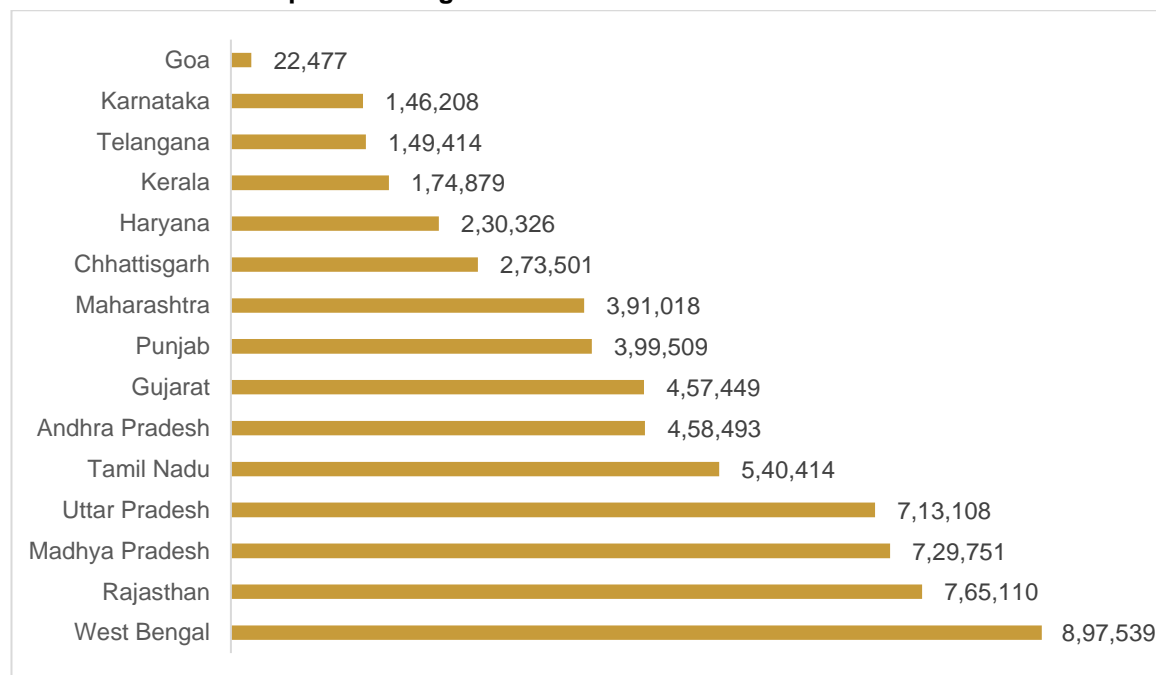


Source: WHO global burden of disease, India: Health of the Nation's States, CRISIL MI&A Research

Madhya Pradesh recorded one of the highest numbers of NCDs in CY2020

As per the National Health Profile 2021, out of 47,162,208 patients who attended NCD clinics in CY20 in India, 5.79% were diagnosed with diabetes, 6.97% with hypertension, 0.35% with cardiovascular ailments, 0.16% with stroke, and 0.14% with common cancers. Out of the states compared below, West Bengal topped the number of persons diagnosed with NCDs out of those screened in CY2020 with 8,97,539 cases. Madhya Pradesh recorded the third highest cases in India with 7,29,751 cases in CY20. Maharashtra, recorded 3,91,018 cases in CY20. The above statistics indicate that Western and Central India states require considerable healthcare services and the demand for healthcare is also forecasted to go up.

State-wise number of persons diagnosed with NCDs in CY 2020



States considered for analysis – Goa, Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, West Bengal,

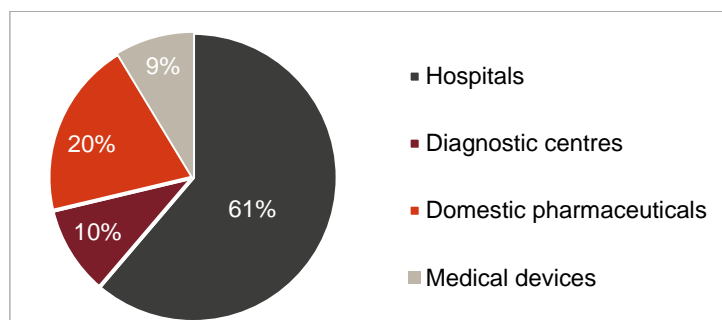
Data for National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) from January 2020 to December 2020.

* Telangana excludes data for cardiovascular disease as it was not reported by the state.

Source: NHP 2021, CRISIL MI&A Research

2 Structure of the healthcare delivery industry in India

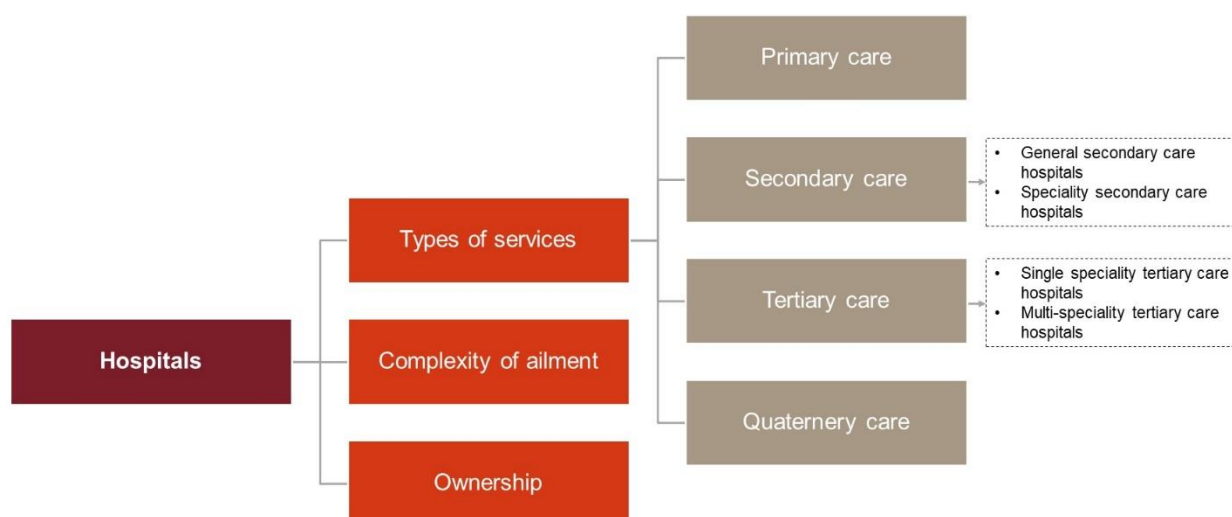
2.1 Overview



Source: CRISIL Research

CRISIL Research estimates the healthcare delivery market, consisting of hospitals and diagnostic centres, to account for a major share of the healthcare pie (71%), followed by domestic pharmaceuticals (20%) and medical devices market (9%) as of fiscal 2020.

2.2 Classification of hospitals



Classification of hospitals based on services offered

Primary care/ dispensaries/ clinics

Primary care facilities are outpatient units that offer basic, point-of-contact medical and preventive healthcare services, where patients come for routine health screenings and vaccinations. These do not have intensive care units (ICU). Primary care centres also act as feeders for secondary care/ tertiary hospitals, where patients are referred to for treatment of chronic/ serious ailments.

Secondary care

Secondary care facilities diagnose and treat ailments that cannot be treated in primary care facilities. These act as the second point of contact in the healthcare system. There are two types of secondary care hospitals - general and specialty care.

- General secondary care hospitals

These hospitals are approached for common ailments, and attract patients staying within a radius of 30 km. The essential medical specialties in general secondary care hospitals include: internal medicine, general surgery, obstetrics and gynaecology, paediatrics, ear-nose-throat (ENT), orthopaedics, and ophthalmology. Such a hospital typically has one central laboratory, a radiology laboratory, and an emergency care department. Generally, secondary care hospitals have 50-100 in-patient beds, a tenth of which are allocated for the ICU segment. The remaining beds are equally distributed between the general ward, semi-private rooms, and single rooms.

- **Specialty secondary care hospitals**

These hospitals are located in district centres, treating patients living within a radius of 100-150 km. They usually have an in-patient bed strength of 100-200, 15% of which are reserved for critical care units. The balance is for private rather than general ward beds. Apart from medical facilities offered by a general secondary care hospital, specialty secondary care hospitals treat ailments related to gastroenterology, cardiology, neurology, dermatology, urology, dentistry, and oncology. These hospitals may also offer some surgical specialties, but they are optional. Diagnostic facilities in a specialty secondary care hospital include: a radiology department; biochemistry, haematology and microbiology laboratories; and a blood bank. They also have a separate physiotherapy department.

Tertiary care

Tertiary care hospitals provide advanced healthcare services, usually on referral from primary or secondary medical care providers.

- **Single-specialty tertiary care hospitals**

These treat a particular ailment (such as cardiac, cancer, etc). Prominent facilities in India include: Escorts Heart Institute & Research Centre (New Delhi); Tata Memorial Cancer Hospital (Mumbai); HCGEL Oncology (Bengaluru); Sankara Nethralaya (Chennai); National Institute of Mental Health & Neuro Sciences (NIMHANS, Bengaluru); and Hospital for Orthopaedics, Sports Medicine, Arthritis and Trauma (HOSMAT, Bengaluru).

- **Multi-specialty tertiary care hospitals**

These hospitals offer all medical specialities under one roof and treat complex cases such as multi-organ failure, high-risk, and trauma cases. Most of these hospitals derive a majority of their revenue through referrals. Such hospitals are located in state capitals or metropolitan cities and attract patients from across states. They usually have more than 150-200 beds. Medical specialties offered include: cardio-thoracic surgery, neurosurgery, nephrology, surgical oncology, neonatology, endocrinology, plastic and cosmetic surgery, and nuclear medicine. In addition, these hospitals have histopathology and immunology laboratories as a part of its diagnostic facilities. Lilavati Hospital, Hiranandani Hospital, Jupiter Hospitals, Jaslok Hospital, Ruby Hall Clinic, Sahyadri Hospital, Bombay Hospital in West India are multi-specialty tertiary care hospitals.

Quaternary care hospitals

Quaternary care hospitals are an extension of tertiary care in reference to advanced levels of medicine which are highly specialised and not widely accessed, and usually only offered in a very limited number of hospitals. Experimental medicine and some types of uncommon diagnostic or surgical procedures are considered quaternary care.

Classification of hospitals by facilities/ services offered

	Primary care	Secondary care	Tertiary care
Services	Provides all services as required for the first point of contact	Provides all services as required, including organised medical research	Provides all services as required, including provision for experimental therapeutic modalities and organised research in chosen specialities
Multi-disciplinary	Yes	Yes	Single- or multi-speciality
Type of service	Only medical services and excludes surgical services	Overall medical and surgical services	Complex surgical services with sophisticated equipment
Type of patient	Only outpatient	Inpatient and outpatient	Primarily inpatient
No of beds	0 beds	50-200 beds	>200 beds
Dependent on	Secondary and tertiary care hospitals for further diagnosis and support	Tertiary care hospital for diagnostic and therapeutic support on referral and for patient transfer	Tertiary care/secondary hospital for referrals for its workload
Investment	Low investment required	Medium	High

Classification based on complexity of ailment

Healthcare delivery may also be classified as primary, secondary and tertiary, on the basis of the complexity of ailment being treated. For instance, a hospital treating heart diseases may be classified as a primary facility if it addresses conditions such as high cholesterol; as a secondary facility if it treats patients suffering strokes; or as a tertiary facility if its deals with cardiac arrest or heart transplants.

Indicative split of ailments & medical treatments provided basis various categories of hospitals & complexities of ailment

Ailment/ condition	Primary	Secondary	Tertiary
Acute infections	Fever	Typhoid/ jaundice	Hepatitis B,C
Accidents/ injuries	Dressing	Fracture	Knee/ joint replacements / brain haemorrhage
Heart diseases	High cholesterol	Strokes	Cardiac arrest/ heart attacks/ heart transplantation/ heart defects like hole in heart, CABG* surgery for heart ailments
Maternity	Diagnosis/ check-ups	Normal delivery/ caesarean	Normal delivery/ caesarean/ post-delivery complications such as brain fever
Cancer	Lump diagnosis/ check-ups	Tumour – medical and radiation therapy	Medical, surgical-robotic surgery to remove minimal access tumour and radiation therapy

*CABG: Coronary artery bypass graft

Source: CRISIL MI&A Research

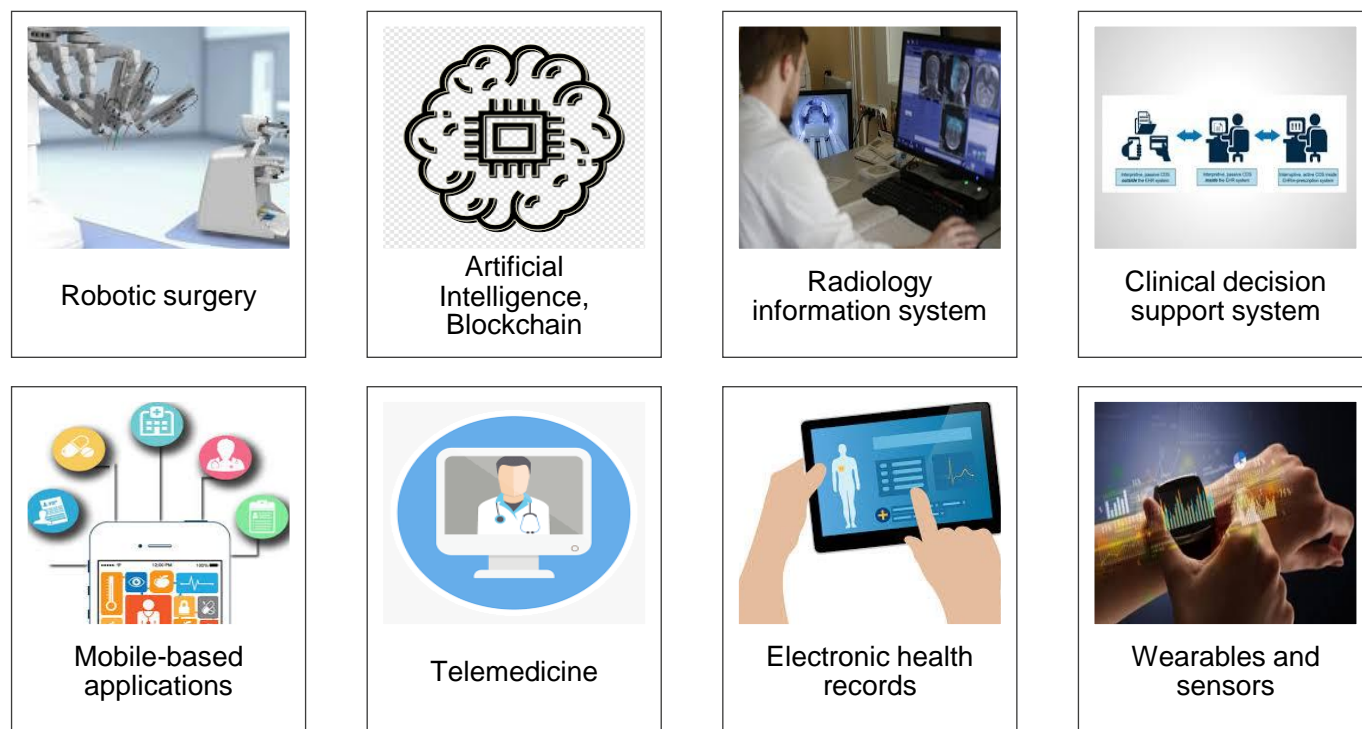
Classification based on ownership

Hospitals can also be classified based on their ownership and management as follows:

Government	<ul style="list-style-type: none"> • Brihanmumbai Municipal Corporation hospitals, KEM Hospital, Cooper Hospital (Mumbai)
Private	<ul style="list-style-type: none"> • Asian Heart Institute, Apollo Hospitals, Medanta, Fortis, Max Healthcare, Jupiter Hospitals
Trust	<ul style="list-style-type: none"> • Lilavati (Mumbai), Hinduja (Mumbai)
Trust owned, but managed by a private party	<ul style="list-style-type: none"> • Two operational models are followed by trusts and private parties: • Medical service agreement - Max Super Speciality Hospital, Patparganj • Operation and management contract - Balabhai Nanavati Hospital in Mumbai; Apollo Hospital in Ahmedabad is owned by a trust but managed by the Apollo Group
Owned by one private player, managed by another	<ul style="list-style-type: none"> • East Coast Hospital in Puducherry was earlier managed by Fortis Healthcare



2.3 Emerging technologies in healthcare delivery



The healthcare industry, like other industries, is constantly evolving in terms of technology. Developments in information technology have helped create systems that ensure faster and reliable services. While, on the one hand, these systems help increase reach and quality of healthcare delivery systems across the country, on the other, they enable healthcare delivery providers to improve efficiency by helping them in resource planning, maintaining patient records, etc. CRISIL Research expects the advent of 5G, smartphone penetration, and increasing health-conscious population to deepen digital healthcare penetration.

Robotic surgery

Robotic surgery or robot-assisted surgery (RAS) is a surgery conducted by using a robotic arm that is controlled electronically by a control pad. The pad may be located at a local or remote place and is equipped with high-definition cameras allowing surgeons to take a closer look at the areas being operated. Since RAS can be performed from remote locations, it allows patients to avail the treatment from the desired specialist surgeons across the globe without having to travel. RAS has been used to conduct general surgery, bypass surgery, colorectal surgery, gastrointestinal surgery, neurosurgery, orthopaedic surgery, etc

Electronic health records

EHRs are designed to manage detailed medical profile and history of patients such as medication and allergies, immunisation status, laboratory test results, and radiology images. Information stored in EHRs can be in a combination of various formats including picture, voice, images, graphs, and videos. Besides storing information, EHRs have the capability of analysing data with respect to a specific ailment, generating customised reports, setting alarms and reminders, providing diagnostic decision support, etc.

EHRs can be shared between multiple systems allowing doctors from various specialties and hospitals to share the same set of patient data. This feature helps improve coordination between doctors, saves time, and prevents

redundancy of recreating medical records. EHRs allow medical histories to be transferred quickly and accurately, thereby ensuring effective and timely treatment. They can be secured with various privacy settings.

Artificial Intelligence (AI) and blockchain

Healthcare establishments like hospitals are looking at opportunities to deploy AI or/and blockchain in improving their operating efficiency – scheduling appointments depending on the gravity of the issue, healthcare monitoring, etc, thereby minimising human error through technological intervention. For instance, NITI Aayog has extended its support to an AI-based project - Radiomics, which is also supported by Tata Memorial Centre Imaging Biobank.

Apollo has partnered with Microsoft to create a cardiovascular disease risk score application programme interface (API) for assigning risk scores to cardiac patients in India. Max Healthcare is also in the process of piloting AI and machine learning (ML) algorithms for prediction of readmission of myocardial infarctions, along with being involved in a project concerning speech to text technology for accurately capturing clinical and radiology information in the systems.

The partnership is beneficial not just for the hospitals, but also for the tech companies that test these technologies on hospital patient data, like Google trying to use AI for detecting diabetic retinopathy at Aravind Eye Care hospitals.

Radiology information system

RIS is a tool that allows managing digital copies of medical imagery such as X-ray, MRI, ultrasound, and associated data on a network. RIS is used by doctors to access medical imagery data from multiple locations. It is connected to medical equipment such as X-ray, MRI and ultrasound machines, which generate diagnosis results in the form of images and graphs.

The RIS directly captures results and feeds them to EHRs, central databases or remote databases. RIS systems are integrated with a dedicated picture archiving and communication modules which ensures that the pictures are stored in a systematic manner and transferred accurately to the intended database or recipient.

Implementation of RIS allows hospitals eliminate the need of generating and maintaining medical imagery on expensive films. RIS enable hospitals to store complete radiology history of patients together. This feature allows generating detailed analytical reports on patient's medical history.

Clinical decision support system

CDSS is a software designed to assist doctors in taking decisions pertaining to the diagnosis and treatment of patients. A CDSS is supported by a large database that has detailed information on ailments with data aspects ranging from symptoms to diagnosis. The database is supported by a set of rules that help generate accurate results for the query made by the user. It also contains patient specific information such as medical history, allergies, etc, which helps doctors to make effective decisions on the treatment. CDSS databases are open-ended to allow addition of information on newly discovered diseases, procedure and medications, rectification of erroneous procedures, and updating of patient information.

Mobile-based application

Healthcare delivery is also seeing an influx of mobile-based applications (mobile apps) to assist doctors as well as patients. These apps provide features such as self-diagnosis, drug references, hospital/doctor search, appointment assistance, electronic prescriptions, etc. While certain apps allow doctors to obtain information on drugs, dosage, contradictions, disease/ condition references and procedures; others allow patients to locate doctors, fix appointments, and opt for video consultations. Furthermore, there are apps that help patients save their medical records and keep them updated regularly.

Even the government is looking at adopting these measures with the launch of UMANG (Unified Mobile Application), which offers 242 services across 57 departments in 12 states. It has a feature to book hospital appointments, check blood availability, and view medical reports online on registration.

Telemedicine

Telemedicine is a technology designed to improve accessibility of healthcare services from remote locations. Telemedicine, through its extensive use of information technology, creates a connection between doctors at the main hospital and patients at remote locations or telemedicine centres. The doctor analyses the patient through telephonic conversation or video conferencing and is assisted by a junior doctor or health worker who is physically present at the telemedicine centre. The junior doctor physically examines the patient and conveys the information, based on which the doctor confirms the diagnosis and prescribes medication. If the ailment is complex, the patient is advised to get admitted at the main hospitals and avail the intensive care facility. This model is useful when there is a dearth of healthcare professionals in the country.

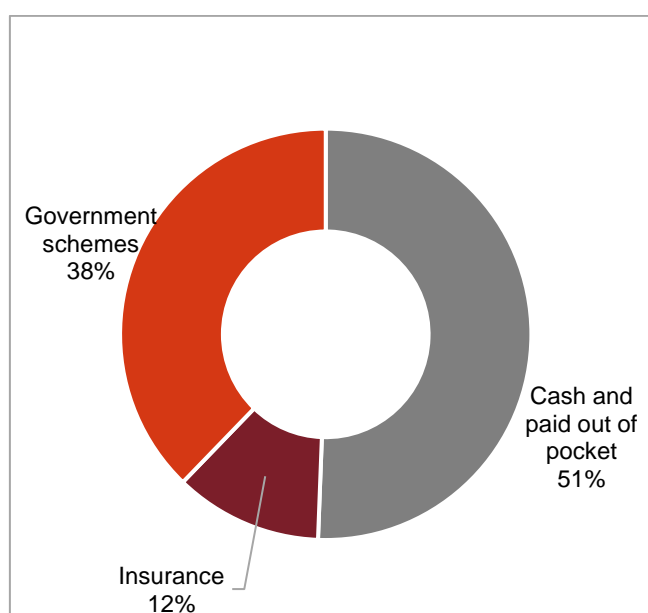
Wearables and sensors

With awareness on healthcare increasing, people have started adopting wearables and sensors that keep a track of the vitals of the user. Wearables and sensors also have data about the user's historical health records and sends out alerts in case of any irregularities. Some sensors are used solely from a curative healthcare perspective, to lead a healthy life with a proper fitness routine.

2.4 Payment modes in Indian healthcare

Government schemes accounted for 38% of the Indian healthcare expenditure in 2020, with PMJAY's contribution being less than 5%. Insurance accounted for 12%, while the major chunk came from cash/out of pocket expenses

Payor mix (India) 2020

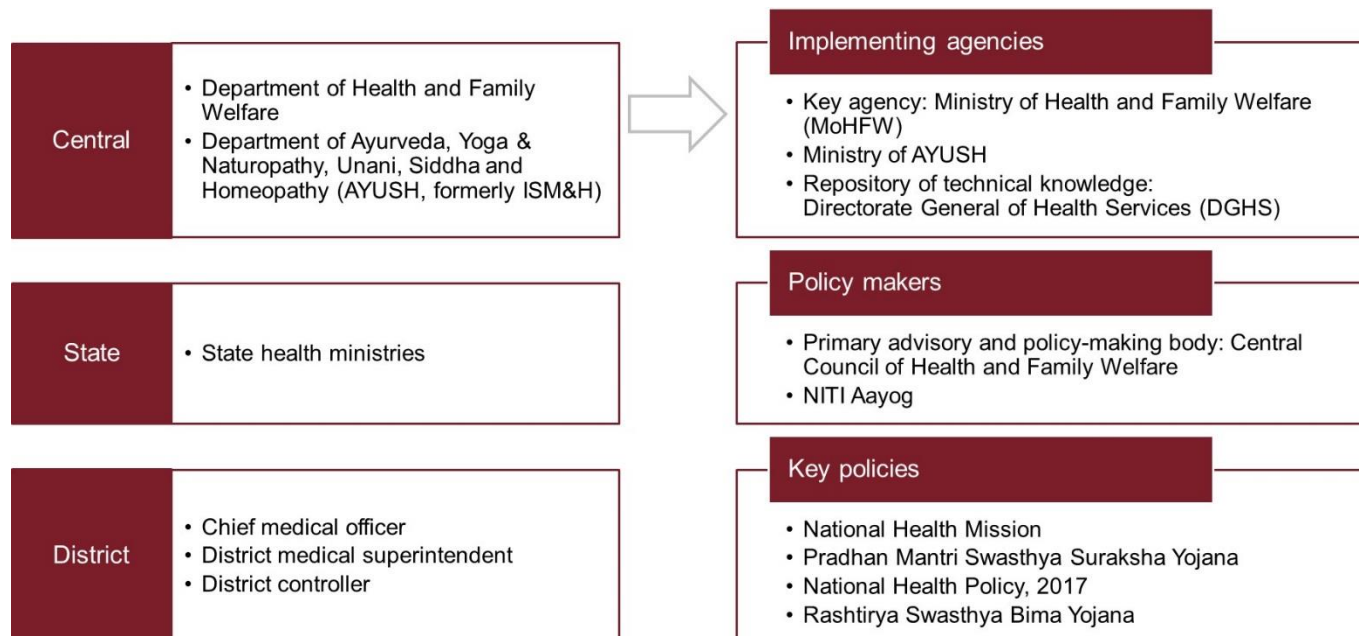


Source: Global Health Expenditure Database - WHO, IRDAI, CRISIL MI&A Research

Government schemes accounted for 38% health expenditure in the country in 2020. PMJAY's contribution was low and accounted for less than 5% of the total healthcare expenditure. 62% was privately funded. Out of this 62%, ~50.6% was out-of-pocket expense and the remaining 11.6% was funded by insurance.

2.5 Regulatory framework for hospitals and healthcare in India

Government framework for healthcare delivery

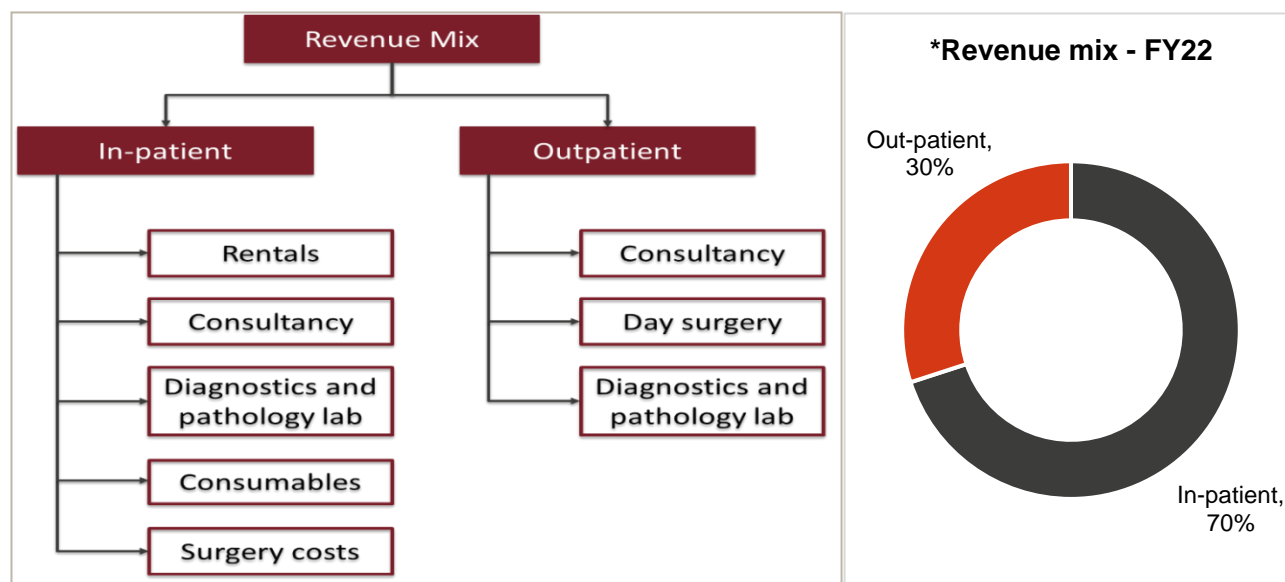


Source: Industry, CRISIL MI&A Research

2.6 Revenue and cost structure review of hospitals

Hospitals derive bulk of their revenue from IPD

The primary revenue streams of hospitals are the In-patient department (IPD) and out-patient department (OPD) segments. Typically, in most hospitals, the OPD contributes to more than three-fourths of total volumes; whereas the IPD accounts for as much as ~70% of the overall revenue as of FY22. This ratio could vary with hospitals, depending on the type of services rendered and the ailment mix. Similar to these estimates, Jupiter Lifeline Hospitals Limited (JLHL) derives ~78.1% of their revenues from IPD while OPD accounts for ~20.4% of their revenues for FY22. Remaining revenue comes from hotel and other income.



Notes: 1) The IPD in a hospital generally consists of beds, operation theatre(s), intensive care unit, supportive services (such as nursing services, pharmaceutical services, laboratory and diagnostics centres) and central sterile and supply department (CSSD)

2) In the OPD, examination, diagnostics and day surgeries are included

*Revenue mix is the estimated average for hospitals across India

Source: CRISIL Research

Surgeries and diagnostics fetch bulk of the IPD revenue

Surgeries and diagnostics account for the bulk of IPD revenue for most hospitals; however, the share of these verticals vary across hospitals, based on the pricing strategies deployed and specialities offered. However, surgical patients generate more revenue as opposed to medical patients. Hospitals used to enjoy high margins on the consumables used. However, after the government has capped the prices of stents and knee implants, they have rationalised their treatment costs by charging for the services rendered. Some hospitals have in-house facilities such as diagnostic centres and pharmacies, while others outsource these services.

Other monitorables that may boost revenue include:

Occupancy levels: Given the high fixed costs (equipment, beds and other infrastructure), occupancy levels need to be commensurate for a hospital to break-even. Most large hospitals operate at over 65-70% occupancy ratio (OR). The following factors aid in ensuring high occupancy levels:

- Good brand recognition
- Reputed doctors
- A strong referral network

Average length of stay (ALOS): Large hospitals usually operate at high occupancy levels but try to keep the ALOS short, which enables them to record higher utilisation levels and ensure that more patients are treated at the same time.

Ailment-wise length of stay

Ailment	ALOS	Remarks
Cardiac	5 days	In complex, surgical cases, ALOS is 7-8 days Angiography – day care; and angioplasty – 2 days

Orthopaedics	3-4 days	Joint replacement surgeries would have relatively higher ALOS
Oncology	5-6 days	Hospitalisation is for surgical cases only. For chemotherapy, there are day-care beds and for radiotherapy, no stay is required
Neurosurgery	8-10 days	Would vary on case-to-case basis depending on the complexity of the case
Ophthalmology	1 day	Day care

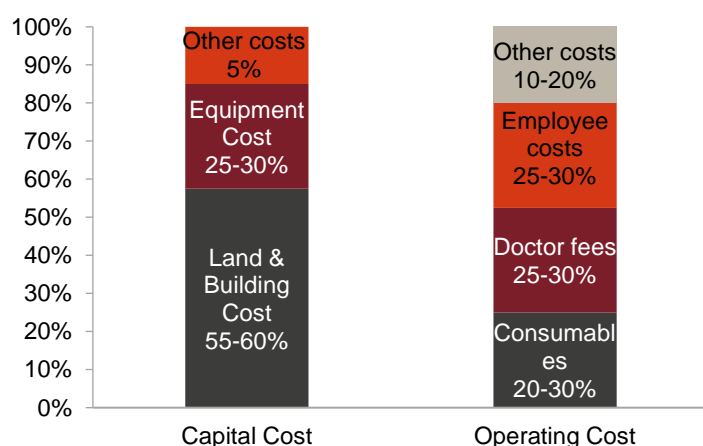
Source: CRISIL Research

Medical patients versus surgical patients: Having a higher number of surgical patients versus medical patients helps hospitals boost revenue. This is because average revenue per surgical patient is higher, given the extensive use of operation theatre and diagnostic facilities.

Capital costs



Typical cost structure of hospitals



Source: CRISIL MI&A Research

Capital cost / bed (excluding land cost)	Secondary care hospital	Tertiary/Quaternary care hospital
Tier - I	Rs 5-8 million	Rs 10 million+
Tier - II	Rs 2.5-5 million	Rs 5-8 million
Tier - III	Rs 1-2.5 million	Rs 2.5-5 million

Players with available land bank in top metro cities have an inherent advantage

The biggest capital costs incurred by hospitals while expanding/entering into top cities are in procuring lands in these cities. Players with available land bank in top cities create a barrier for other players to enter a particular market. Apart from cost of land, availability of land in top cities is also a huge factor. For example, availability of land in Mumbai for a large multi-speciality hospital is scarce and would cost huge capital. Hence, players with available land bank in Mumbai would have an inherent advantage to expand into the market. Jupiter Hospital and Shalby Hospital, with land parcels in Dombivli and Santacruz respectively, are well positioned to capitalise on the opportunity.

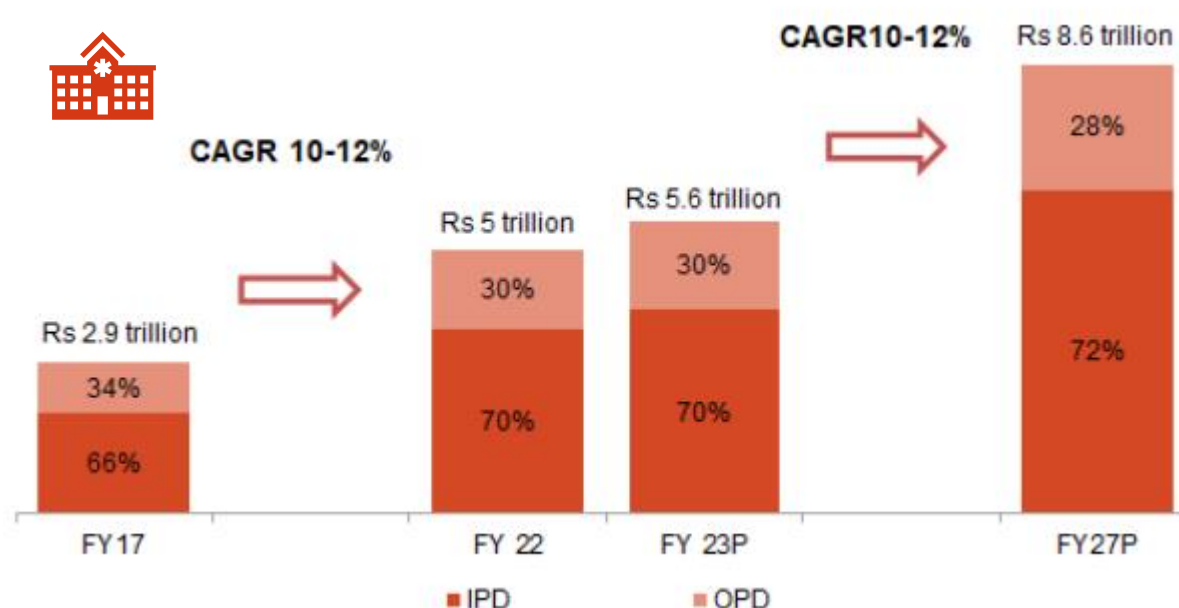
3 Assessment of India's hospital market

3.1 Review and outlook

Indian healthcare delivery market poised for robust growth in the medium term

Breaching pre-covid level in FY22, CRISIL MI&A Research estimates the Indian healthcare delivery industry to post healthy 10-12% compound annual growth rate between fiscals 2022 and 2027, driven by long term structural factors, strong fundamentals, increasing affordability and potential of the Ayushman Bharat scheme.

Overall healthcare delivery market in India



Note: IPD stands for in-patient department and OPD stands for out-patient department. According to CRISIL MI&A Research out-patients are those who are not required to stay at the hospital overnight. It includes consultancy, day surgeries at eye care centres, and diagnostics, and excludes pharmaceuticals purchased from standalone outlets.

Source: CRISIL MI&A Research

Healthcare delivery industry estimated to grow to ~Rs 5.6 trillion in fiscal 2023

CRISIL MI&A Research estimates the Indian healthcare delivery market to reach ~ Rs 5.5 - 5.7 trillion in value terms by end of fiscal 2023, with growth being contributed by stabilisation of regular treatments, surgeries and OPD amid minimization of disruption due to the pandemic and expansion of ARPOB for the sector. A potential upside is also expected from picking up of high realisation medical tourism as international travel restrictions are relaxed. Within the overall healthcare delivery market, the in-patient department (IPD) is expected to account for nearly 70% (in value terms), while the balance is to be catered by the out-patient department (OPD). Though in terms of volumes, OPD volumes outweigh IPD volumes, with the latter contributing the bulk of the revenues to healthcare facilities.

As opposed to fiscal 2022, when government investment growth in the sector reduced on the high base of fiscal 2021 to combat the pandemic, the private sector complemented the role of the government in fiscal 2022 in the second wave, which was an upside especially for hospitals where occupancies were typically on the lower side.

Growth was driven in fiscal 2022 by low base and the pent-up demand from deferred treatments due to covid waves.

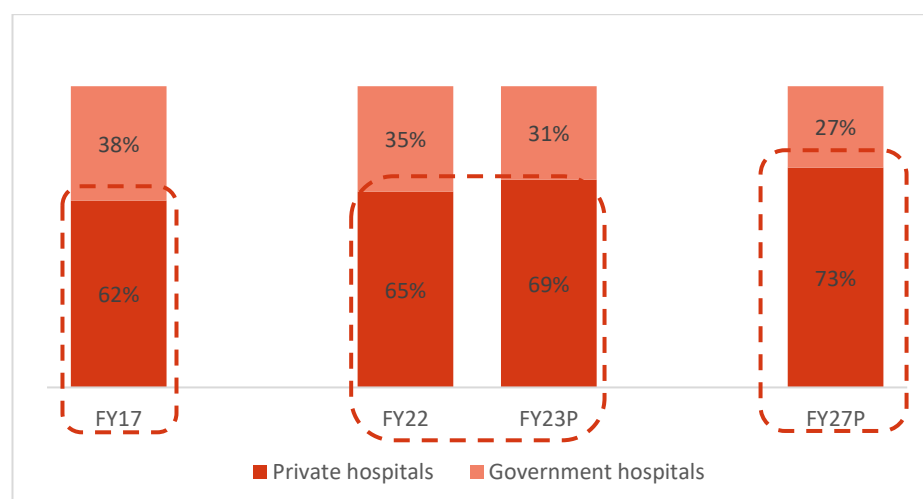
Healthcare delivery industry to grow 10-12% from FY22 to FY27

With long term structural factors supporting growth, renewed impetus from PMJAY and government focus shifting onto healthcare sector, the healthcare delivery market in India is expected to grow at 10-12% compounded annual growth rate (CAGR) and reach Rs 8.6 trillion in fiscal 2027.

From fiscal 2018 to fiscal 2022, major hospital chains have added supply (~2-3% of their incremental supply during the period). The supply was largely affected during the covid period as from fiscal 2020 to fiscal 2022, major hospital chains supply was declined by ~1-2%. The government is also expected to augment this via the Ayushman Bharat scheme which aims to create 1,50,000 Health and Wellness centers (~1,54,338 HWC's created till Dec 2022) for strengthening primary & secondary infrastructure in the country. The other contributors to the demand are more structural in nature, like, increase in lifestyle-related ailments, increasing medical tourism, rising incomes and changing demography.

In India, healthcare services are provided by the government and private players, and these entities provide both IPD and OPD services. However, the provision of healthcare services in India is skewed towards the private players (both for IPD and OPD). This is mainly due to the lack of healthcare spending by the government and high burden on the existing state health infrastructure. The share of treatments (in value terms) by the private players is expected to increase from 60% in fiscal 2018 to nearly 70% in fiscal 2027, the share only witnessing a slight dip in fiscal 2021. The skew is more towards the private players owing to the expansion plans of private players being centered on it, further buttressed by increasing reliance on private facilities till government infrastructure is properly put in place.

Share of treatments in value terms (government hospitals versus private hospitals/clinics)



Source: CRISIL MI&A Research

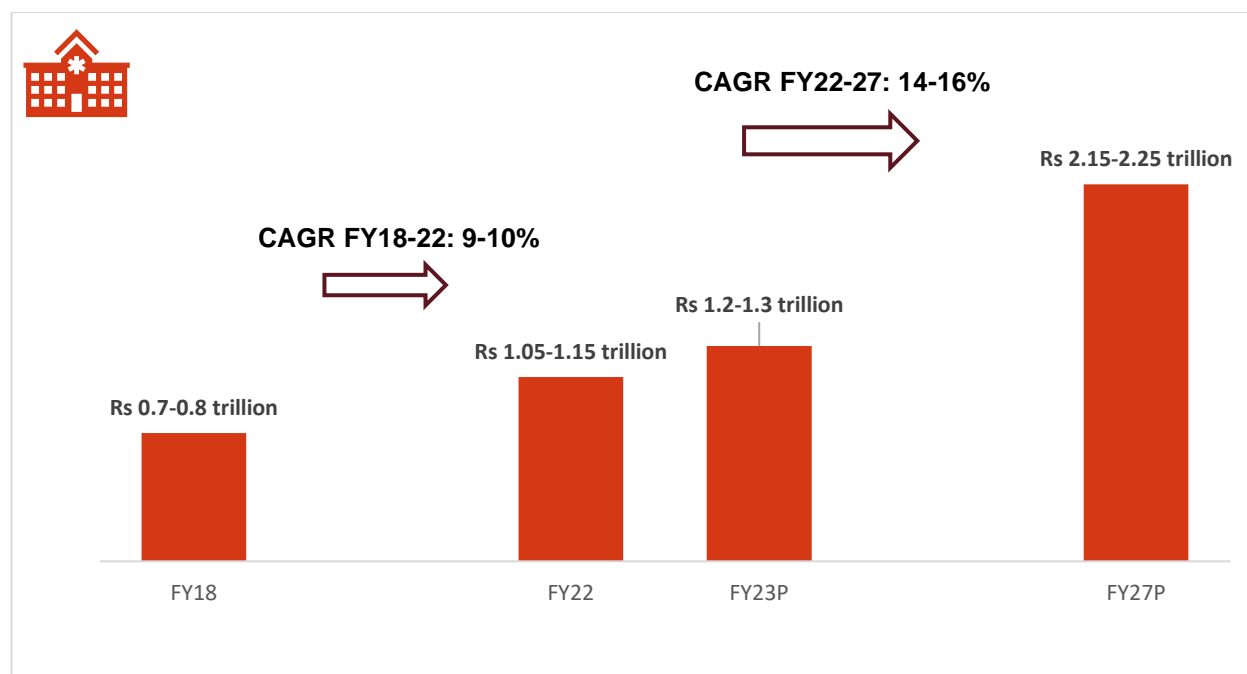
Western region to witness strong growth in healthcare sector

Some western region states such as Gujarat and Goa have increased focus on healthcare spending to improve healthcare infrastructure and services ranking 4th and 12th respectively in terms of healthcare spending compared to overall spending. Health infrastructure of Maharashtra is better compared to many states in the country as it ranked 7th on Niti Ayog health index (index ranks states based on various health parameters). The region has also performed strongly in terms of GDP and per capita income growth. In fiscal 2021, Maharashtra, and Gujarat were top rankers in terms of gross state domestic product (GSDP) at constant prices. Also, in terms of per-capita net

state domestic product (NSDP) at constant prices, Goa led all the states in India in FY21 with a per capita income of Rs 0.30 million. Gujarat and Maharashtra had a per capita NSDP of Rs 0.16 and 0.13 million respectively, which is higher than the national per capita income of Rs 0.085 million in FY21, indicating a higher paying capacity of the population in the Western region. This trend in growth for the Western region is expected to continue supported by central and state government initiatives for the region and the industrial growth following it. Increase in per capita income is expected to support demand for better healthcare services in Western region of India. As per Insurance Regulatory and Development Authority of India (IRDAI) data for FY22, western region comprising of Gujarat, Maharashtra, Goa and Madhya Pradesh has health insurance penetration of 78% in terms of number of persons covered compared to the population, which is higher than the national average of 38%. The western region being better served by health insurance will also support the growth of healthcare delivery market.

The healthcare market for West India is expected to grow from the current levels of Rs 1.05-1.15 trillion in FY22 to Rs 2.15-2.25 trillion by FY27, at a CAGR of 14-16% between FY22-FY27. Lower penetration of chained hospitals, high population density of the region, increasing average revenue per occupied bed (ARPOB) figures of private players in the region and increasing penetration of health insurance in the region are expected to drive the growth of the healthcare delivery market in the western region of India.

Estimated Western healthcare delivery market (Rs billion)



Note: Western region consists of Maharashtra, Goa, Gujarat, Madhya Pradesh and Union territories of Daman & Diu and Dadra & Nagar Haveli
Source: CRISIL MI&A Research

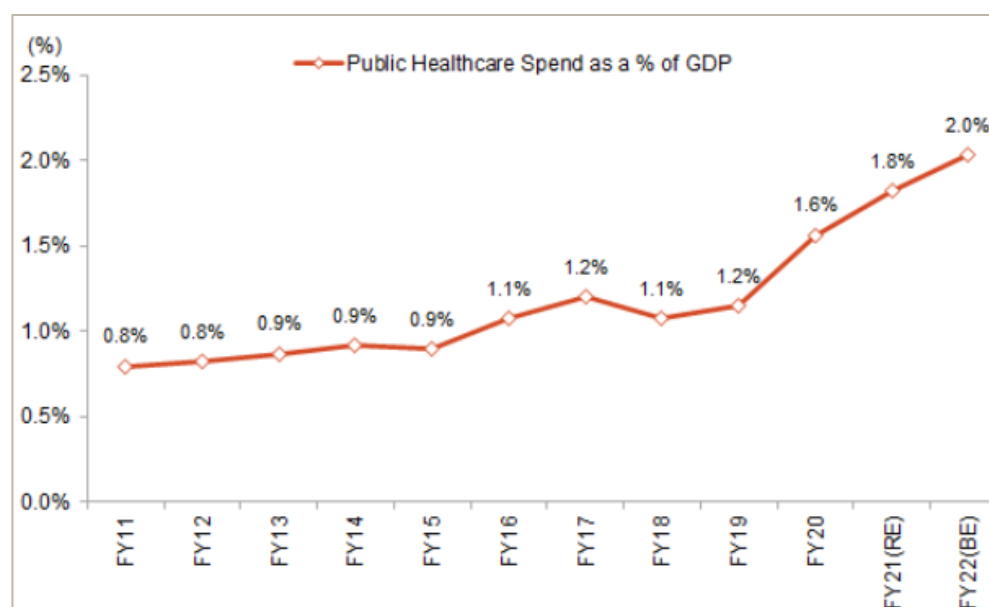
3.2 Key growth drivers of healthcare delivery industry

A combination of economic and demographic factors is expected to drive healthcare demand in India. CRISIL MI&A Research believes the PMJAY scheme launched by the government would also support these drivers. These drivers are expected to lead to better health infrastructure and improvement in overall accessibility of healthcare facilities in the country.

Government policies to improve healthcare coverage

An estimated Rs. 892 billion has been allocated to the ministry of health and family welfare for the fiscal year 2024 from Rs. 764 billion revised estimates in fiscal 2023. The long-term goal is to raise its healthcare spending to 2.5% of GDP by 2025 under the National Health policy 2017 from the current 1.3% of the GDP.

Public expenditure as a proportion of GDP



Note: Total public healthcare expenditure includes budgeted expenditure for states and centre together

Source: Budget document

According to the government, inpatient hospitalisation costs have risen by 300% over the past 10 years and nearly six million families had to sell assets or borrow money to undertake treatment, thereby driving them to poverty.

The PMJAY was launched on September 23, 2018, with the objective of providing affordable healthcare. The scheme primarily has three objectives:

Strengthening of physical health infrastructure: Sub-centres

Upgradation of 0.15 Mn 'Health and Wellness' centres to provide comprehensive healthcare, including coverage of non-communicable diseases and maternal and child health services. These centres would also provide essential medicines and diagnostic services free of cost. Inclusion of new ailments under the ambit of the scheme would go a

long way in ensuring focus on preventive care as opposed to only curative care. A strong referral network is vital in providing a continuum of care.

Strengthening of physical health infrastructure: Government hospitals

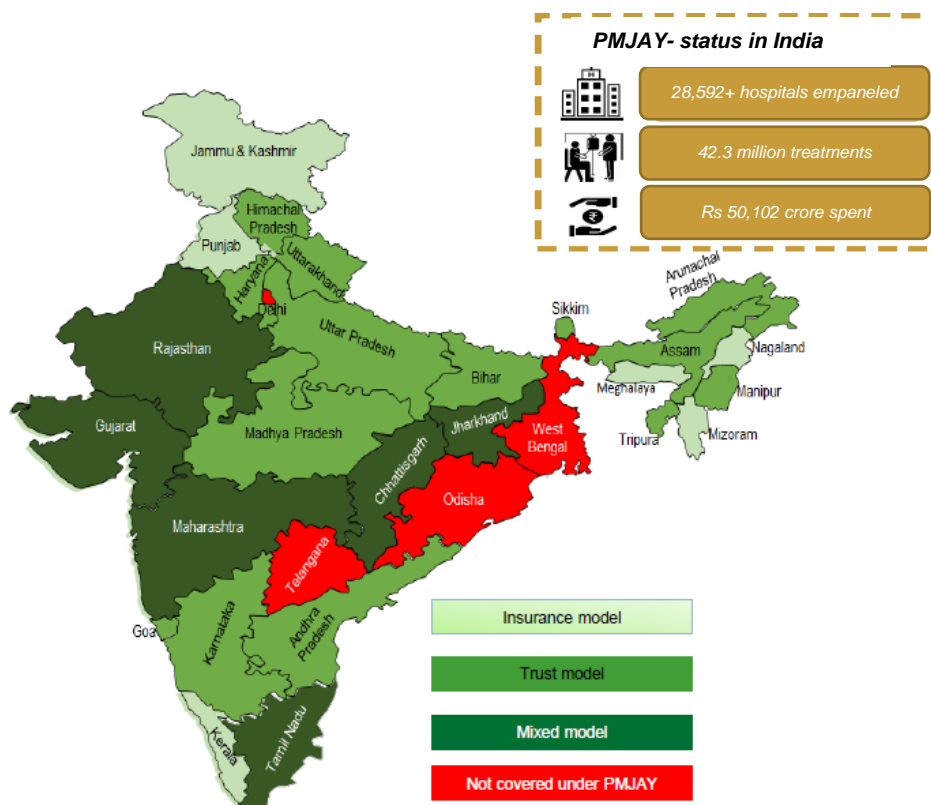
Setting up of 24 new government hospitals and medical colleges and upgradation of existing district hospitals. The intention is to have at least one medical college for three parliamentary constituencies. The government already has a scheme in place, Pradhan Mantri Swasthya Suraksha Yojana (PMSSY), to correct the geographical imbalance in the availability of tertiary healthcare. Six All India Institute of Medical Sciences (AIIMS), one each at Patna (Bihar), Raipur (Chhattisgarh), Bhopal (Madhya Pradesh), Bhubaneswar (Odisha), Jodhpur (Rajasthan), and Rishikesh (Uttarakhand), have been set up. An AIIMS is under construction at Rae Bareilly (OPD services have started) and 13 new ones have been announced by the government. The aim is to tackle issues of inadequate healthcare infrastructure and personnel.

Expansion of health insurance coverage: Ayushman Bharat

This involves a provision of Rs 0.5 million assured healthcare coverage to each family that is eligible, selected on the basis of inclusion under the Socio-Economic Caste Census (SECC) list. Nearly 107.4 million families will be covered under the scheme. All existing central and state health insurance schemes will be subsumed under Ayushman Bharat. The model of implementation of the scheme (via insurance company, trust or mixed model) is the state's prerogative.

However, healthcare delivery at affordable prices would require a shift in focus towards capitalising on volumes (with nearly 165 million new people coming under a healthcare scheme) rather than on value (via margins). The government has started an initiative of National Health Stack (NHS), a shared digital framework for both private and public hospitals. It is expected to digitise all health records and keep track of all details concerning healthcare enterprises in the country. The scheme is well-intentioned and holds huge potential for the healthcare delivery and allied industries, but the mechanism for quality control and monitoring along with raising resources for implementation will be a key monitorable.

Pradhan Mantri Jan Arogya Yojana adds a demand impetus



Note: PMJAY stands for Pradhan Mantri Jan Arogya Yojana; East and Northeast India covers Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Bihar, Jharkhand, Odisha and West Bengal

Source: PMJAY-AB updates, CRISIL MI&A Research

Under the trust-based model, the scheme is directly implemented by the State Health Authority (SHA) without the intermediation of the insurance company. The financial risk of implementing the scheme is borne by the government in this model. Even though no insurance company is involved, the SHA employs the services of an Implementation Support Agency (ISA) for claim management and related activities.

In the insurance model, the SHA competitively selects an insurance company through a tendering process to manage PMJAY in the state. Based on a market-determined premium, the SHA pays premium to the insurance company per eligible family for the policy period and the insurance company, in turn, completes the claims settlement and makes payments to the service provider. The financial risk for implementing the scheme is also borne by the insurance company in this model.

Under the hybrid/mixed model, the SHA engages both the assurance/ trust and insurance models mentioned above in various capacities with the aim of being more economic, efficient, flexible and allowing convergence with the state scheme. This model is usually employed by brownfield states which had existing schemes covering a larger group of beneficiaries.

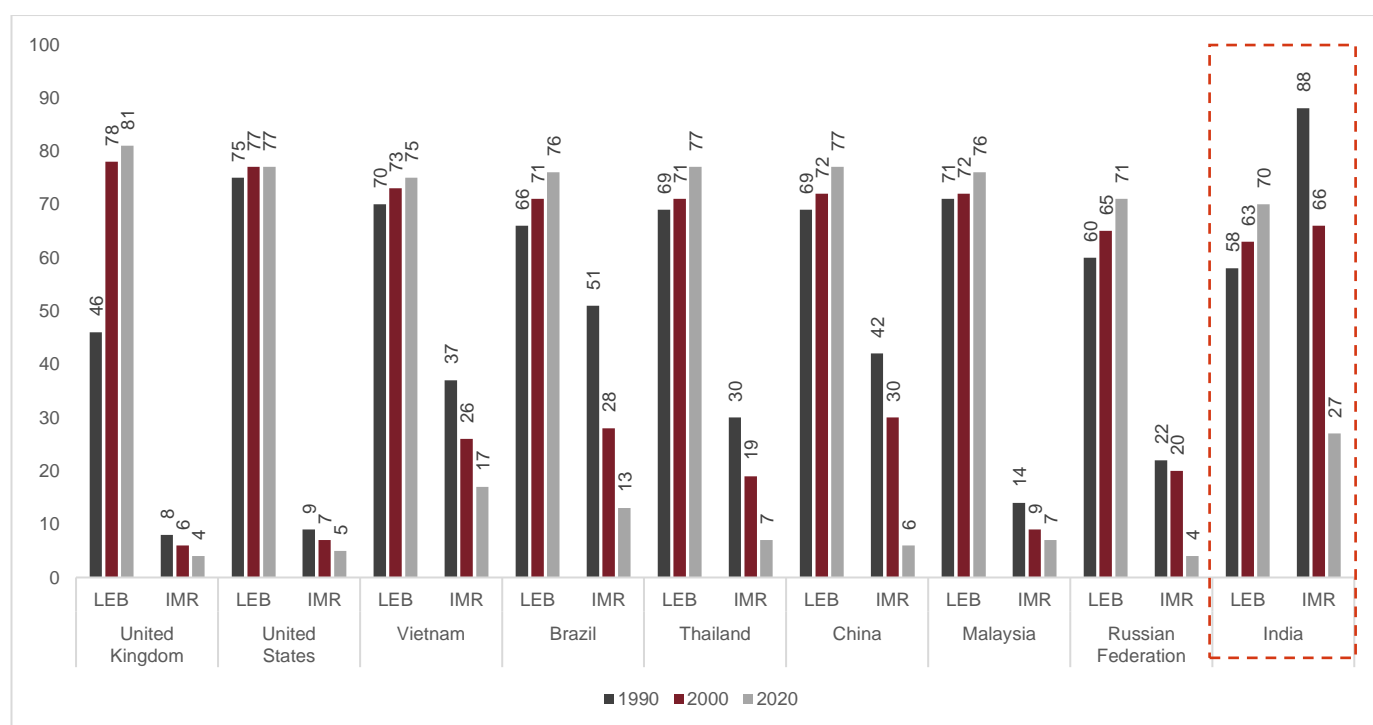
Ayushman Bharat will further provide volume momentum to the sector, with the scheme on its full-scale implementation providing healthcare assurance of Rs 5 lakh per family (on floater basis) to nearly 10.74 crore families (the actual coverage would be greater on account states extending the scheme to even some sections of the uncovered populace). This would mean coverage to approximately 50 crore individuals. As of December 2022, nearly 42.3 million treatments had taken place under Ayushman Bharat since the inception of the scheme in September 2018.

In terms of implementation till date, most states have signed a MoU with the National Health Agency (NHA) under varied implementation models- Trust based, Insurance based or Mixed model, however, some states are yet to kick start full scale adoption. However, states like Madhya Pradesh, Uttar Pradesh and Bihar which were devoid of any health insurance scheme have extended coverage under PMJAY to more than 25% of its population.

With life expectancy improving and changing demographic profile, healthcare services are a must

With improving life expectancy, the demographic profile of the country is also witnessing a change. As of 2011, nearly 8% of the Indian population was of 60 years or more, and this is expected to surge to 12.5% by 2026. However, the availability of a documented knowledge base concerning the healthcare needs of the elderly (aged 60 years or more) remains a challenge. Nevertheless, the higher vulnerability of this age group to health-related issues is an accepted fact.

Life expectancy (at birth) and infant mortality rate: India vs others

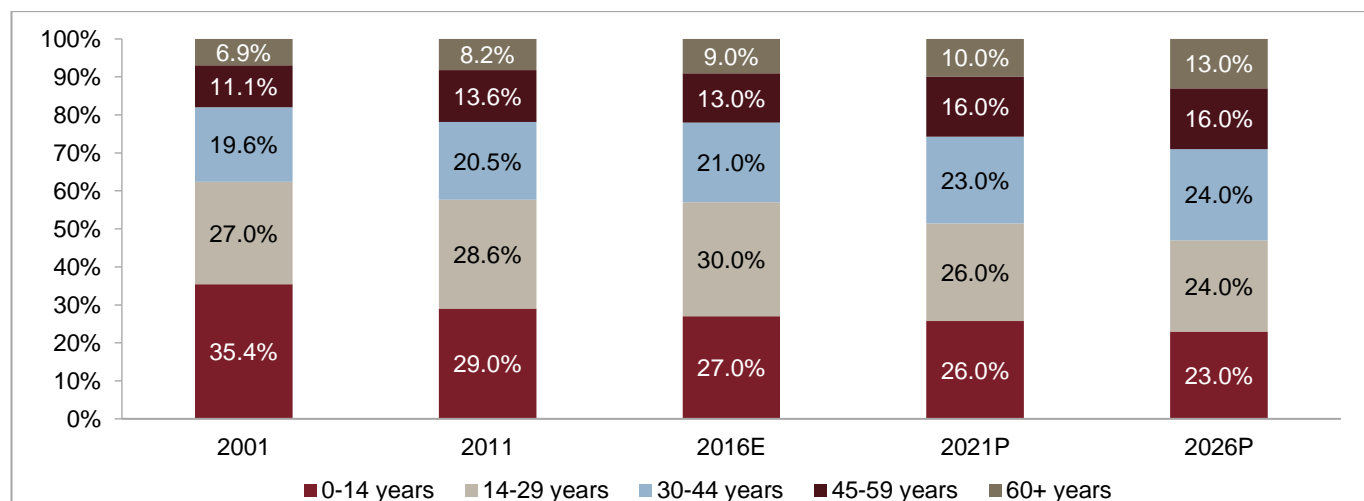


Note: LEB – life expectancy at birth; IMR – infant mortality rate (probability of dying by age one year per 1000 live births)

Source: WHO World Health Statistics 2022, CRISIL MI&A Research

According to the Report on Status of Elderly in Select States of India, 2011, published by the United Nations Population Fund (UNFPA) in November 2012, chronic ailments, such as arthritis, hypertension, diabetes, asthma, and heart diseases, were commonplace among the elderly, with ~66% of the respective population reporting at least one of these. In terms of gender-based tendencies, while men are more likely to suffer from heart, renal and skin diseases, women showed higher tendencies of contracting arthritis, hypertension, and osteoporosis.

Population in 60+ age group to grow faster



Source: Census, CRISIL MI&A Research

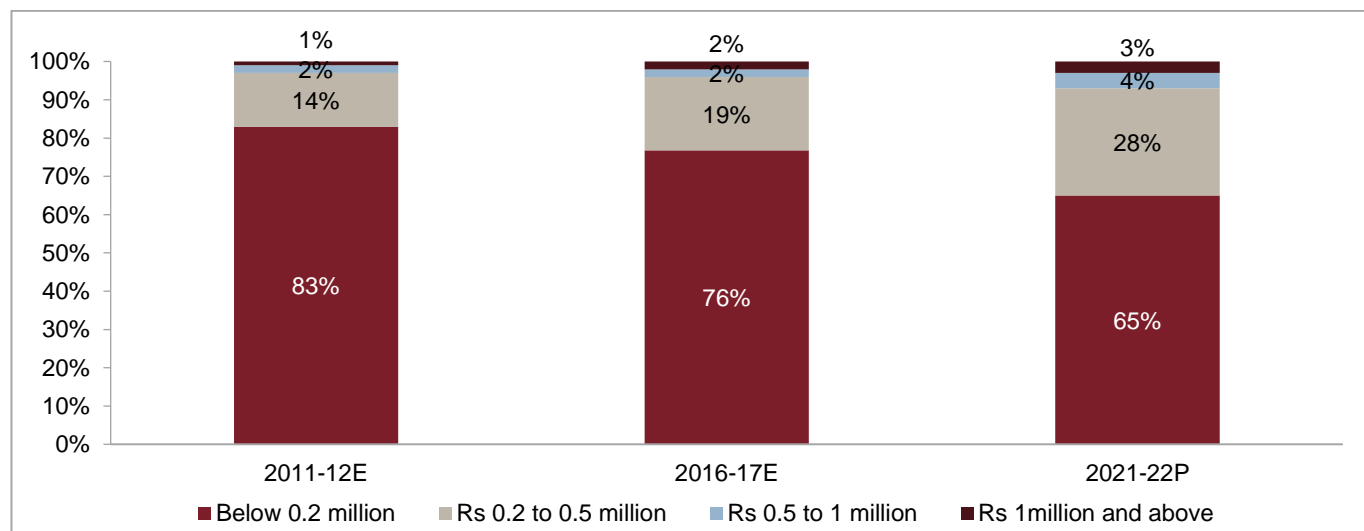
With the Indian population expected to grow to ~1.4 billion by 2026 and considering the above mentioned factors, the need to ensure healthcare services to this vast populace is imperative. This also provides a huge opportunity to expand into a space that bears enormous potential.

Rising income levels to make quality healthcare services more affordable

Though healthcare is considered a non-discretionary expense, considering that ~83% of households in India had an annual income of less than Rs 0.2 million in fiscal 2012, affordability of quality healthcare facilities remains a major constraint.

Growth in household incomes and, consequently, disposable incomes, are critical to the overall growth in demand for healthcare delivery services in India. The share of households falling in the income bracket above Rs 0.2 million is expected to go up to 35% in fiscal 2022 from 23% in fiscal 2017. They provide a potential target segment (with more paying capacity) for hospitals.

Income demographics



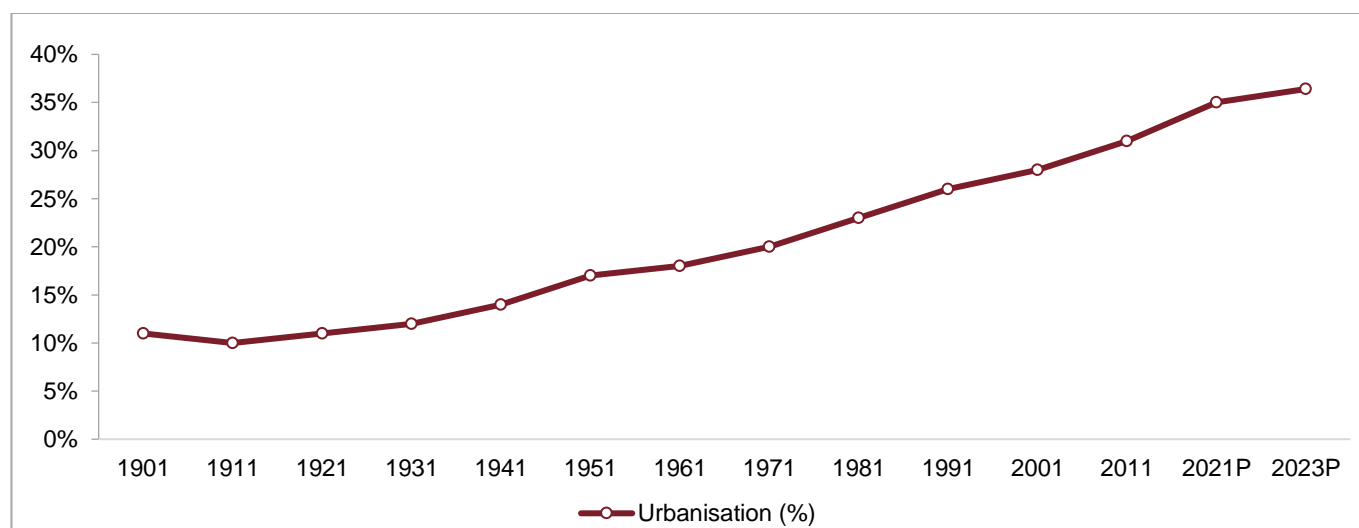
Source: CRISIL MI&A Research

Increasing health awareness to boost hospitalisation rate

Majority of healthcare enterprises in India are more concentrated in urban areas. With increasing urbanisation (migration of population from rural to urban areas), awareness among the general populace regarding presence and availability of healthcare services for both preventive and curative care is expected to increase.

CRISIL MI&A Research, therefore, believes that the hospitalisation rate for in-patient treatment as well as walk-in out-patients will improve with increased urbanisation and increasing literacy.

Urban population in India (% of total population)



Source: UN World Urbanisation Prospects: The 2018 revisions

Non-communicable diseases, a silent killer

As opposed to the decreasing rate in communicable diseases, lifestyle-related illnesses or non-communicable diseases (NCDs) have been increasing rapidly in India over the past few years. The contribution of NCDs to the disease profile has risen from 30% in 1990 to 55% in 2016. Statistics show that these illnesses accounted for nearly 62% of all deaths in India in 2016.

As per the World Economic Forum, the world will lose nearly \$30 trillion by 2030 for NCD treatments and India's burden from this will be \$5.4 trillion.

In 2016, of the total disease burden, the contribution of group of risks (unhealthy diet, high blood pressure, high blood sugar, high cholesterol and overweight), which mainly causes ischemic heart disease, stroke and diabetes, had risen to nearly a quarter. The combination of these risks was highest for states such as Punjab, Tamil Nadu, Kerala, Andhra Pradesh and Maharashtra, but has increased in all other states as well. There were 38 million cases of cardiovascular diseases (CVDs) in 2005, which rose to nearly 64 million cases in 2015.

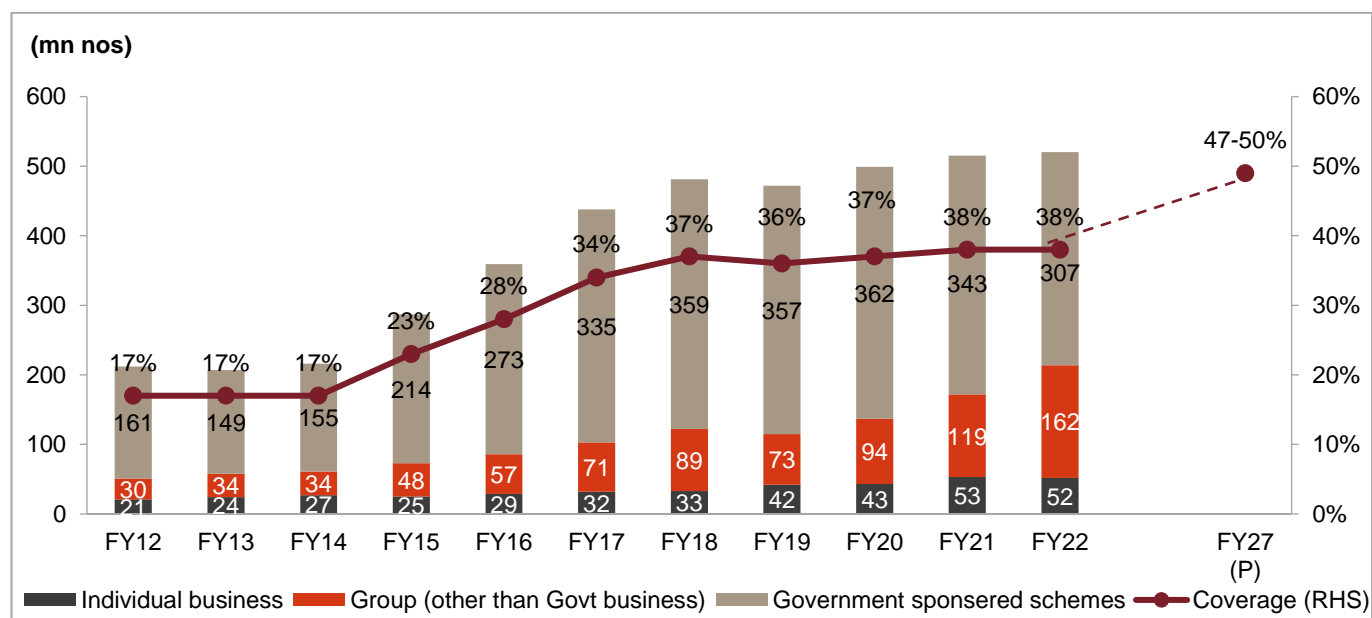
CRISIL MI&A Research believes that NCDs exhibit a tendency to increase in tandem with rising income. WHO projects an increasing trend in NCDs by 2030, following which CRISIL forecasts demand for healthcare services associated with lifestyle-related diseases such as cardiac ailments, cancer and diabetes to rise.

Another emerging market in the country is orthopaedics, which currently comprises a very small proportion compared with NCDs but has a potential market in the country. The orthopaedics market can be classified into four different segments, viz., knee, hip, trauma, and spine, of which the knee-replacement market holds the biggest share, followed by trauma and spine. Hip replacement in India is still a very small segment compared to knee replacement, whereas it is the opposite around the world.

Growing health insurance penetration to propel demand

Low health-insurance penetration is one of the major impediments to the growth of the healthcare delivery industry in India, as affordability of quality healthcare facilities by the lower-income groups remain an issue. Health insurance coverage has increased from 17% in fiscal 2012 to ~38% in fiscal 2022. As per the Insurance Regulatory and Development Authority (IRDA), more than 520 million people have health insurance coverage in India (as of fiscal 2022), as against 288 million (in fiscal 2015), but despite this robust growth, the penetration in fiscal 2022 stood at only 38%.

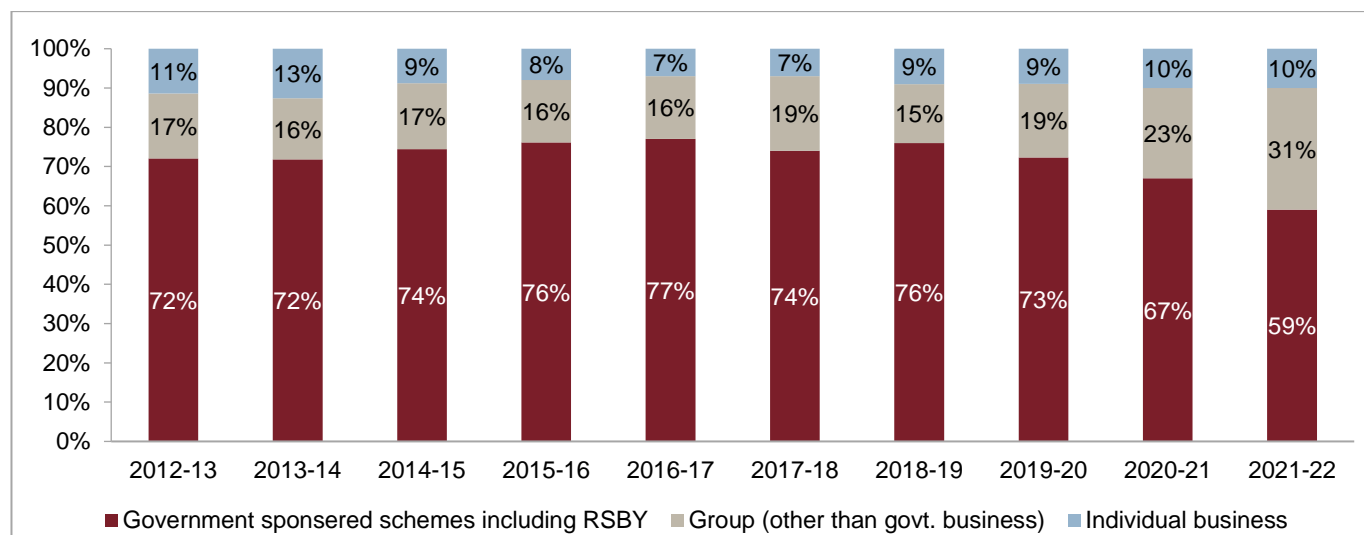
Population-wise distribution among various insurance businesses (million)



Source: IRDAI annual report 2021-22

As is evident, the share of government-provided insurance is greater than that due to insurance policies availed of by individuals not covered under any schemes. Government or government-sponsored schemes, such as the Central Government Health Scheme (CGHS), Employee State Insurance Scheme (ESIS), Rashtriya Swasthya Bima Yojana (RSBY), Rajiv Arogyasri (Andhra Pradesh government), and Kalaingar (Tamil Nadu government) account for ~75% of health insurance coverage provided. The remaining is through commercial insurance providers, both government (Oriental Insurance and New India Assurance.) and private (ICICI Lombard and Bajaj Allianz) players.

Percentage split of number of persons covered under health insurance



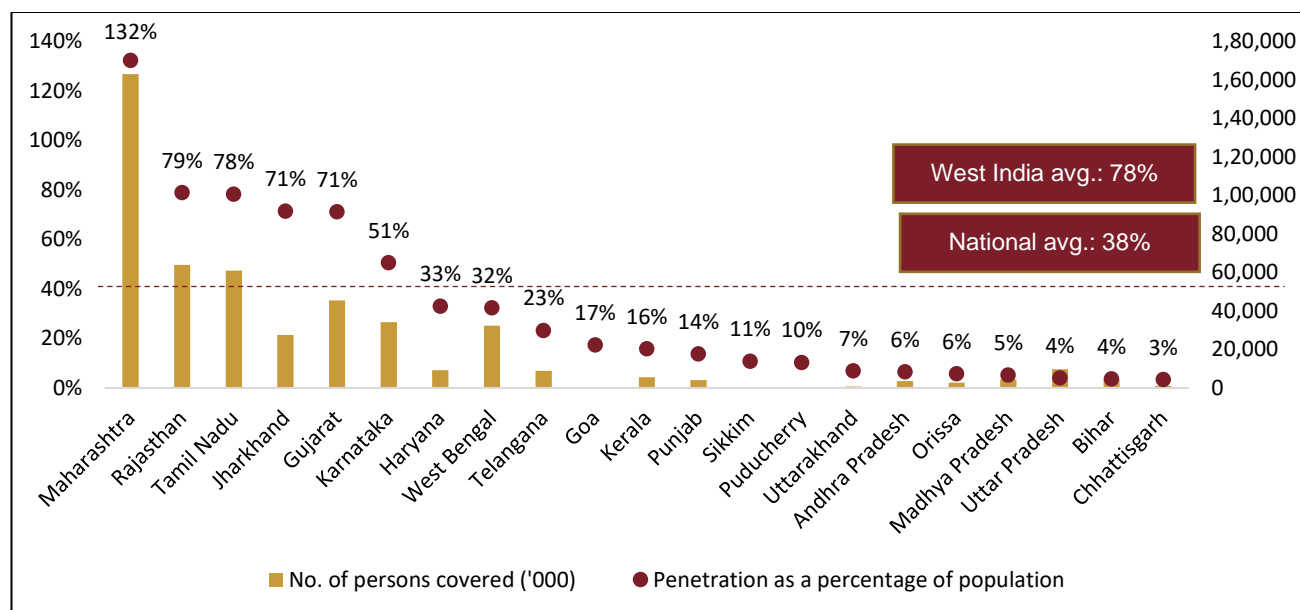
Source: IRDAI annual report 2021-22

CRISIL MI&A Research sees that while low penetration is a key concern, it also presents a huge opportunity for the growth of healthcare delivery industry in India. With the PMJAY scheme and other growth drivers, the insurance coverage in the country is expected to increase to 47-50% by FY27.

With health insurance coverage in India set to increase, hospitalisation rates are likely to go up. In addition, health check-ups, which form a mandatory part of health insurance coverage, are also expected to increase, boosting demand for a robust healthcare delivery platform. Covid-19 has also accelerated the coverage and also online channels which make it easier to get insurance.

Maharashtra and Gujarat among leading states in terms of health insurance penetration

State-wise penetration and number of persons covered under health insurance (select states) FY22



Note: Estimated 2022 population compared with fiscal 2022 health insurance coverage data

Source: Handbook on Indian insurance statistics FY 2021-22, UIDAI, CRISIL MI&A Research

Maharashtra and Gujarat stand out in terms of health insurance penetration among the West India states. Penetration of health insurance coverage in the country stood at 38% in FY22, while the average for West India states of Maharashtra, Goa, Gujarat and Madhya Pradesh was ~78% in FY22.

With schemes such as the PMJAY, health insurance penetration in these states is expected to grow further in the coming years, thus providing a boost to private hospitals. Key regional healthcare provider brands in the states are expected to benefit as patients prefer them on account of the variety of specialisations they provide and the trust they command in the region.

Medical tourism in India

The healthcare costs in developed countries are relatively higher in comparison to India. Some of the factors which makes India an attractive destination for medical tourism is presence of technologically advanced hospitals with specialized doctors and facilities like e-medical visa.

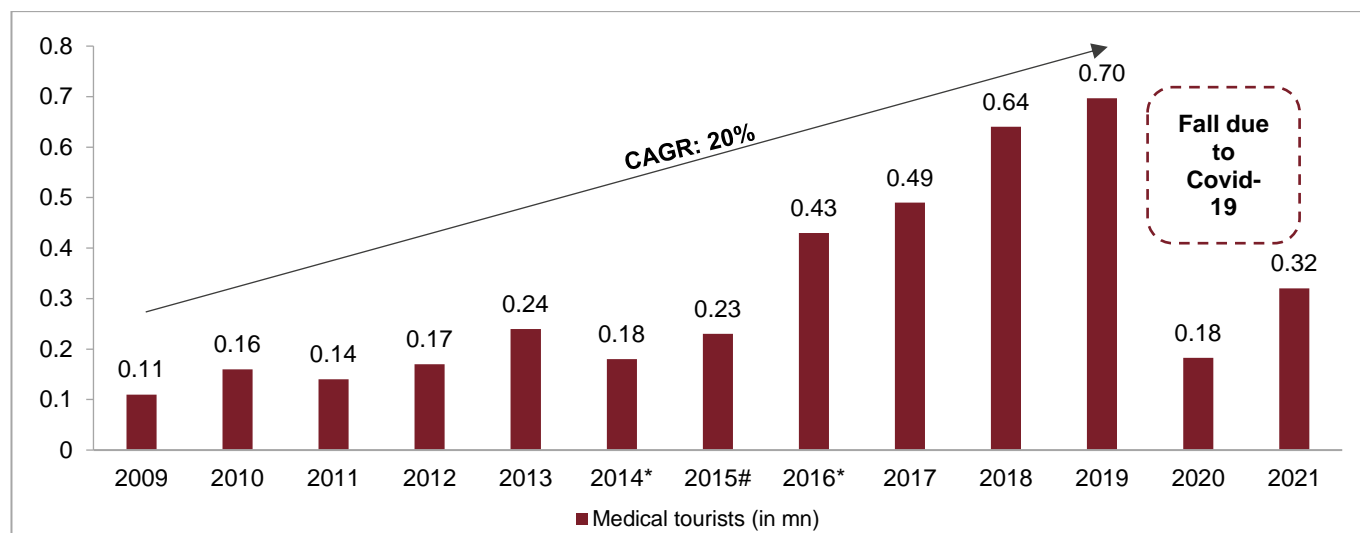
Also, medical tourists from neighboring countries (like Bangladesh – which sees the highest footfall of medical tourists to India) along with Iraq, Yemen, Afghanistan, Oman and some parts of Nepal come to India as they don't have quality care in their countries. Medical tourism is not just driven by cheaper prices. Mumbai and Pune being tier-I cities are well connected by flights to these countries. The health infrastructure offered along with the tourism has made both Mumbai and Pune important medical tourism destinations in West India.

Treatments mostly sought after in India are for heart surgery, knee implant, cosmetic surgery and dental care, due to their relatively low costs. Medical tourism in India is driven by the private sector.

As per the Ministry of tourism, countries like Singapore, Malaysia and Thailand also offer medical care facilities to foreigners but what differentiates India apart from state-of-the-art infrastructure with reputed healthcare professionals is traditional healthcare therapies like Ayurveda and Yoga combined with allopathic treatments providing holistic wellness.

According to the latest data available with the Ministry of Tourism, of the total foreign tourist arrivals in India, the proportion of medical tourists has grown from 2.2% (0.11 million tourists) in 2009 to 6.38% (0.62 million tourists) in 2019. However, the number of medical tourists fell sharply in 2020 (0.18 million tourists) because of international travel restrictions due to covid 19. The number of medical tourists recovered to 0.32 million tourists in 2021. The government has constituted a National Medical and Wellness Tourism Board along with provision of financial assistance to the tune of Rs 0.6 million to medical tourism service providers under market development assistance (MDA) to develop medical tourism in India. The government had estimated medical tourism to be worth 9 billion USD by 2020 garnering 20% of the global share, up from the 3 billion USD in 2015, however we might have fallen short of this figure in the year 2020 owing to travel restrictions put in place due to Covid pandemic.

Growth in medical tourists*



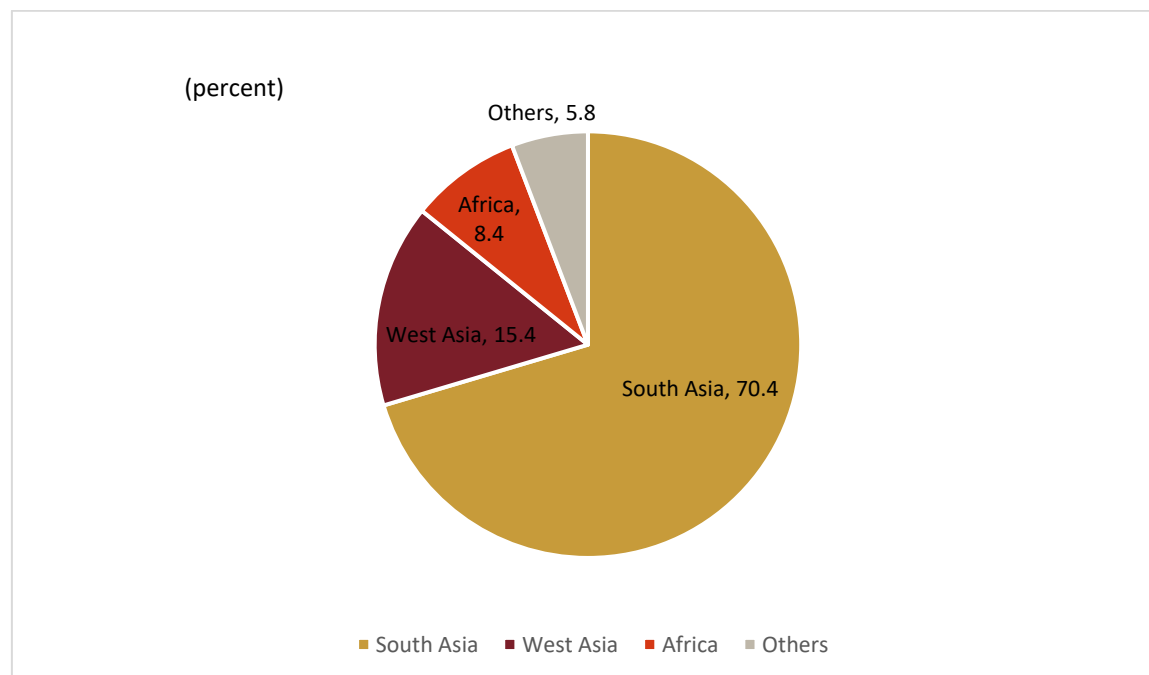
Note: * Includes all types of medical and medical attendant visa; #includes medical visa and medical attendant visa

Source: Ministry of Tourism

About two-thirds of medical tourism demand from South Asia

More than 94% of medical tourists are from countries in Africa, west and south Asia. Medical tourists from countries like United Kingdom and Canada are also seeing an increase, given long waiting periods for availing of treatments in these regions.

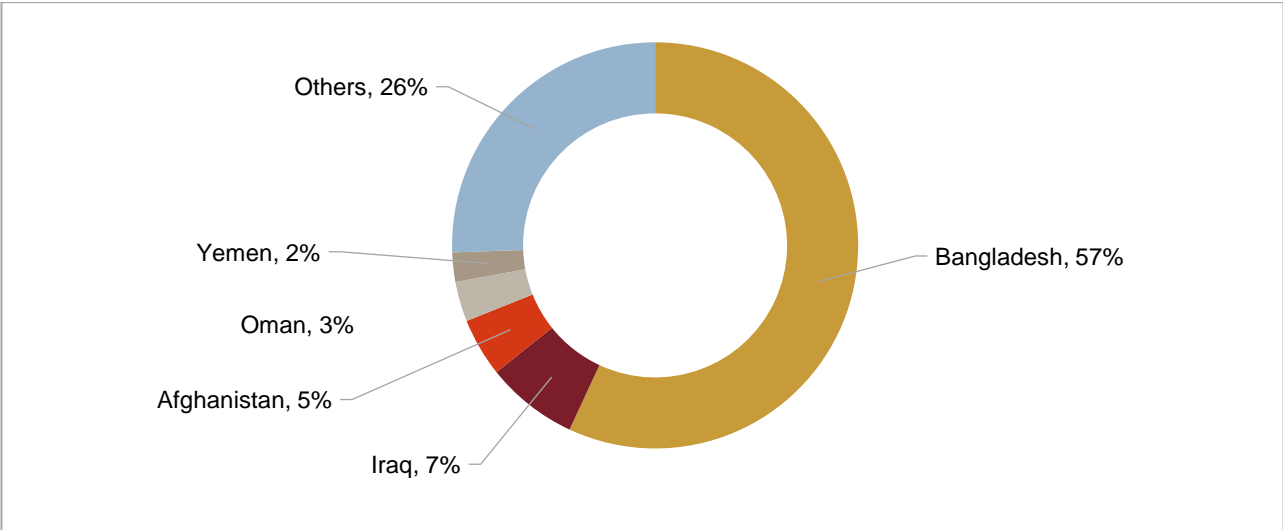
Break-up of medical tourists* by major region of origin (CY2019)



Note: * Proportion of medical tourists of the overall foreign tourist arrivals, 2019

Source: Ministry of Tourism, CRISIL MI&A Research

Break-up of medical tourists* by major country of origin (CY2019)



Note: Based on data as of CY19 as CY20 and CY21 were impacted due to Covid-19

Source: Ministry of Tourism

Country-wise cost of key treatment procedures (in \$)

Ailments (\$)	US	Korea	Singapore	Thailand	India
Hip replacement	50,000	14,120	12,000	7,879	7,000
Knee replacement	50,000	19,800	13,000	12,297	6,200
Heart bypass	144,000	28,900	18,500	15,121	5,200
Angioplasty	57,000	15,200	13,000	3,788	3,300
Heart valve replacement	170,000	43,500	12,500	21,212	5,500
Dental implant	2,800	4,200	1,500	3,636	1,000

Source: CRISIL MI&A Research

Improved healthcare services in India adding to the trust of patients

Over the last few years, healthcare services have improved in India which has resulted in better clinical outcomes. This is evident from notable improvement in the following demographics:

- India has experienced notable improvement in child mortality by reducing the Neo-Natal Mortality Rate (NNMR) from 40 deaths per 1000 live births during 2001 to 23 in 2018 and Under Five Mortality Rate (per 1000 live births) from 59 in 2010 to 36 in 2018.
- India has witnessed notable improvement in maternal health by bringing down the Maternal Mortality Ratio to 113 maternal deaths per 1,00,000 live births in 2016-18, from 301 during 2001-03.
- During the last two decades, India has added more than five years to average life expectancy at birth of its population from 63.4 years in 1999-2003 (mid-year 2001) to 69.4 years in 2014-18 (mid-year 2016)

Improving clinical outcomes creates a strong trust among patients which is a key driver of growth for the healthcare sector.

3.3 Key challenges for the healthcare delivery industry

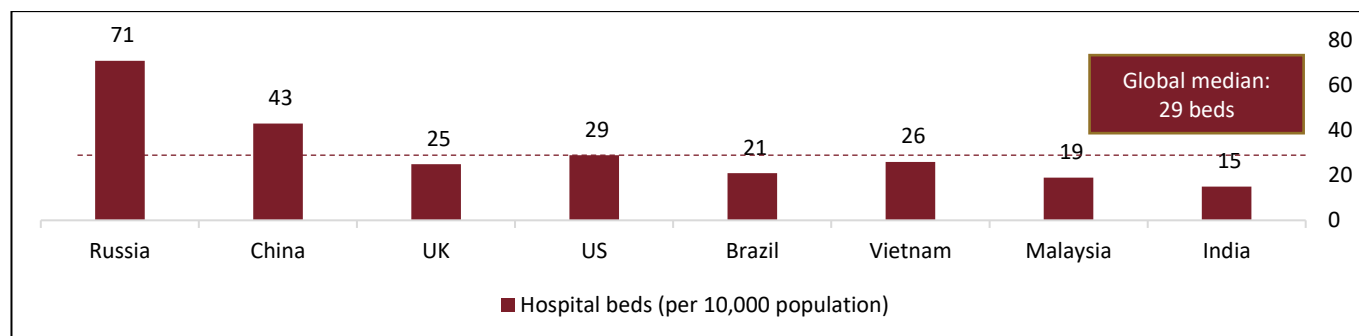
The potential demand and opportunities in healthcare in India aside, many challenges exist, mainly: inadequate health infrastructure and unequal quality of services provided based on affordability and healthcare financing.

Health infrastructure in dire need of improvement

The adequacy of a country's healthcare infrastructure and personnel is a barometer of its quality of healthcare. This, in turn, can be assessed from bed density (bed count per 10,000 population) and availability of physicians and nurses (per 10,000 population).

For India, that's where the concern begins. The country comprises nearly a fifth of the world's population, but has an overall bed density of merely 15, with the situation being far worse in rural than urban areas. India's bed density not only falls far behind the global median of 29 beds, it also lags that of other developing nations, such as Brazil (21 beds), Malaysia (19 beds), and Vietnam (26 beds).

Hospital bed density: India vs. other countries

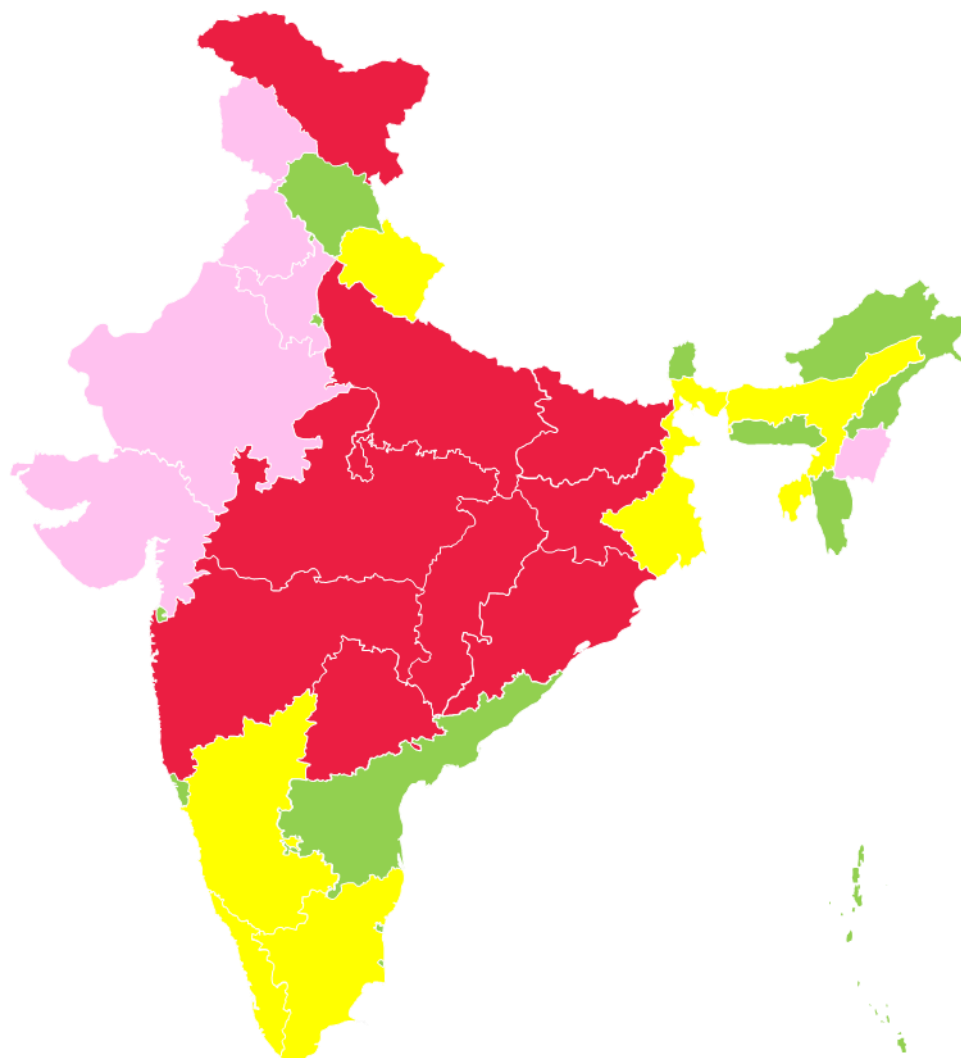


Note: India bed density is estimated by CRISIL Research for FY 2022, CY2016 figure for Bangladesh, CY2017 figures for Brazil, China, Malaysia and United States, CY2018 figures for Russian Federation, CY2019 figure for UK, global median is for CY2019

Source: World Health Organization Database, CRISIL MI&A Research

The total number of government beds in India are estimated at ~0.8 million. An estimated population of ~1.37 billion implies that 1,660 people on average are served per government bed in the country. Among the Indian states (excluding union territories), Sikkim (33), Himachal Pradesh (20), Goa (19) have the highest government bed density per 10,000 population. Telangana (1), Bihar (2), Maharashtra, Chhattisgarh and UP (3 each) have the lowest.

Availability of government beds (per 10,000 population) in India*



Note: <4 beds indicates very low density (red)

>4 and <7 beds indicates low density (pink)

<13 beds indicates medium density (yellow)

>13 beds indicate high density (green)

**CY19 data for Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Gujarat, Himachal Pradesh, Karnataka, Meghalaya, Odisha, Tripura, Uttarakhand, Chandigarh, Dadra & Nagar Haveli and Delhi; *FY20 data for Jammu & Kashmir, Kerala, Mizoram and Puducherry; *CY18 data for Madhya Pradesh, Assam, Nagaland; *Lakshadweep data as of September 3, 2020; * Jharkhand, Maharashtra, Sikkim, Tamil Nadu, Telangana, Daman & Diu data as of August 31, 2020; *Uttar Pradesh, Haryana data as of September 30, 2020; *Andaman & Nicobar Island data as of September 15, 2019*

Source: National Health Profile 2021

Healthcare financing has been a pain point

In India, out-of-pocket (OOP) expenditure on health accounted for nearly 51% of total health expenditure as of 2020. Insurance earlier did not cover out-patient treatments (Insurance companies started covering OPD treatments under health insurance only recently). Hence, OOP expenditure on out-patient treatments greater than in-patient treatments.

Nearly 17% of the rural population and 13% of the urban population are dependent on borrowings for funding their healthcare expenditure for July 2017- June 2018 as per NSS 75th Round Health in India Report. And nearly 80% of the rural population and 84% of the urban population use their household savings on healthcare-related expenditure as per "Health in India – 2018, NSS 75th Round. Health expenditure contributes to nearly 3.6% and 2.9% of rural and urban poverty, respectively. And annually, an estimated 60 to 80 million people fall into poverty due to healthcare-related expenditure. However, with Pradhan Mantri Jan Arogya Yojana (PMJAY), the affordability aspect of healthcare expenditure is expected to be taken care of to some degree, especially for the deprived population.

Government price capping of medical equipment

The government has restricted price capping to four devices – cardiac stents, drug-eluting stents, knee implants and intra-uterine devices. However, the National Pharmaceutical Pricing Authority (NPPA) is proposing to bring in capping of trade margins instead of extending the list of devices under the National List of Essential Medicines.

Even state governments have been resorting to measures to curb profiteering by hospitals. The Delhi government had, earlier this year, proposed norms for restricting hospitals and nursing homes from marking up prices of consumables and medicines from their procurement prices, to limit their profits.

Price capping on cardiac stents introduced in February 2017, and on knee-implants, in August 2017 was a deterrent for the industry, which is majorly run by the private sector. However, players have since been able to come back to normalcy after taking a hit on operating margins initially, through price rationalisation via bundle pricing. The National Pharmaceutical Pricing Authority (NPPA) has further extended the capping of prices of knee implants, ranging from Rs 0.054 million to Rs 0.114 million, for one more year.

Post implementation of price caps on stents and implants, the government has identified 23 medical devices to put price controls on.

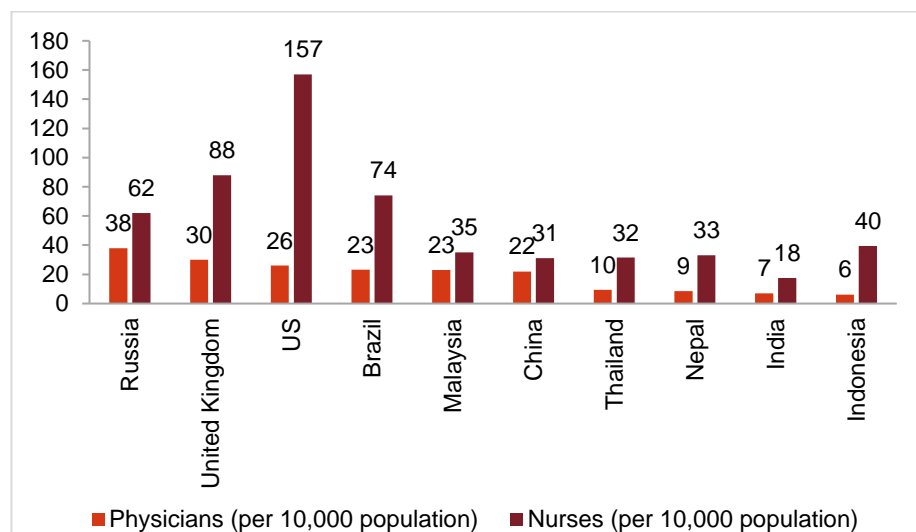
Outstanding receivables affecting fiscal profile of hospitals

The financial profile of many hospitals empanelled under state schemes became weak due to rising outstanding receivables from the government (state and Centre) for providing treatments to beneficiaries under health insurance schemes. However, this challenge is expected to be dealt with on priority under the PMJAY, by fixing a particular timeline for reimbursements of claims.

Paucity of experienced specialised doctors

Paucity of experienced specialised doctors is another challenge. Experienced specialised doctors also contribute to the reputation and brand of the hospitals. Paucity of such doctors, thus, impacts the growth of the hospital sector. At seven physicians and 18 nursing personnel per 10,000 population, India trails the global median of 18 physicians and 40 nursing personnel. Even on this parameter, India lags behind Brazil (23 physicians, 74 nurses), Malaysia (23 physicians, 35 nurses).

Healthcare personnel: India vs. other countries (aggregate CY2012-CY2020)



Source: WHO World Health Statistics 2022

3.4 Key actionable areas

While the healthcare delivery sector in India faces several teething issues currently, it also presents immense opportunities for the players involved.

This potential is further augmented with information and communication technology (ICT)-enabled services gaining widespread popularity – CRISIL MI&A Research expects internet subscriber base to increase to ~1,070-1,100 million by fiscal 2025; while the wireless subscriber base (mobile phone users) is expected to increase to 1,200-1,250 million by fiscal 2025. Not only do these technologies increase the reach of healthcare facilities to hitherto remote locations, they also help players achieve better efficiencies.

Data from the healthcare space is growing at a steady pace and this has driven hospitals to adopt artificial intelligence (AI)-based patient intelligence systems. These are expected to improve the operating metrics of the hospitals and drive timely detection of diseases.

Shortfall in bed capacity: Major opportunity for healthcare delivery players

India needs to increase its bed capacity to reach the global median by almost 2.1 million beds. With the population growing at almost 1% annually, India is expected to have more than 1.5 billion people by 2030.

Compounding the bed shortfall, dearth of healthcare personnel (physicians and nursing personnel) continues to be immense. India had ~0.9 million physicians in 2013. The physician count needs to be almost doubled to meet the global median. According to the national health profile (NHP) 2021, the average population served by an allopathic doctor is 1,113 and there are nearly 12.3 lakh doctors registered with the Medical Council of India (MCI) as of 2019.

Currently, there are only 542 medical colleges offering a total of about 81,400 MBBS seats as per NHP 2021, producing nearly 8 doctors (MBBS) per lakh of population being added annually.

The shortage of nursing personnel (nurses and midwives) is also critical (18 nurses in India vs. 40 globally). As per the NHP 2021, there are 1,892 Auxillary Nurse Midwives institutions producing 0.55 lakh auxillary nurses and 6,894 nursing institutions producing 2.72 lakh nurses annually.

Diversification into different format/areas to increase reach and efficiency

Despite the challenges present in the healthcare delivery system in India, innovations and newer business models are being explored. The main objective of these innovations are to increase efficiencies through optimum resource utilisation and widen the reach of healthcare services. Though different business models might be applied depending on the location and services to be provided, the PMJAY is expected to lead to the adoption of new business models focusing on volume-driven, affordable healthcare.

Single speciality healthcare units

Single-specialty healthcare units are those that treat patients with specific medical conditions, with the need of specific medical/surgical procedures. A single-specialty healthcare unit can be a hospital, clinic, or care centre. The advantage of these units is that, by focusing on providing care in a single segment, they can increase efficiencies as well as create a niche in the target segments. Nowadays, birthing centres are among the fastest growing single specialty centre. Specific regulatory headwinds, however, can affect the margins of these business units.

Day-care centres

The objective of day-care centres is to reduce the need for overnight hospitalisation. In this type of setup, a patient is allowed to go home on the same day after being treated. These centres have also given rise to the concept of outpatient surgeries.

While this model is very popular in the eye care segment, other segments such as arthroscopic, general, cosmetic, and dental surgery have also been using this as a popular care delivery model. The advantage of the day-care centre model is that patients can save on bed/room rentals associated with overnight hospitalisation. The healthcare units, on the other hand, can have a streamlined setup with optimum equipment, staff and infrastructure, which helps bring down operational costs.

End-of-life/geriatric care centres

The objective of end-of-life care centres or hospices and palliative care centres is to provide care and support to patients, who are suffering from terminal illness with a life expectancy of six months or less. Hospice and palliative care focus more on pain management and symptom relief rather than continuing with curative treatment. These centres are designed to provide patients a comfortable life during their remaining days and cover physical, social, emotional, and spiritual aspects apart from the medical treatment. Such type of care can be delivered onsite, where special facilities are set up, in the hospital premises, or at the patient's home.

Palliative care is delivered with the help of an inter-disciplinary team which may consist of the patient's physician, hospice doctor, a case manager, registered nurses, counsellor, a dietician, therapist, pharmacologist, social workers, and various trained volunteers. Depending upon the patient's ailment and medical condition, the team prepares a customised care programme which comprises services such as nursing care, social services, physician services and trained volunteer support.

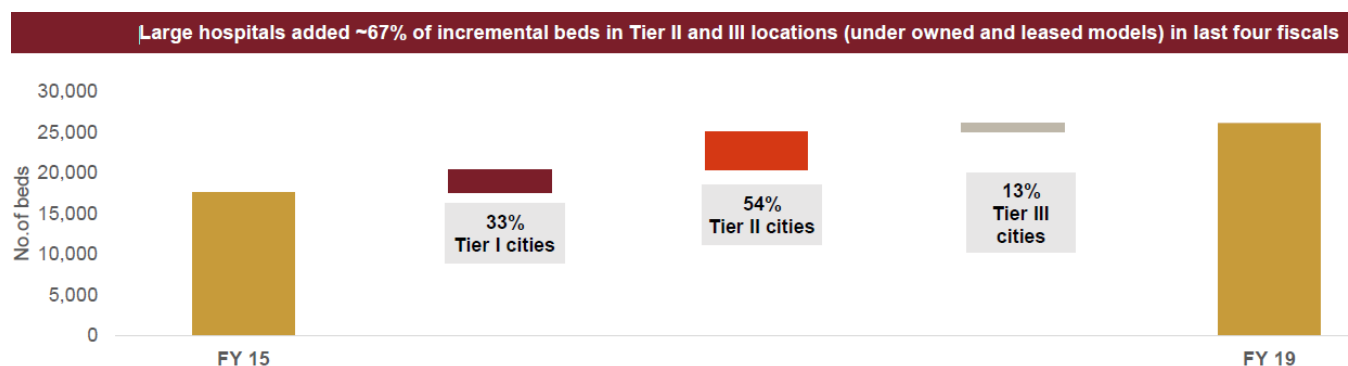
Home healthcare

The primary objective of home healthcare services is to provide quality health care at the patient's premises. In India, these services are still in the nascent stages. CRISIL MI&A Research believes that with increasing geriatric population, institution of families and increasing disease burden causing a strain on conventional health delivery systems, home healthcare will be a preferred alternative. A number of healthcare start-ups have started vying for growth in this space.

The revenue from ICU beds decreases as weeks pass by and, hence, reducing the strain (both on hospitals and patients) can be explored through home healthcare. Patients can avail of ICU care at home at nearly a fifth of the prices of hospital care. Hospitals can also benefit by this model not just through reduced overcrowding, but also prevention of associated hospital acquired infections.

The services currently offered are: post-intensive care, rehabilitative care and services of skilled/unskilled nurses. But areas such as home therapeutic care for infusion and respiratory therapy, dialysis and convenience centred teleconsultation, have more potential for growth. Apollo HomeCare (by AHEL) & Max@Home (by MHIL) are home care services provided by two largest hospital chain operators in the country.

Increasing penetration of hospital chains in tier 2 and 3 locations



Note: Based on city category classification followed by 7th Pay Commission, tier I – X cities (top 8 cities), tier II – Y cities (next 88 cities)

Source: Company reports, CRISIL MI&A Research

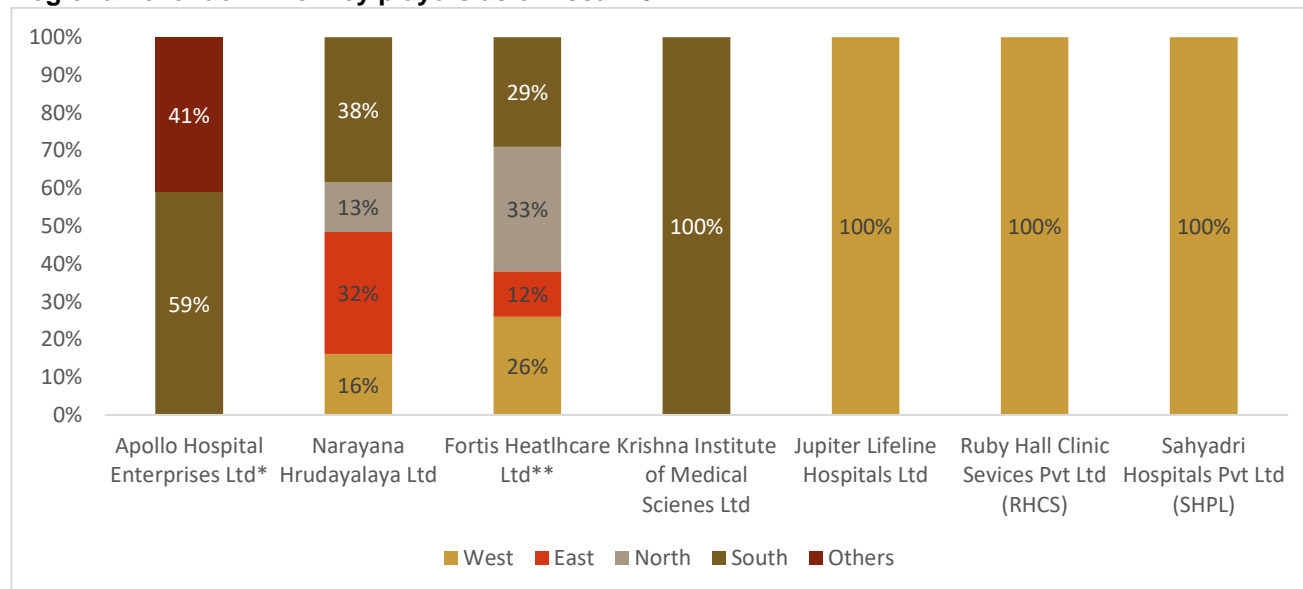
The Indian healthcare delivery system has seen consolidation in recent years. A highly competitive industry, coupled with tightening of healthcare regulations, has made it difficult for smaller players in the industry to stay profitable. Larger hospital brands typically have stronger financial discipline and negotiating power with suppliers, better ability to attract medical talent, and greater capital and administrative resources to meet these needs over standalone hospitals. Many of the established players in the healthcare delivery industry follow inorganic growth to expand into the geographies where they have limited presence. In terms of supply creation, major hospital chains have expanded into the next level of creamy tier 2 and 3 locations (with ~67 % aggregate bed additions by 10 large hospitals players in the past four years being in these areas).

Rise in demand for health infrastructure, modern technologies and multi-disciplinary healthcare have been some of the key driving factors for consolidation in the industry. Investments by private equity (PE) players is also gaining traction. Majority of the PE deals in the industry in the past 2-3 years have been towards hospital portfolio consolidation, also enabling formation of regional clusters that provide base for further expansion and consolidation. Recently, Manipal Health acquired 100% stake in Columbia Asia hospitals, strengthening its presence in southern India. Jupiter Hospital Projects Pvt Ltd (JHPPL), a subsidiary of Jupiter Lifeline Hospitals Ltd, acquired the business operations of Vishesh Diagnostics Private Limited (VDPL) for its hospital located at Ring Road, Indore with a capacity of 200 beds in November 2020.

Established regional presence gives players an upper hand

Key listed healthcare delivery players in India have established themselves in regions across the country. Those with regional presence have an added advantage over those that don't.

Regional revenue mix of key players as of fiscal 2022



*For Apollo Hospitals Enterprise Ltd (AHEL), revenue from Tamil Nadu, Andhra Pradesh, Telangana, and Karnataka has been considered under the 'south' region. 'Others' includes revenue from 'significant subsidiaries/JVs/associates', as classified by AHEL in its earnings update PPT for FY22, which includes revenue from Bhubaneswar, Bilaspur, Nashik, Navi Mumbai, Ahmedabad, Kolkata, Delhi, Indore, Assam, and Lucknow.

**For Fortis Healthcare Ltd, revenue contribution from only Indian hospitals has been considered (i.e. excluding revenue from international hospitals), regions as defined in the investor presentation of Fortis Healthcare Ltd.

Regions for all listed players as given in their investor presentations, for unlisted players operations of hospitals in the states of Maharashtra, Gujarat, Goa and Madhya Pradesh are considered as West

Regional revenue mix not available for Max Healthcare Institute Ltd. and Global Health Ltd.

Source: Company annual reports/investor presentations, CRISIL MI&A Research

Some of the key advantages of having regional presence are as follows:

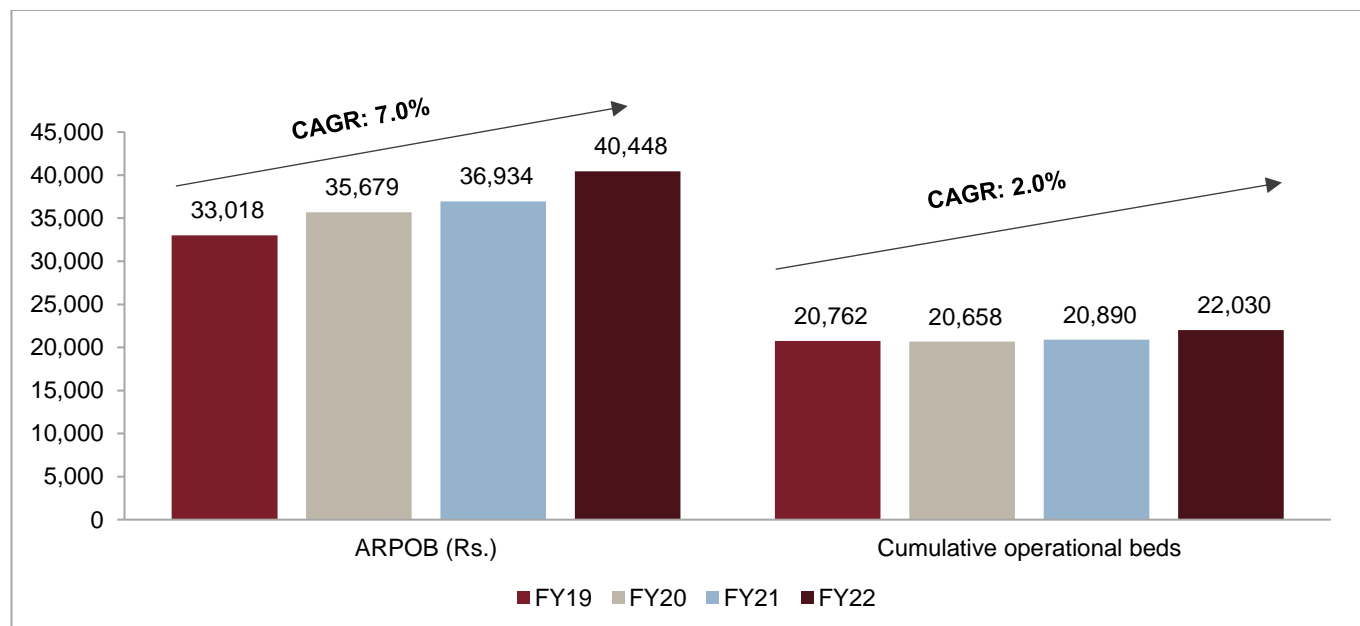
Understanding the mentality of people (patients) in a particular region forms a crucial part of connecting and establishing long-term relationships for any hospital. Players with regional presence often have a strong grasp of the regional languages, food preferences, culture, and affordability, which helps them connect and bond with their patients from a long-term perspective.

Understanding the mentality of doctors is also an important aspect for a hospital. Having regional presence not only gives players access to the key doctors in the region, but it also helps doctors tie up with a brand to enhance their portfolios.

Integrating talent from well-established allied workforce such as lab technicians and nurses also augers well for established players. There are additional benefits for employees associated with a regional chain, such as easy location transfers for any personal reasons. Hence, workforce in such hospitals sticks longer.

Operating metrics of key listed players

Average revenue per occupied bed (ARPOB) of key listed players clocked ~7.0% CAGR over fiscals 2019-22



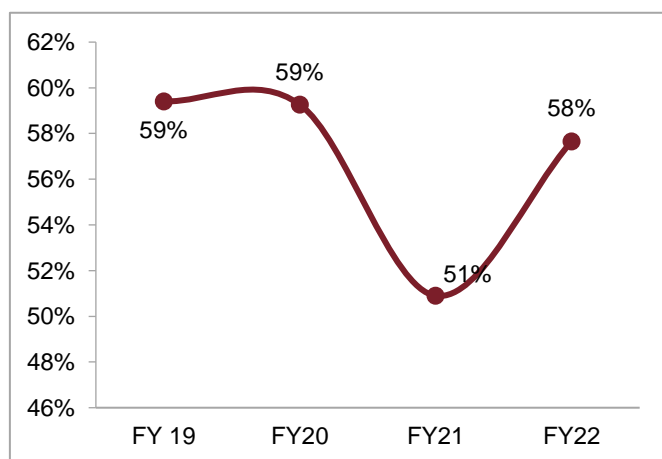
Note: Companies considered for analysis are Apollo Healthcare Institute Limited (AHEL), Fortis Healthcare Ltd (FHL), Narayana Hrudayalaya Ltd (NHL), Max Healthcare Institute Ltd (MHIL), Krishna Institute of Medical Sciences (KIMS) and Global Health Ltd (GHL); KIMS does not report operational beds, as a result KIMS has been excluded for the calculation of cumulative operational beds in the above chart

Source: Company annual reports, investor presentations, CRISIL MI&A Research

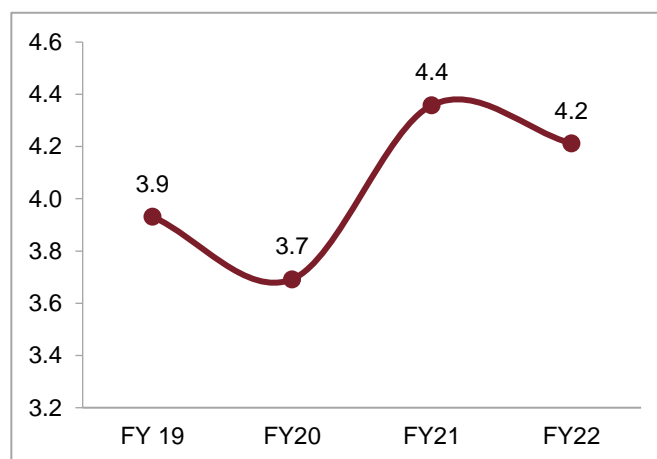
ARPOB of key listed players increased at a CAGR of ~7.0% over fiscals 2019-22, and operational beds logged a 2.0% CAGR.

Aggregate occupancy rates and ALOS of key listed players

Occupancy rate (%)



ALOS (days)

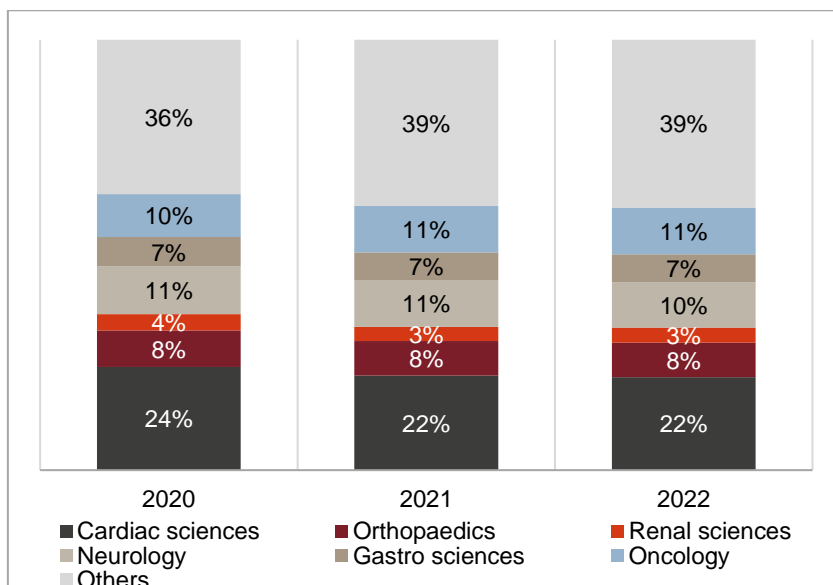


Note: Companies considered for analysis are Apollo Healthcare Institute Limited (AHEL), Fortis Healthcare Ltd (FHL), Narayana Hrudayalaya Ltd (NHL), Max Healthcare Institute Ltd (MHIL), Krishna Institute of Medical Sciences (KIMS) and Global Health Ltd (GHL); occupancy rate for NHL calculated using ALOS and discharge patients data

Source: Company annual reports, investor presentations, CRISIL MI&A Research

Occupancy rates of key listed players have remained steady (58-59%) between FY19 and FY22 except FY21, when occupancy rate fell to 51% on account of Covid pandemic. Although aggregate occupancy rates are in the range of 58-59%, the metric is skewed at the individual company level – e.g. MHIL had an occupancy rate of 75% in FY22. A steady aggregate occupancy rate and a declining ALOS are a positive for these players. ALOS, on an aggregate basis, of key listed players decreased to 3.7 days in fiscal 2020 from 3.9 days in fiscal 2019. ALOS rose to 4.4 in FY21 and 4.2 in FY22 which may be attributed to longer stay of patients due to Covid. Hospitals typically focus on reducing their ALOS, as it increases their ARPOB and ensures more patients are treated at the same time.

Cardiac sciences dominates in terms of share, but oncology drives the highest growth across treatment mix for key listed players



Cardiac sciences accounted for the largest share of revenue in the specialty mix over fiscals 2020-22. Cardiac sciences comprises various types of surgeries, such as valve replacement, open heart, and coronary artery bypass grafting. Cardiac sciences is followed by oncology and neurology. However, in terms of share, cardiac sciences lost share in fiscal 2021 and 2022. Oncology has gained the highest share since FY20 with oncology reaching 11% in FY22 from 10% in FY20.

Note: Companies considered for analysis are Apollo Healthcare Institute Limited (AHIL), Fortis Healthcare Ltd (FHL), Narayana Hrudayalaya Ltd (NHL) and Krishna Institute of Medical Sciences (KIMS); Others is a consolidation of services such as nephrology, pulmonology, gynaecology & obstetrics, arthroplasty etc.

Data for Max Healthcare Institute Ltd (MHIL) and Global Health Ltd (GHL) is not available

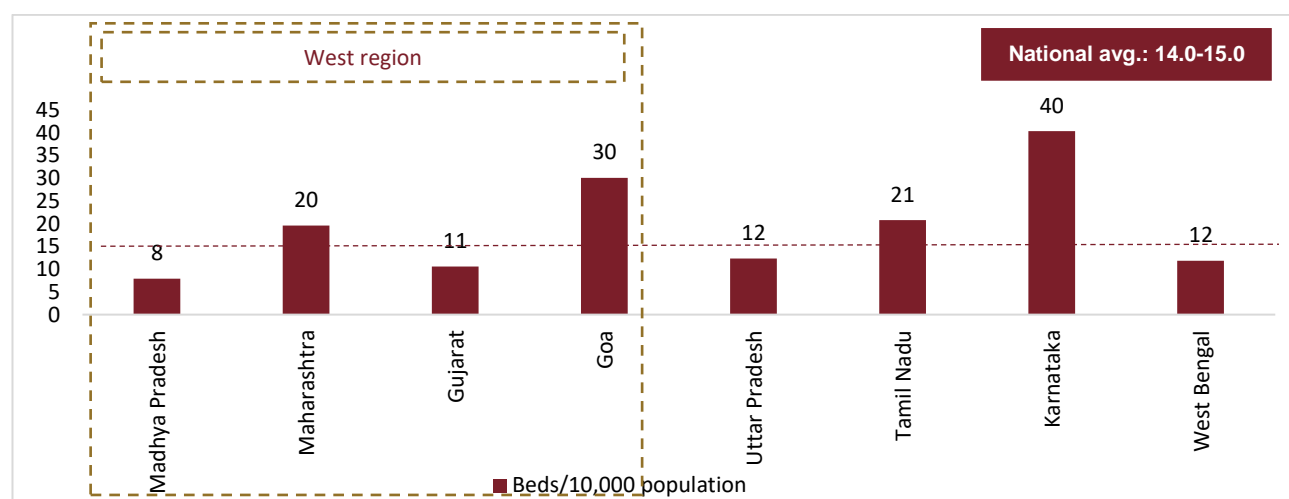
Source: CRISIL MI&A Research

3.5 Healthcare infrastructure in select states and key micro markets

In this section, CRISIL MI&A Research has defined micro markets as neighbourhoods, subdivisions, or segments of a region (Western region of India in this case consisting of Maharashtra, Gujarat, Goa and Madhya Pradesh states) which may have their own unique demand and supply characteristics (Example: Indore)

West India states of Gujarat and Madhya Pradesh have bed density lower than that of national average

Hospitals bed density (Beds per 10,000 population of the state) FY22

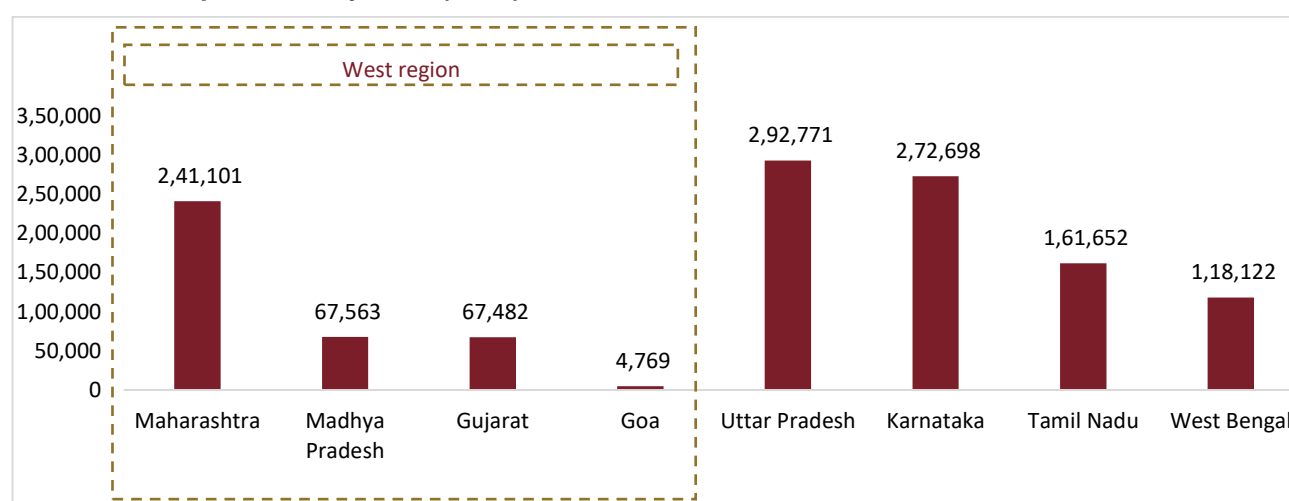


Source: UIDAI, CRISIL MI&A Research

Among West India states under study, Gujarat and Madhya Pradesh had bed densities of 11 and 8 respectively, which is lower than the national average of 14-15.

Maharashtra has the highest hospital beds availability in the Western region

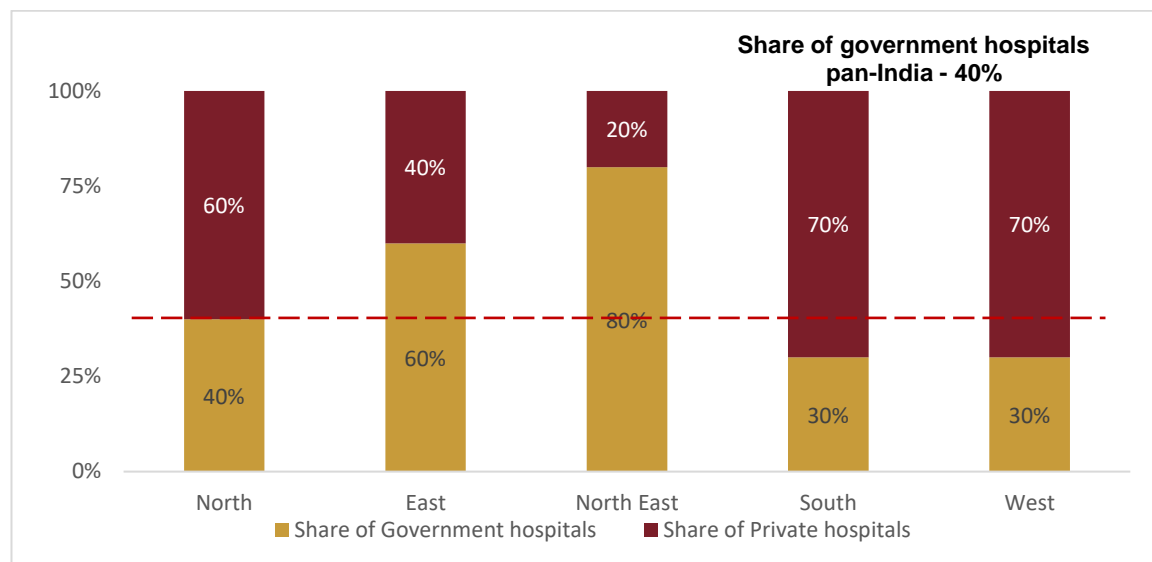
Number of hospital beds by state (FY22)



Source: UIDAI, CRISIL MI&A Research

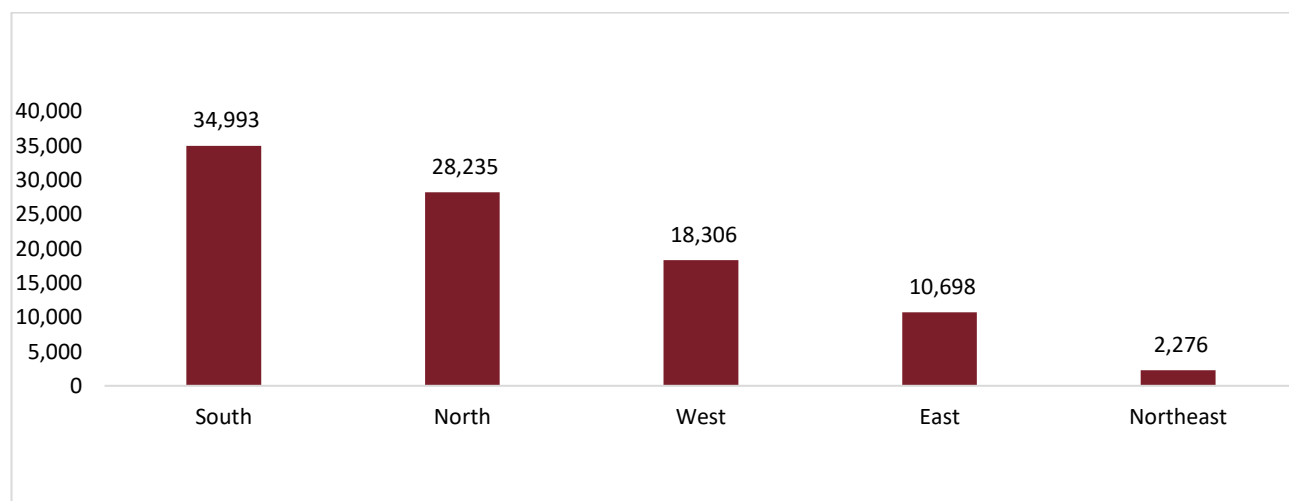
Maharashtra being densely populated states among Western India states, it has the highest number of hospital beds in the region.

Share of public hospitals in India (FY22)



Source: CRISIL MI&A Research

Estimated number of ICU beds by region (FY20)

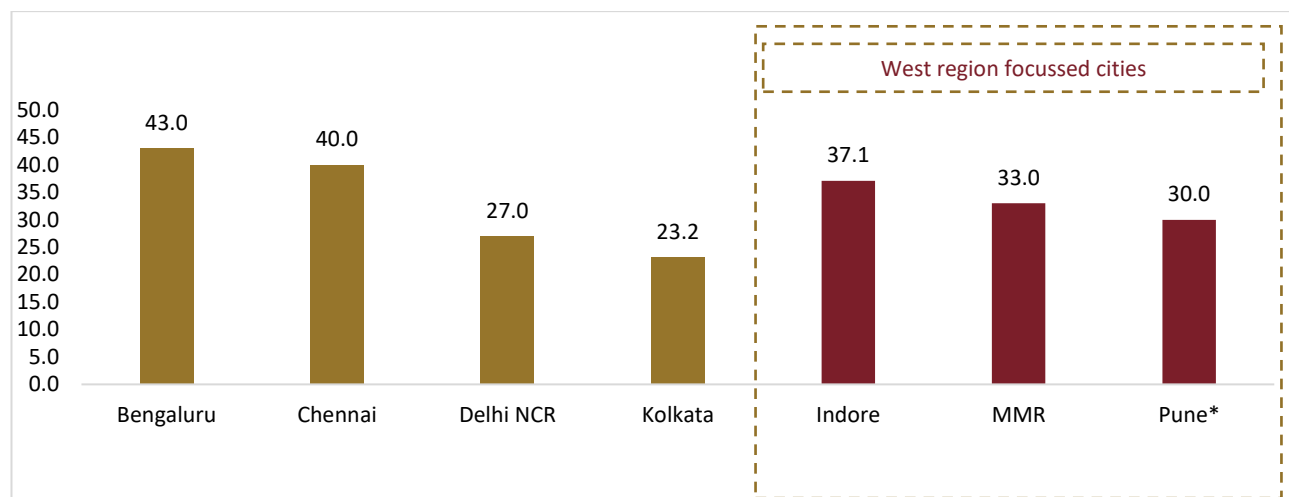


Note: West consists of Maharashtra, Goa, Gujarat, Madhya Pradesh; South consists of Kerala, Telangana, Tamil Nadu, Karnataka, Andhra Pradesh; East consists of Bihar, Jharkhand, West Bengal, Odisha, Chhattisgarh; Northeast consists of Tripura, Sikkim, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Assam and Nagaland; North consists of Jammu Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Haryana, Delhi, Uttar Pradesh, Chandigarh, Rajasthan

Source: UIDAI, CRISIL MI&A Research

Our estimates suggest that there were ~18,300 ICU beds in Western region of India consisting of Maharashtra, Goa, Gujarat and Madhya Pradesh as of FY20.

Estimated hospitals bed density (Beds per 10,000 population) as of December 31, 2022



Note: *Pune Metropolitan region

Source: CRISIL MI&A Research, State and district healthcare websites

Mumbai Metropolitan Region (MMR) micro market has 33.0 beds per 10,000 people as of December 2022

MMR has 33.0 beds per 10,000 people, which is higher than the state average of Maharashtra (20 beds per 10,000 people). It has an estimated population of 20.96 million, a population density of 22,937 people per sq. km and ~1,300 hospitals with ~69,000 hospital beds as of December 2022.

PD Hinduja National Hospital & Research Centre, Jupiter Hospital, Asian Heart Institute, Apollo Hospital, Jaslok Hospital, Fortis Hospital, Wockhardt Hospital, Bethany Hospital, Bhaktivedanta Hospital & Research Institute are some of the key hospitals in Mumbai.

Key hospitals	Estimated number of beds*
Apollo Hospital	500
PD Hinduja National Hospital & Research Centre	400
Jupiter Hospital@	377
Jaslok Hospital	364
Wockhardt Hospital	350
Fortis Hospital, Mulund	350
Bhaktivedanta Hospital & Research Institute	~300
Asian Heart Institute	250
Bethany Hospital	190

* No. of beds as per data published on their website/secondary sources accessed in the month of February 2023, @Total bed capacity as of December 31, 2022

MMR micro market consists of municipal corporations of Greater Mumbai, Thane, Kalyan-Dombivali, Ulhasnagar, Mira-Bhayandar, Bhiwandi-Nizampur, Navi Mumbai, Vasai Virar and Panvel

Kalyan-Dombivli micro market has ~10 beds per 10,000 people as of December 2022

Kalyan-Dombivli has ~10 beds per 10,000 people. It has an estimated population of 1.5 million, a population density of ~10,950 people per sq. km and ~50 hospitals & nursing homes with ~1,500 hospital beds as of December 2022.

AIMS Hospital, SRV Mamata Hospital and Baj RR Hospital are the key hospitals in Kalyan-Dombivli.

Key hospitals	Estimated number of beds*
AIMS Hospital	250
SRV Mamata Hospital	100
Baj RR Hospital	100

* No. of beds as per data published on their website/secondary sources accessed in the month of February 2023
Kalyan Dombivli is a twin city and a municipal corporation within MMR region with its headquarters in Kalyan

Pune Metropolitan Region micro market has 30.0 beds per 10,000 people as of December 2022

The number of beds per ten thousand people in Pune Metropolitan Region is 30.0. The city has an estimated population of 14.97 million, a population density of ~605 people per sq. km (Pune District) and ~600 hospitals with 21,500 hospital beds as of December 2022.

Aditya Birla Memorial Hospital, Ruby Hall Clinic, Jupiter Hospital, Deenanath Mangeshkar Hospital & Research Centre, Jehangir Hospital, Sahyadri Hospital, Noble Hospital are the key hospitals in Pune.

Key hospitals	Estimated number of beds*
Deenanath Mangeshkar Hospital & Research Centre	800
Ruby Hall Clinic, Sassoon Road	600
Aditya Birla Memorial Hospital	500
Jehangir Hospital	350
Jupiter Hospital	386
Noble Hospital	250
Sahyadri Hospital, Deccan	202

* No. of beds as per data published on their website/secondary sources accessed in the month of February 2023; @Total bed capacity as of December 31, 2022; Pune Metropolitan Region consists of two municipal corporations namely Pune Municipal Corporation & Pimpri Chinchwad Municipal Corporation and three cantonment boards namely Pune Cantonment Board, Khadki Cantonment Board & Dehu Road Cantonment Board

Source: Secondary research, CRISIL MI&A Research

Indore micro market

Indore has ~220 number of total hospitals including primary & community health centres and 12,000 hospital beds. Indore is a part of Madhya Pradesh and has an estimated population of 3.2 million, with a population density of 3,800 people per sq. km in the metro area as of December 2022.

Bombay Hospital, Jupiter Hospital, Choithram Hospital, Arihant Hospital & Research Centre, Care Hospital, Shalby Hospital, Medanta Super specialty Hospital are some of the key hospitals in Indore.

Key hospitals	Estimated number of beds*
Bombay Hospital	600
Choithram Hospital	350

Arihant Hospital & Research Centre	300
Care Hospital	260
Shalby Hospital	243
Vishesh Jupiter Hospital	431
Medanta Super Specialty Hospital	175

** No. of beds as per data published on their website/secondary sources accessed in the month of February 2023; @Total bed capacity as of December 31, 2022*

4 Competitive mapping of key players in the Indian healthcare delivery market

4.1 Comparative analysis of players in the hospital sector

In this section, CRISIL MI&A Research has compared the key players in the hospital industry. Data in this section has been obtained from publicly available sources, including annual reports and investor presentations of listed players, regulatory filings, rating rationales, and/or company websites, as relevant.

For this assessment, we have considered the following key players: Aditya Birla Health Services Pvt Ltd (ABHS), Apollo Hospitals Enterprise Limited (AHEL), Fortis Healthcare Limited (FHL), Global Health Ltd. (GHL), Jupiter Lifeline Hospitals Ltd (JLHL), Krishna Institute of Medical Sciences Limited (KIMS), Manipal Health Enterprises Pvt Ltd (MHEP), Max Healthcare Group* (MHIL), Narayana Hrudalaya Limited (NHL), Quality Care India Ltd (QCIL), Ruby Hall Clinic Services Pvt Ltd (RHCS), Shayadri Hospitals Pvt Ltd. (SHPL) and Shalby Limited (SHAL).

Company	Geographic Presence
Aditya Birla Health Services Pvt Ltd (ABHS)	West India
Apollo Hospitals Enterprise Limited (AHEL)	Pan India
Fortis Healthcare Ltd (FHL)	Pan India
Global Health Limited (GHL)	North, Central and East India
Jupiter Lifeline Hospitals Ltd (JLHL)	West India
Krishna Institute of Medical Sciences Limited (KIMS)	South India
Manipal Health Enterprises Pvt Ltd (MHEP)	Pan India
Max Healthcare Group* (MHIL)	North and Mumbai
Narayana Hrudalaya Ltd (NHL)	Pan India
Quality Care India Ltd (QCIL)	Central and South India
Ruby Hall Clinic Services Pvt Ltd (RHCS)	West India
Sahyadri Hospitals Pvt Ltd (SHPL)	West India

* Representing Max Healthcare Institute Ltd and its associate trust owned hospitals

Source: Company annual reports/investor presentations, CRISIL MI&A Research

The hospital chains mainly provide secondary and tertiary healthcare services (across a myriad of specialties).

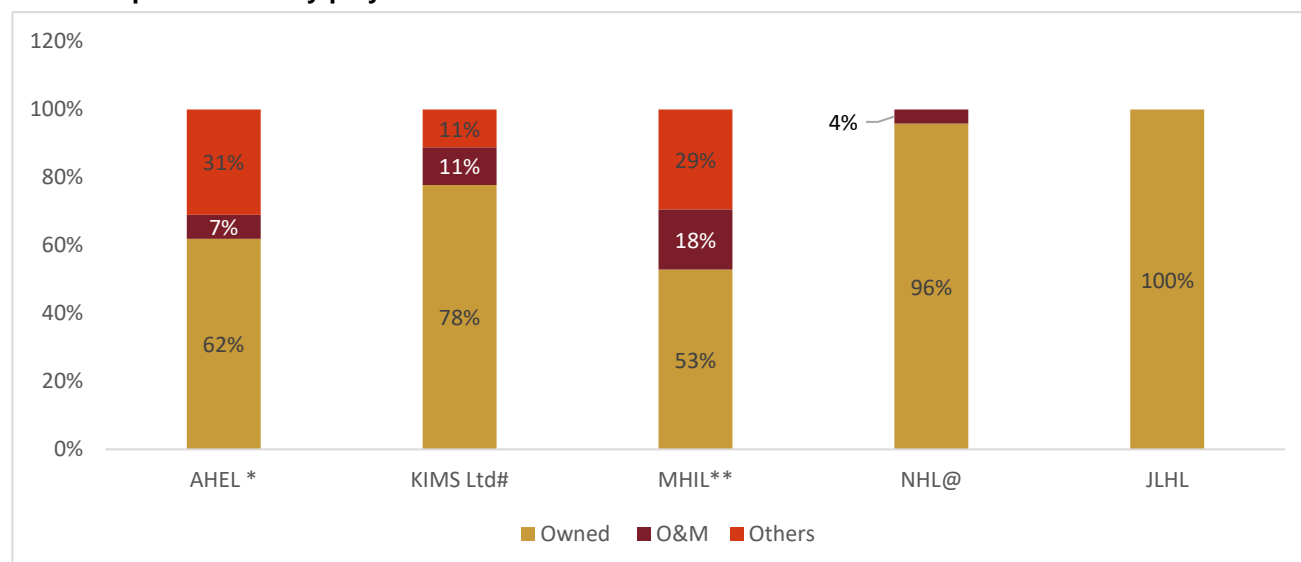
Key specialties undertaken by major players

Player	Key specialties undertaken and other achievements
ABHS	- Gynaecology, oncology, cardiology, neurology etc.
AHEL	- Multinational hospital chain covering cardiology, cosmetology, dermatology, orthopaedics, diabetes, gastroenterology, haematology, infertility, nephrology, neurology, oncology, paediatrics, pulmonology, radiology, rheumatology, urology, etc.
FHL	- Multi-speciality chain covering cardiology, cosmetology, dermatology, orthopaedics, diabetes, gastroenterology, haematology, infertility, nephrology, neurology, oncology, paediatrics, pulmonology, radiology, rheumatology, urology, etc.

Player	Key specialties undertaken and other achievements
GHL	- Cardiology, digestive & hepatobiliary sciences, neurology, urology, transplants & regenerative medicine, oncology, orthopaedics, anaesthesia etc.
JLHL	- Cardiology, bariatric surgery, gastroenterology, dermatology, neurology, organ transplants etc.
KIMS	- Cardiology, neurosciences, renal sciences, bariatric surgery, oncology, paediatric, Ophthalmology, cosmetics, dental, intensive, and critical care, diabetes, preventive care, gynaecology, IVF, etc.
MHEP	- Oncology, cardiology, gastroenterology, neurology, obstetrics & gynaecology, orthopaedics, organ transplant etc.
MHIL	- Oncology, cardiology, neurology, gastroenterology, hepatology endocrinology, orthopaedics, urology, dermatology, dental, eye care, Infertility, IVF, gynaecology, paediatric, etc.
NHL	- Cardiology, transplants, orthopaedics, haematology, oncology etc.
QCIL	- Cardiology, gastroenterology, nephrology, neurology, oncology, orthopaedics etc.
RHCS	- Oncology, bariatric surgery, cardiology, endocrinology, cosmetic & plastic surgery etc.
SHPL	- Cardiology, endocrinology, haematology & bone marrow, gastroenterology etc.

*Note: Above specialties and achievements do not represent an exhaustive list and are taken from company websites accessed in February 2023,
Source: Company annual reports, investor presentations, CRISIL MI&A Research*

Mode of operation of key players as of fiscal 2022



* Others include 11 day-care/ short surgical stay centres with 270 beds and 10 Cradles with 260 beds.

** Others include partner healthcare hospitals and medical centres in which the company and subsidiaries provide healthcare services in key specialties for a fee and/or for a share of revenue.

@ Data for 24 hospitals situated in India as per investor presentation

Source: Companies' annual reports/investor presentations, CRISIL MI&A Research

Analysis of hospitals and beds for select players

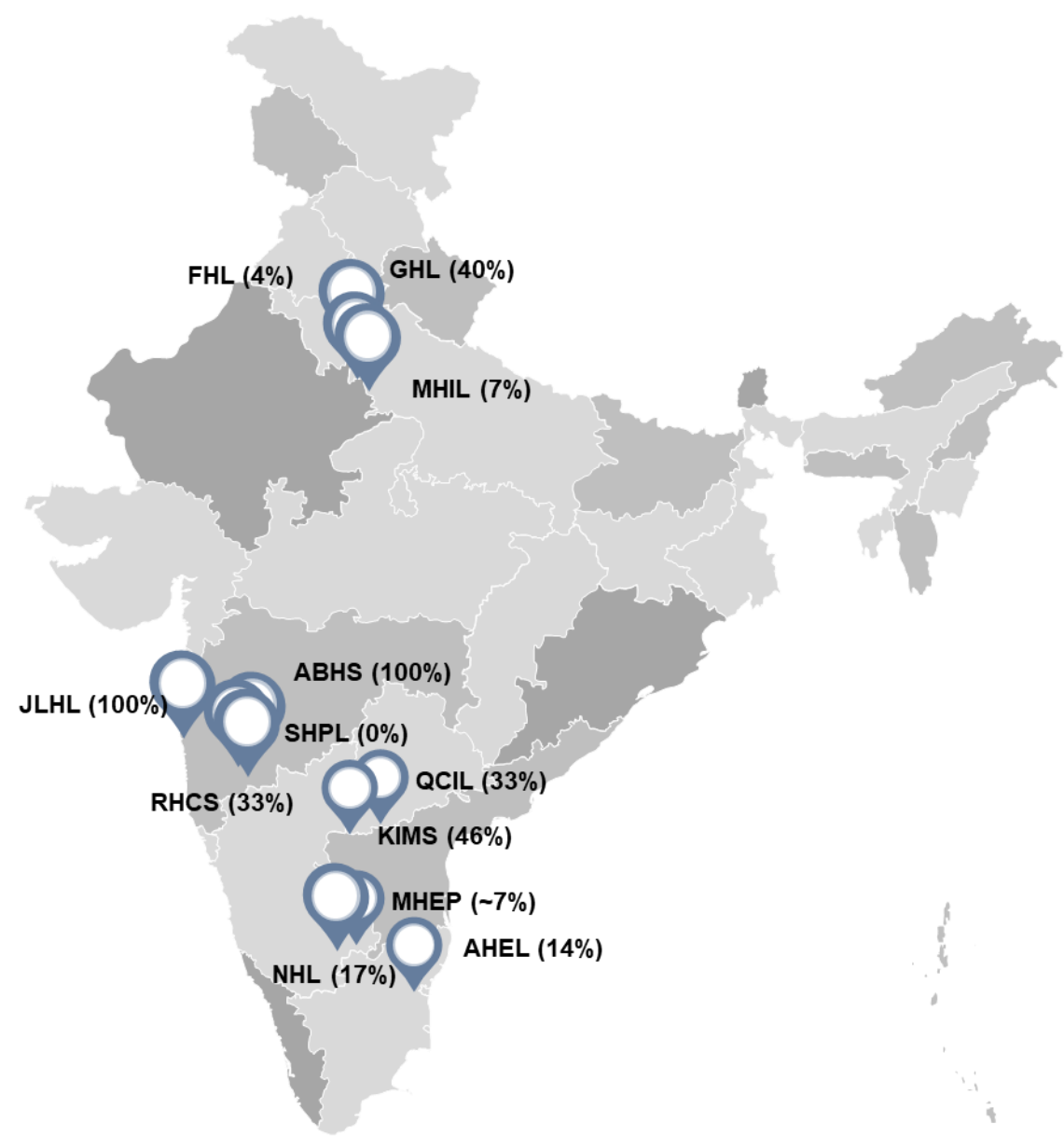
Key parameter s	Total hospitals	Total bed capacity	Estimated hospitals with 300+ beds in terms of capacity	Headquarter state	Hospitals in headquarter state	Hospitals (Rest of India)	Estimate d bed capacity in headquarter state	Estimated bed capacity in rest of India
Apollo Hospitals Enterprise Limited (AHEL)	71	10,006	10	Tamil Nadu	20	51	2,512	7,494
Fortis Healthcare Ltd (FHL)	26	4,300*	1	Haryana	2	24	509	3,791
Global Health Limited (GHL)	5	2,571	2	Haryana	1	4	1,391	1,180
Manipal Health Enterprises Pvt Ltd (MHEP)#	27	More than 7,600	2	Karnataka	12	15	2,352	5,248
Krishna Institute of Medical Sciences (KIMS)	13	4,015	6	Telangana	4	9	1,200	2,815

Key parameter rs	Total hospitals	Total bed capacity	Estimated hospitals with 300+ beds in terms of capacity	Headquarter state	Hospitals in headquarter state	Hospitals (Rest of India)	Estimated bed capacity in headquarter state	Estimated bed capacity in rest of India
Max Healthcare Group** (MHIL)	17	3,512	5	New Delhi	8	9	2,115	1,397
Quality Care India Ltd (QCIL)	12	2,876	4	Telangana	5	7	1,226	1,650
Narayana Hrudalaya Ltd (NHL)	24@	5,911****	4	Karnataka	10	14	2,373	3,538
Aditya Birla Health Services Pvt Ltd (ABHS)	1	500	1	Maharashtra	1	-	500	-
Jupiter Lifeline Hospitals Ltd (JLHL)***	3	1,194	3	Maharashtra	2	1	763	431
Ruby Hall Clinic Services Pvt Ltd (RHCS)	3	800	1	Maharashtra	3	0	800	-
Sahyadri Hospitals Pvt Ltd (SHPL)	8	1,018	0	Maharashtra	8	8	1,018	-

Note: Data from company websites accessed in the month of February 2023; *operational beds; #MHEP has more than 7,600 beds as per company website; Western India focused players; **December 2022 data for NHL, MHIL, GHL, KIMS, JLHL and AHIL; ***consolidated basis; @hospitals in India as per investor presentation Q3 FY23; ****operational beds in India as per Q3 FY23 investor presentation

Source: Company websites, investor presentations, CRISIL MI&A Research

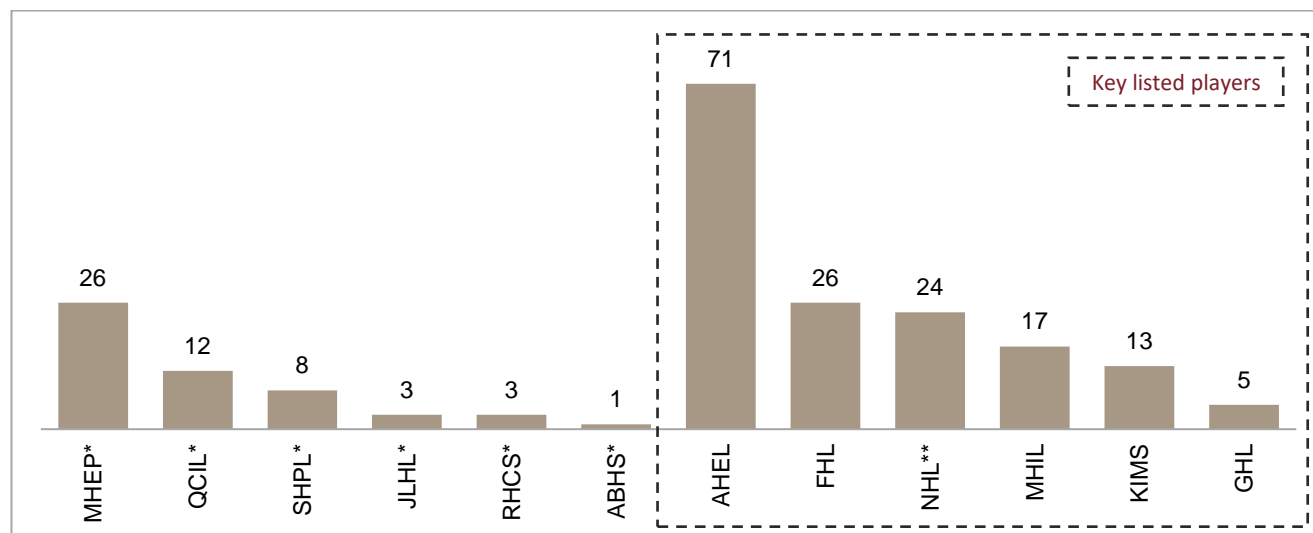
Percentage of total hospitals with 300+ beds in terms of total bed capacity (Estimated)



Note: Data from company websites accessed in the month of February 2023; *operational beds for FHL; #MHEP has more than 7,600 beds as per company website; **December 2022 data for NHL, MHIL, GHL, KIMS, JLHL and AHEL
Source: Annual reports, Company websites, CRISIL MI&A Research

4.2 Key operational parameters of major hospital players

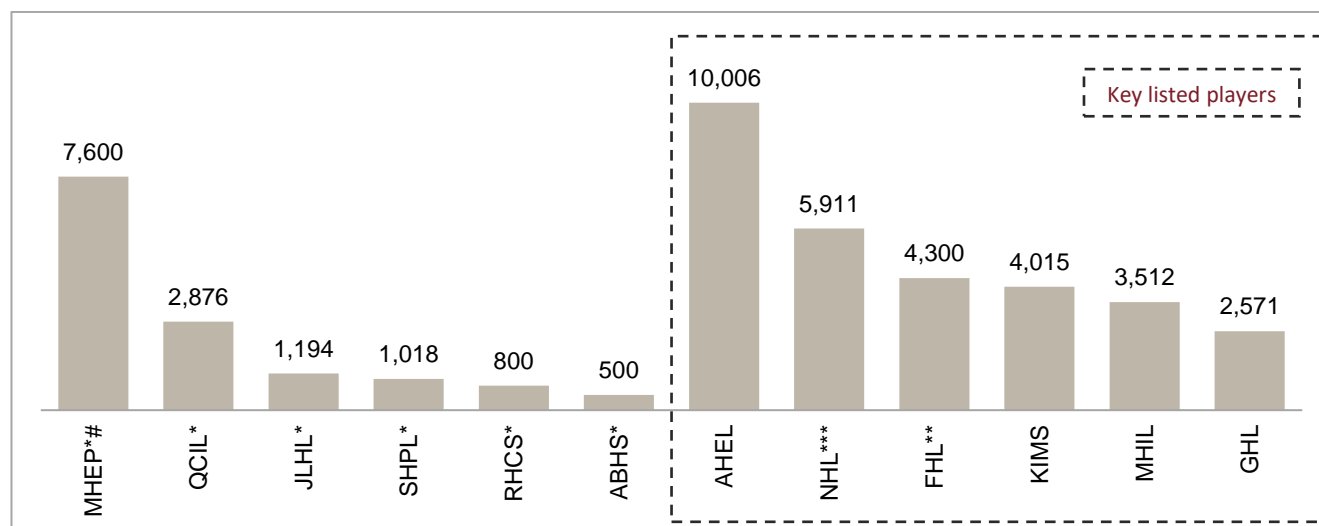
Total number of hospitals (December 2022)



*Data from company website accessed in February 2023, **Data for Indian hospitals only as given in Q3 FY23 investor presentation

Source: Annual reports, Company website, CRISIL MI&A Research

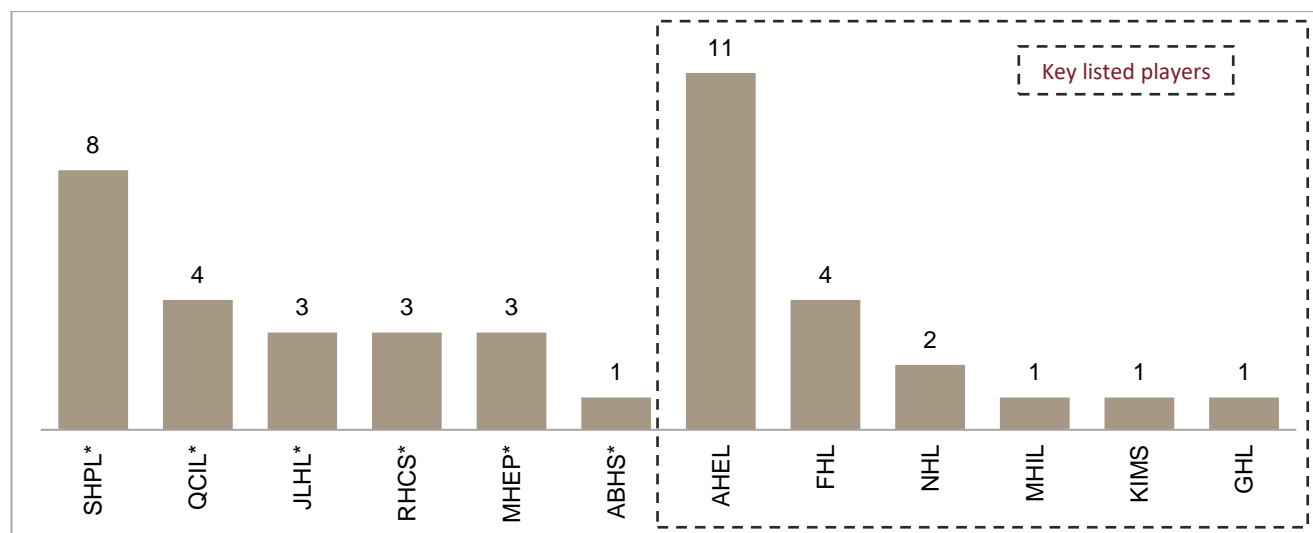
Total bed capacity (December 2022)



Note: *Data from company website accessed in February 2023, ***FHL operational beds are provided as of FY22; #MHEP and QCIL have over 7,600 and 2,700 beds respectively as per the website, ***operational beds in India as given in Q3 FY23 investor presentation

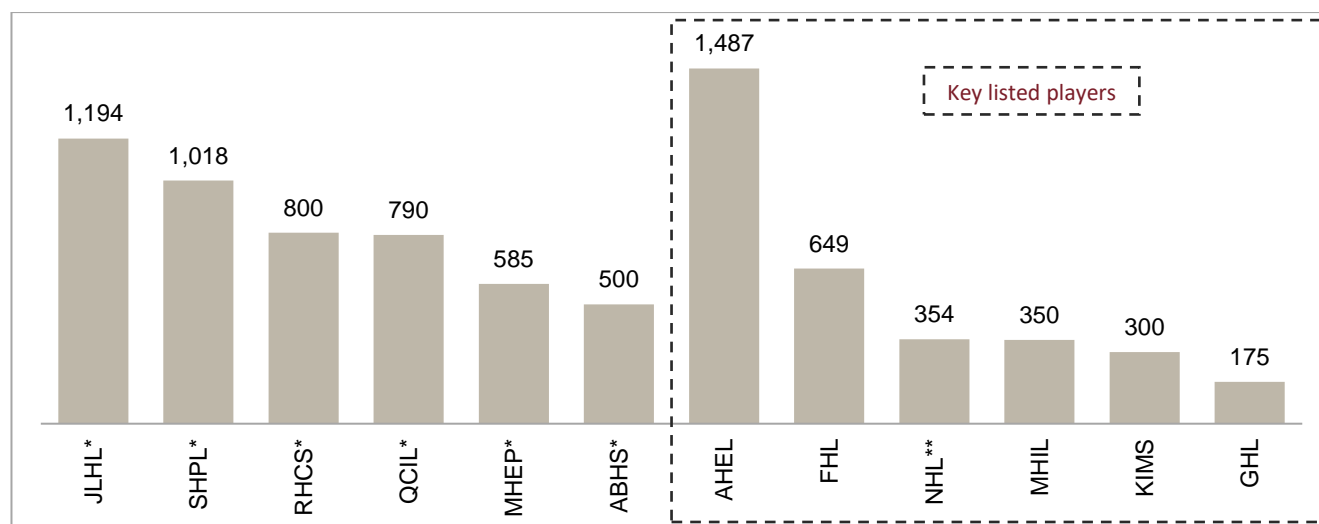
Source: Companies' annual reports/investor presentations, secondary research, CRISIL MI&A Research

Estimated number of hospitals in Western region (December 2022)



*Data from company website accessed in February 2023, #KIMS currently has 1 hospital in western region in Nagpur which was added in FY23 which is why the number is 0 for FY22 in the chart above; Western region consists of Maharashtra, Gujarat, Goa and Madhya Pradesh
Source: Annual reports, Company websites, investor presentations, CRISIL MI&A Research

Estimated total bed capacity in Western region (December 2022)



Note: *Data from company website accessed in February 2023; Western region consists of Maharashtra, Gujarat, Goa and Madhya Pradesh; **operational beds as given in Q3 FY23 investor presentation for NHL

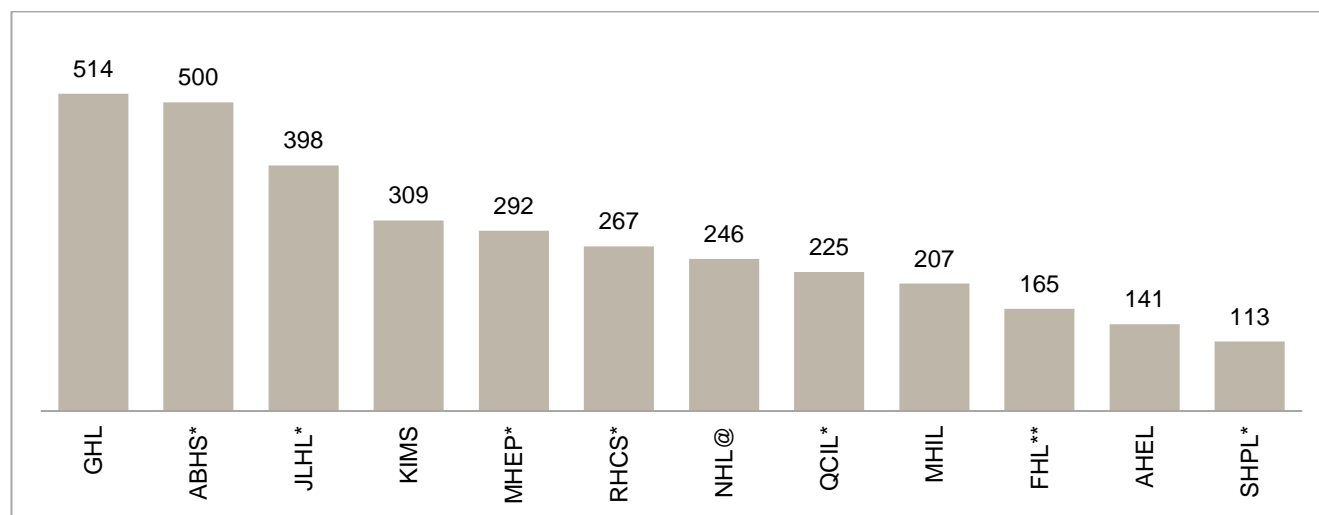
Source: Companies' annual reports/investor presentations, secondary research, CRISIL MI&A Research

Jupiter Lifeline Hospitals Ltd (JLHL) is among the key multi-specialty tertiary and quaternary healthcare providers in the Mumbai Metropolitan Area (MMR) and Western region of India with a total bed capacity of 1,194 hospital beds across 3 hospitals as of December 31, 2022. Jupiter Hospitals are located in densely populated micro markets which have low presence of chained hospitals. If we compare the hospitals and beds of listed players in Western region of India consisting of Maharashtra, Gujarat, Goa and Madhya Pradesh, AHEL and FHL both have ~15% of their total hospitals and beds in this region. GHL has ~7% of its total bed capacity in Western region of India. MHIL group has ~6% of its hospitals and ~10% of its bed capacity in Western region. Similarly, MHEP has ~11% of its hospitals and

~8% of its bed capacity in Western region. NHL has ~8% of its hospitals (considering hospitals in India only) in Western region.

JLHL's Thane and Indore hospitals are amongst the few hospitals in Western region of India to provide neuro rehabilitation services through a dedicated robotic and computer-assisted neuro rehabilitation centre. Additionally, JLHL operates one of the few multi-organ transplant centres in Thane.

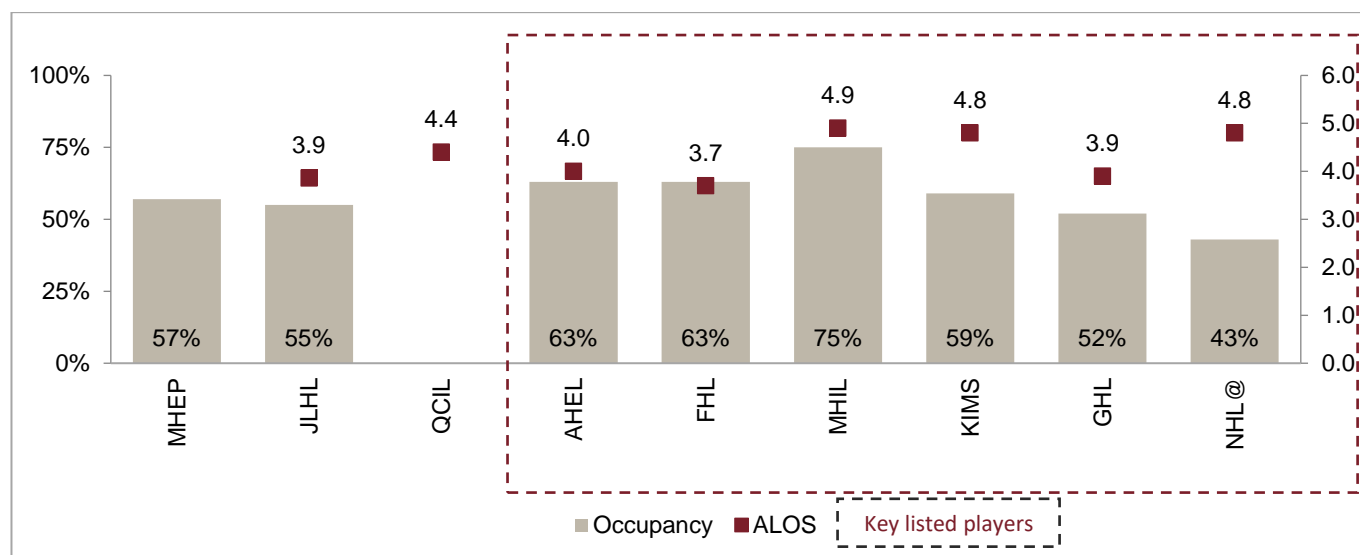
Total number of hospital beds per hospital / average size of hospital (December 2022)



Note: *Data from company website accessed in February 2023; **FHL operational beds as of FY22 are provided, @operational beds considered in India as per Q3 FY23 investor presentation

Source: Companies' annual reports/investor presentations, CRISIL MI&A Research

Occupancy rate (OR) and ALOS for FY22

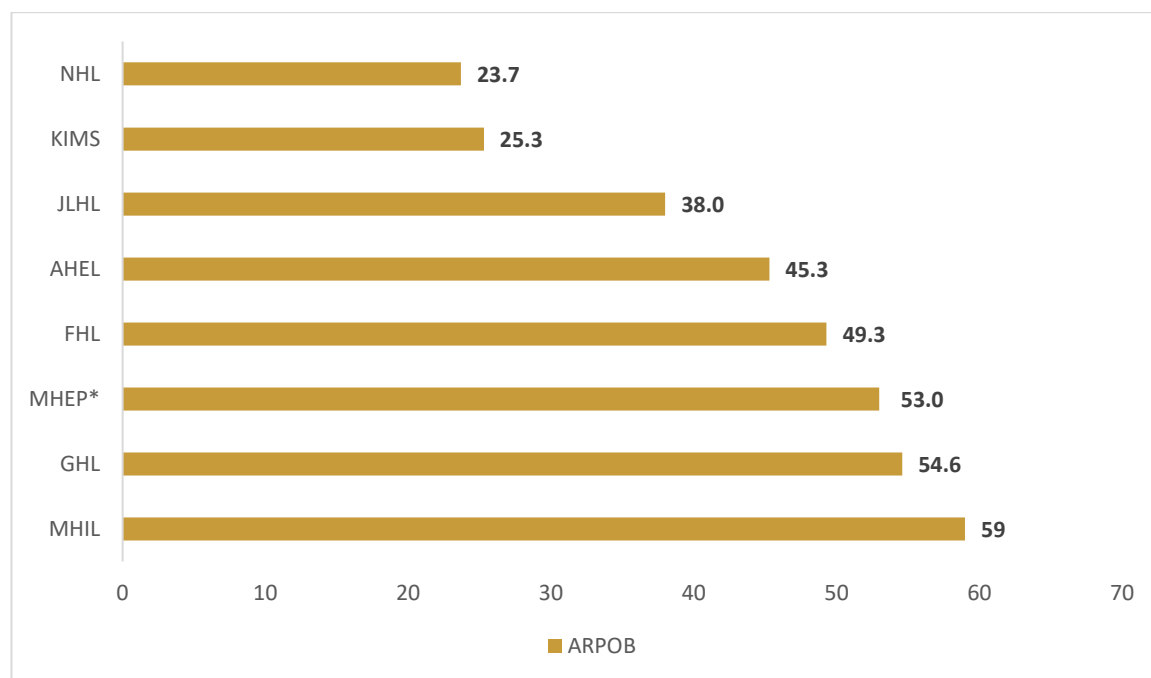


Note: MHIL ALOS figure is for FY21 figure, occupancy rate of MHIL and NHL for FY22 calculated using annual inpatients and ALOS values

Source: Companies' annual reports/investor presentations, CRISIL MI&A Research

JLHL had an ARPOB of ~Rs 38,000 in FY22 and has grown from Rs 32,000 in FY20 (CAGR: 9.0% between FY20 and FY22).

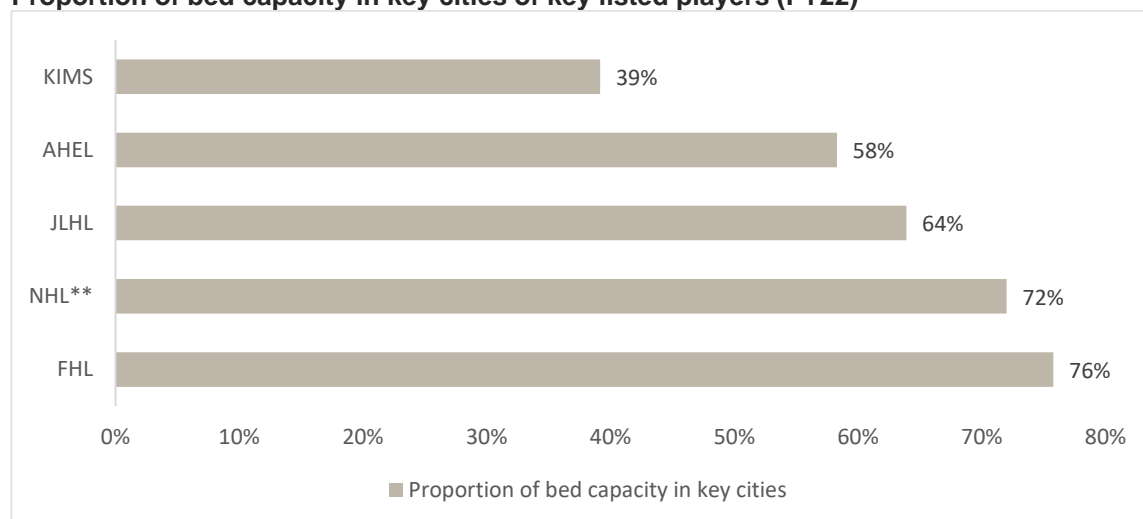
Average revenue per occupied bed (ARPOB) of major hospital players for FY22 (Rs. '000)



Note: ARPOB in '000 per occupied bed. *MHEP figure is for Manipal Hospital Pvt Ltd and not for the whole entity Manipal Hospital Enterprise Pvt Ltd

Source: Companies' annual reports/investor presentations, Credit ratings, CRISIL MI&A Research

Proportion of bed capacity in key cities of key listed players (FY22)



Note: Key cities include NCR, MMR, Chennai, Hyderabad, Bengaluru, Kolkata, Pune and Ahmedabad; Proportion of beds in key cities for Fortis Healthcare and Apollo Hospitals Enterprises have been derived from the list of hospitals on their website; Fortis Healthcare Ltd data for FY21; ** Narayana Hrudalaya bed capacity calculation includes operational beds from the following markets defined in their FY22 investor presentation: Bangalore, Kolkata, Western (only added beds from Mumbai and Ahmedabad for Western), Delhi NCR

Source: Company annual report, investor presentation, CRISIL MI&A Research

Select operational parameters of key listed players (FY22)

Key operational parameters (FY22)	Inpatient volume	Outpatient volume	Inpatient revenue (Rs million)	Outpatient revenue (Rs million)	Operational beds
AHEL*	460,152	2,514,365**	70,135	18,011	7,875
FHL@	267,200	2,707,400	~36,032***	~5,373***	~4,300
GHL	NA	NA	NA	NA	1,779
KIMS	136,731	1,013,759	NA	NA	NA
MHIL#	NA	NA	NA	NA	2,275
NHL	191,000@	1,881,000\$	~21,735	~7,712	5,801 @@
JLHL^	34,650	6,10,796	5,760	1,502	900****

Note: Nap.: Not applicable / Not meaningful, NA: Not available, Inpatient and outpatient revenue in the above table are not reclassified as per CRISIL MI&A Research standards and directly taken from investor presentation/ annual report *Data for Healthcare services, **volume for new registrations only; @data for hospitals business, ***calculated based on specialty mix given in investor presentation; ^ on a consolidated basis, **** as of December 31, 2022, @ corresponds to number of discharges, \$includes day care business but excludes vaccine footfalls, @@operational beds in India as per investor presentation

Source: Companies' annual reports, investor presentations, CRISIL MI&A Research

Additional select financial parameters of key listed players (FY22)

Key operational parameters (FY22)	Tangible Net worth (Rs million)	Reported Book Value (Rs per share) or net asset value (NAV)
AHEL	48,384.00	336.47
FHL	25,427.64	33.68
GHL	16,097.43	63.57
KIMS	12,941.03	161.71
MHIL	11,720.80	12.09
NHL	15,773.10	77.18

Net Asset value (NAV) = Reported Book Value (in Rs Per share)

Source: Companies' annual reports, investor presentations, CRISIL MI&A Research

4.3 Key financial parameters of major hospital players

Key financial parameters (FY22)

Key financials (FY22)	Operating income (Rs million)	Y-o-y growth (%)	3-Year CAGR (Mar 2019 to Mar 2022)	OPBDIT (Rs million)	Y-o-y growth (%)	3-Year CAGR (Mar 2019 to Mar 2022)	PAT (Rs million)	Y-o-y growth (%)	3-Year CAGR (Mar 2019 to Mar 2022)
AHEL	1,46,769.00	38.90%	15.11%	22,040.00	92.81%	27.07%	11,084.00	710.83%	76.92%
FHL	56,567.21	42.14%	8.56%	10,097.25	190.89%	66.94%	7,899.45	N.Ap.	N.Ap.
GHL	21,771.56	49.47%	14.16%	4,659.38	124.46%	40.06%	1,962.02	581.14%	47.63%
KIMS	16,637.55	24.83%	21.82%	5,287.19	41.45%	46.34%	3,437.95	67.31%	N.Ap.
MHIL#	52,180.00	43.78%	13.18%	13,900.00*	118.55%	57.47%	8,370.00	N.Ap.	82.81%
MHEP	39,542.10	116.63%	30.21%	9,002.00	162.97%	51.84%	5,417.20	N.Ap.	N.Ap.
NHL	37,013.17	42.93%	9.00%	6,572.99	226.73%	30.65%	3,421.20	N.Ap.	83.57%
QCIL	13,181.61	25.11%	10.68%	2,603.53	41.87%	37.09%	1,228.91	80.71%	N.Ap.
ABHS	1,983.86	32.85%	9.56%	215.94	N.Ap.	77.78%	107.19	-8.83%	N.Ap.
JLHL	6,572.79	42.55%	18.07%	1,588.51	129.97%	34.11%	1,057.13	537.09%	79.95%
RHCS	64.55	28.98%	-3.36%	13.66	180.55%	23.52%	-13.94	N.Ap.	N.Ap.
SHPL	7,269.44	33.60%	24.05%	1,542.92	21.64%	54.08%	671.09	172.15%	43.85%

Note: Nap.: Not applicable / Not meaningful, NA: Not available Western India focused players; Financials have been reclassified as per CRISIL MI&A Research standards

Green highlighted cells are highest value for the parameter mentioned in the column

#For MHIL, operating income, operating margin and net profit margin taken for the whole group from the investor presentation, other available ratios which have been put are for Max Healthcare Institute Ltd. *Operating EBITDA margin used in place of operating margin for Max group

Source: Companies' annual reports, CRISIL MI&A Research

Key Financial Ratios for major hospital players (FY22)

Key financials (FY22)	Operating margin	PAT Margin	ROCE	ROA	Fixed Assets Turnover Ratio	ROE	Gearing ratio	Receivables turnover ratio	Payables turnover ratio	Working capital days	Avg. collection period	Avg. payment period	Debt service coverage ratio	Interest coverage ratio
AHEL	15.0%	7.6%	25.5	1.2	2.0	24.2	0.5	8.2	4.6	-18	44	79	2.7	6.8
FHL	17.9%	14.0%	29.7	0.8	1.1	28.9	0.4	12.7	2.1	-134	29	178	5.0	9.8
GHL	21.4%	9.0%	16.3	0.7	1.0	13.1	0.5	12.0	4.0	-48	31	90	2.3	6.2
KIMS	31.8%	20.7%	37.0	0.9	1.8	33.4	0.1	12.8	2.7	-93	28	133	9.2	34.1
MHIL#	26.6%	16.0%	32.9	1.0	1.9	59.9	0.8	8.0	2.0	-126	46	179	7.2	10.5
MHEP	22.8%	13.7%	36.9	0.9	1.4	149.3	12.5	13.2	1.5	-209	28	246	2.8	3.4
NHL	17.8%	9.2%	27.2	1.2	1.9	28.7	0.9	8.5	1.6	-92	43	234	3.3	10.3
QCIL	19.8%	9.3%	21.4	1.1	1.8	19.1	0.4	11.2	2.1	-134	33	171	3.1	6.3
ABHS	10.9%	5.4%	12.5	1.5	3.8	N.Ap.	-15.6	5.0	8.0	46	73	46	2.7	11.5
JLHL	24.2%	16.1%	22.1	0.9	1.4	29.1	1.0	23.8	2.4	-129	15	155	2.9	5.6
RHCS	21.2%	-21.6%	N.A.p.	1.1	1.6	N.Ap.	1.2	N.Ap.	N.Ap.	0	NA	NA	NA	3.8
SHPL	21.2%	9.2%	40.4	1.1	1.8	53.1	1.0	19.3	2.4	-127	19	153	5.0	4.9

#For MHIL, operating income, operating margin and net profit margin taken for the whole group from the investor presentation, all other available ratios which have been put are for Max Healthcare Institute Ltd. *Operating EBITDA margin used in place of operating margin for Max group

Green highlighted cells are highest value for the parameter mentioned in the column except for gearing for which a lower value is desirable. N.Ap. stands for not applicable, Western India focused players

Ratios calculated as per CRISIL MI&A Research standards as described below:

Formulae used for ratio calculations:

1. Operating income = Gross sales + Other related income
 2. Operating Earnings before Interest taxes depreciation and amortization (EBITDA) = Operating profit before depreciation interest and taxes (OPBDIT)
 3. Operating margin = OPBDIT / operating income
 4. Return on Equity (RoE) = Profit after tax / Tangible Net Worth
 5. Return on capital employed (ROCE) = (Profit before interest and taxes) / (Total Debt + Tangible Net worth)
 - 6.. Tangible Net worth= Total paid-up equity share + Reserves- Intangible assets
 7. Return on Assets (RoA) = Operating income/Total Assets
 8. Average collection period = 365*net Receivables/Operating income
- Note: Net Receivables = Gross Receivables - Allowance for doubtful accounts
9. Average payment period = 365*average accounts payables/Total Credit purchases
 10. Gearing ratio = Total Debt / Tangible Net worth
 11. Debt service coverage ratio = Operating income/Total short term debt
 12. Interest coverage ratio = Profit before depreciation interest & taxes (PBDIT) / Interest and Finance Charges
 13. Total assets turnover ratio = Operating income/Total Assets
 14. Fixed assets turnover ratio = Operating income/Net Fixed Assets
 15. Receivables turnover ratio = (365/Average collection period days)
 16. Payables turnover ratio = (365/Average payment days)
 17. PAT Margin = Profit after tax / operating income

Key observations

- In fiscal 2022, AHEL had the highest operating income at Rs 146,769.00 million, followed by Fortis Healthcare at Rs 56,567.21 million among the peers compared above. **JLHL reported the second highest operating income among peers of west region compared above (West region peers include ABHS, JLHL, RHCS and SHPL)** with a revenue of Rs 6,572.79 million.
- JLHL reported the second highest CAGR (FY19-22) in terms of profit after tax (PAT) among the peers compared above. Max Healthcare Group reported the highest PAT CAGR (FY19-22) among the peers compared above.
- In FY22, JLHL reported the best receivables ratio of 23.8 among the peers compared above. SHPL and MHEP reported the second and third best receivables turnover ratio in FY22 among the peers compared above.

Cost structure of major hospital players as a percentage of operating income (OI) – FY22

Cost structure (FY22)	Material and consumables cost as % of OI	Power & fuel costs as % of OI	Employee costs as % of OI	Other costs as % of OI
ABHS	28.1%	3.2%	15.7%	42.1%
AHEL	51.6%	1.3%	12.2%	19.9%
FHL	24.0%	2.0%	19.2%	37.1%
GHL	24.9%	2.2%	26.1%	25.5%

Cost structure (FY22)	Material and consumables cost as % of OI	Power & fuel costs as % of OI	Employee costs as % of OI	Other costs as % of OI
JLHL	19.3%	2.1%	17.8%	36.7%
KIMS	21.3%	1.6%	15.7%	29.6%
MHEP	25.1%	1.7%	14.0%	36.4%
MHIL	23.5%	1.6%	19.3%	31.6%
NHL	29.5%	2.3%	20.7%	29.2%
QCIL	23.3%	2.2%	15.0%	39.7%
RHCS	NA	10.1%	16.6%	52.1%
SHPL	24.4%	2.0%	20.7%	31.7%

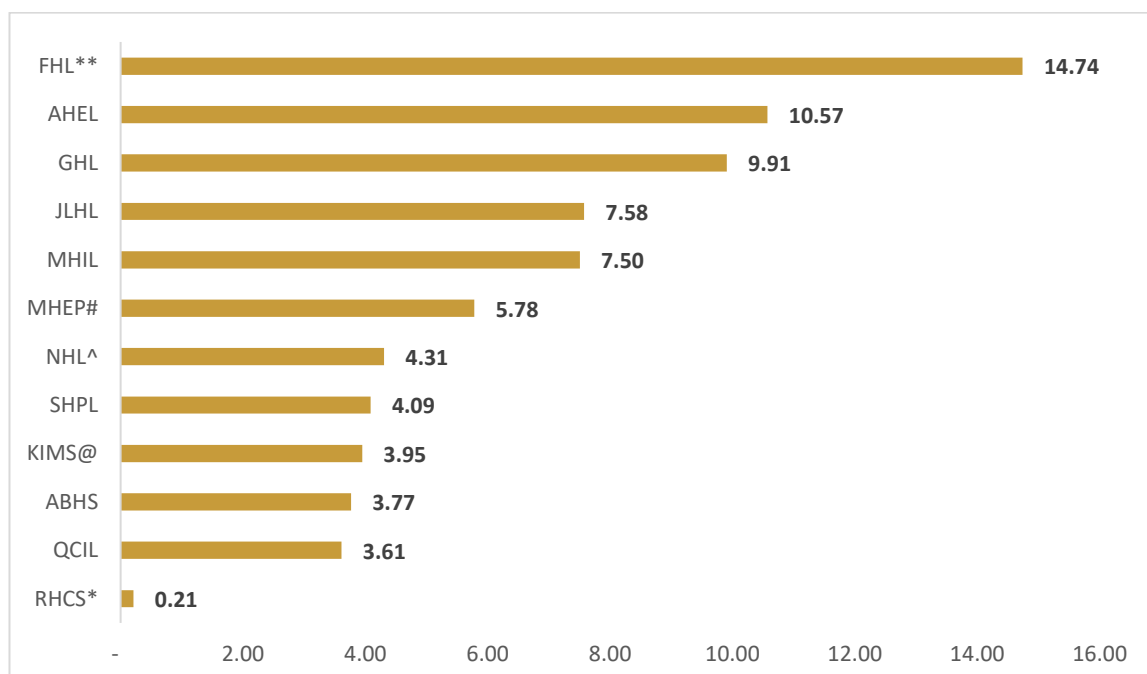
Green highlighted cells are lowest cost value for the parameter mentioned in the column

Employee cost includes employee benefit expense. Doctor's payout cost, retainer fees to doctor, etc. are included in other. Other costs also include selling and other manufacturing expenses

Note: OI: Operating income, NA stands for not available

Source: Companies' annual reports, CRISIL MI&A Research

Gross block per bed at the end of FY22 (Rs. million)



Note: Capital expenditure per bed is calculated as increase in gross block for the last three fiscal years divided by the total beds of the above players; Note:., ***FHL operational beds are provided; #MHEP has over 7,600 beds as per the website, @KIMS currently has 4,015 beds as it acquired Sunshine hospitals in April 2022 and a hospital in Nagpur in Q2 FY23, but as of FY22, the bed capacity was at 3,064 beds which is considered for above calculations; *RHCS gross block as per annual report has reduced from FY19 to FY22; ^Total capacity beds of the group considered (6,584) as given in the investor presentation for the above chart's calculation in case of NHL

Source: Companies' annual reports/investor presentations, CRISIL MI&A

Planned expansion of key players

Hospital	Expansion planned	Locations of planned expansion	Estimated capex per bed
AHEL	2,000 beds at Rs 30,000 million	Mumbai, Bangalore, Gurgaon, Chennai	Rs 15 million
FHL	300-400 beds per annum for the next 2-4 years	Mumbai, Bangalore, Delhi, Noida	Rs 8 million
KIMS	320 beds	Nashik	Rs 6.25-8 million
SHPL	The group is adding over 100 beds at its Hadapsar hospital and plans to construct a new hospital building at Deccan Gymkhana for which land plots are being acquired	Pune	NA
MHIL	~2,840 beds	Pan India	Rs 12-13 million
GHL	300 beds	West India	NA
JLHL	500+ beds	Dombivali, West India	NA

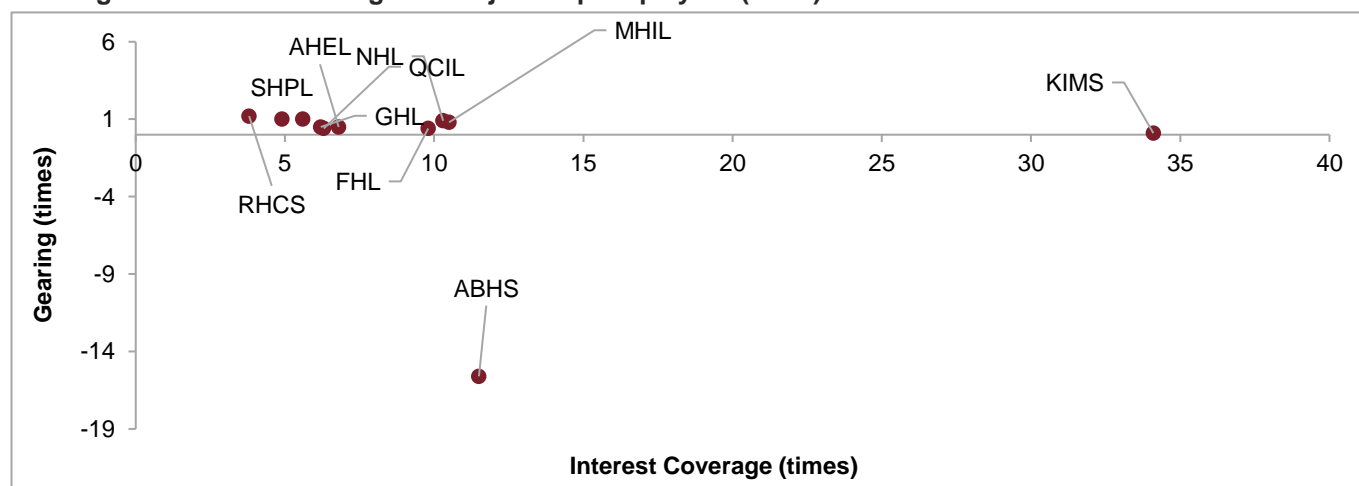
Note: NA stands for not available

Source: Companies' annual reports/investor presentations, CRISIL MI&A Research

Key observations:

- Material cost and employee cost are two of the largest cost components for the players under study. For most players compared hereby, material cost is in the range of 20-30% and employee cost in 10-20% compared to the operating income. **JLHL had the lowest material and consumables cost in FY22 at 19.3% among the peers compared above.**

Gearing and Interest Coverage for major hospital players (FY22)

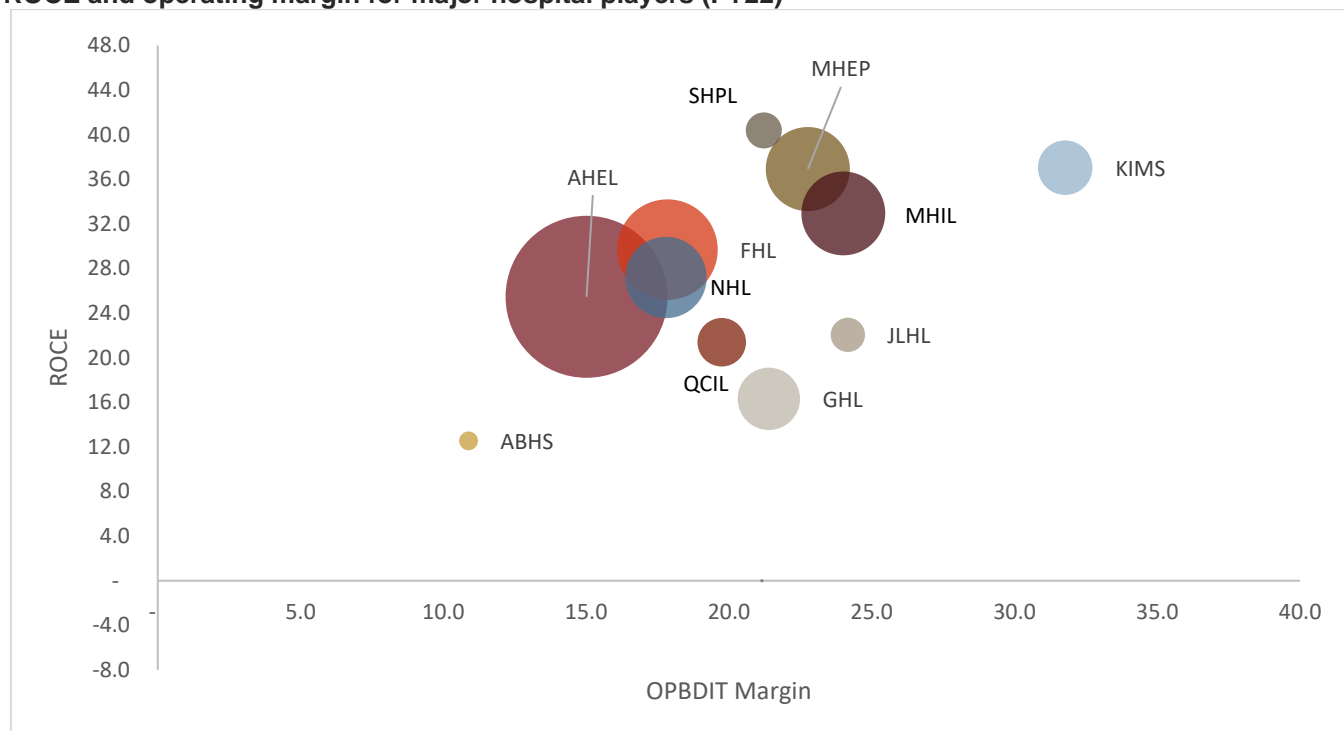


Note: Gearing ratio = Total Debt / Tangible Net worth

Interest coverage ratio = Profit before depreciation interest & taxes (PBDIT)/ Interest and Finance Charges

Source: Company annual reports, CRISIL MI&A Research

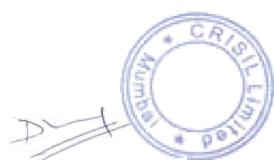
ROCE and operating margin for major hospital players (FY22)



Note: Return on capital employed (ROCE) = (Profit before interest and taxes) / (Total Debt + Tangible Net worth)

Operating margin = OPBDIT / operating income

Source: Company annual reports, CRISIL MI&A Research



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