SHRI RAM COLLEGE OF COMMERCE

HEALTHCARE INFRASTRUCTURE INDEX

A Student Research Initiative By

THE ECONOMICS SOCIETY, SRCC

PRINCIPAL'S NOTE

PROF. SIMRIT KAUR

The growth and development of a nation are directly proportional to its citizens' health and well-being. The year 2021 has made this notion stronger than ever. Every state in the country has basic infrastructural facilities and human resources that are vital for the efficient distribution of quality healthcare facilities.

In a paradigm where adequate health infrastructure becomes the most relevant, it is necessary to analyze the status of the same across the country. Nudging states towards improving their social outcomes requires developing indices that would capture annual increments in performance. The broader goal is to develop a spirit of cooperative and competitive federalism whereby the Center and States can jointly determine the route to progress and prosperity. It is in this context that The Economics Society, SRCC has spearheaded the Healthcare Infrastructure Index and has an explicit focus on the core of health systems.

Shri Ram College of Commerce has established itself as a premier institution of academic and extracurricular excellence and draws the brightest minds of the country to its doors. With a vision of becoming a 'College of Global Choice,' we aim to harness the potential of students by providing them with platforms to initiate intellectual discourse on pressing global matters.

The Economics Society, SRCC has created a niche for itself in the college, and deservedly so, with their tradition for fostering economic curiosity and their insistence on moving past the confines of theoretical knowledge. Overstepping the confines of conventional learning methods, the society has undertaken interesting research projects on a wide range of themes, organized policy workshops in collaboration with leading think tanks, and hosted personalities from diverse fields.

I congratulate the entire team of the Healthcare Infrastructure Index under the Society's DataLab for having undertaken such rigorous research at an undergraduate level and wish all the budding researchers involved the best for the success of this report and their future. The Index has been a collective well-intentioned effort of the students to add to the discourse on healthcare policy in our country as they remain steadfast in their determination towards a nation better equipped to take care of its citizens, with quality and equity at the core of it all. Any feedback on the research conducted or ways to improve it will be highly appreciated by them, in the spirit of evolving this annual report to a more meaningful publication.

FACULTY ADVISOR'S NOTE

DR. AJC BOSE **DR. RAJEEV KUMAR**

The Economics Society, SRCC, with the hard work, dedication and sincerity of all its members, has grown into a full-fledged organization that aspires to achieve perfection in every sphere and strives to perform to its full potential. Built on a sturdy foundation of research and policy, the Society has gone above and beyond the traditional realms of learning and imparts essential life skills via its multiple operations.

The students working for various activities of the Society are motivated by the curiosity of contributing to learning and value addition by way of standing for pluralistic, realistic and interdisciplinary socio-economic understandings.

The impetus to initiate discourse and offer a multitude of perspectives on an issue as contemporary as Health Infrastructure is highly appreciable. I hope this report shall assist the policymakers and other stakeholders in our country in terms of engineering better decision making in the Health Infrastructure of India by working on data insights. I convey my best wishes to The Economics Society for the Healthcare Infrastructure Index, and their annual data project, Jaankari, along with their digital publication, Ceteris Paribus.

TABLE OF CONTENTS

Abbreviations i

Introduction 1

Need and Logic for the Study 1

Methodology 2-8

- Data Collection 2
- Elimination of Personal Biases 5
- Scientific Approach 6

2019 in Review 9-11

2011-2018 Timeline 12

States 13-44

- Large States 13

- Kerala 14
- Himachal Pradesh 15
- Jammu and Kashmir 16
- Karnataka 17
- Tamil Nadu 18
- Telangana 19
- Punjab 20
- Andhra Pradesh 21
- Uttarakhand 22
- Rajasthan 23
- Maharashtra 24
- Delhi 25
- Gujarat 26
- West Bengal 27
- Chhattisgarh 28

TABLE OF CONTENTS

Odisha	29
Haryana	30
Assam	31
Madhya Pradesh	32
Uttar Pradesh	33
Jharkhand	34
Bihar	35
Small States	36
Mizoram	37
Arunachal Pradesh	38
Sikkim	39
Goa	40
Manipur	41
Meghalaya	42
Nagaland	43
Tripura	44
Comparison with Health Index of Niti Aayog	**45-47**
Conclusion	**48-49**
Annexure	**50-55**
References	**56-58**

ABBREVIATIONS

ANM	Auxiliary Nursing Midwives
ASHA	Accredited Social Health Activists
CAGR	Compound annual growth rate
CBHI	Central Bureau of Health Intelligence
CHCs	Community Health Centers
GDP	Gross Domestic Product
KMO Test	Kaiser-Meyer-Olkin Test
LHV	Lady Health Visitors
NCBI	National Center for Biotechnology Information
NCLEX-RN	National Council Licensure Examination
NE	North-Eastern
NHM	National Health Mission
NHP	National Health Profile
NITI	National Institution for Transforming India
PCA	Principal Component Analysis
PHCs	Primary Health Centers
SC	Sub-Health Centres
UTs	Union Territories
WHO	World Health Organization

INTRODUCTION

Health infrastructure is one of the most important pillars needed to sustain a country. Being a merit good, its establishment should be necessarily undertaken by the State.

The report aims to develop a state-wise index of health infrastructure for India over a period of 9 years, from 2011 to 2019. On the basis of the available data taken from various issues of the National Health Profile, eighteen indicators of health infrastructure have been considered. Ranks are assigned to various states for their health infrastructure as per their index values, for all nine years.

THE NEED AND LOGIC FOR THE STUDY

The growth and development of a nation are directly proportional to its citizens' health and well-being. The year 2020 has made this stronger than ever. Every state in the country has basic infrastructural facilities and human resources that vital for efficient distribution of quality healthcare facilities. These resources are necessary to sustain and thus improve the health status of its population.

This index has been created to measure the performance of states only with respect to these inputs. It measures the condition of basic healthcare facilities in various states while keeping the performance of other states in perspective. The development of such an infrastructure index will ease the formulation of measures and approaches required to identify the limitations and bring about improvements. Thereby, this index has the potential to help the states become better performers. This report is, hence, disparate to the performance of Healthcare Infrastructure or the inputs for the health care in the state and its people, and does not analyze the quality of these resources or the efficiency in their implementation. Once identified, the reasons for their disappointing statistical performance can be pinned down to some particularly poor-performing indicators and steps can be taken to improve the status quo. As seen later, development in health infrastructure will also bring about holistic improvement in the population's health indicators.

METHODOLOGY

DATA COLLECTION

For the purpose of this study, 18 variables necessary for an efficient healthcare system were identified. The chosen variables include the built environment and supporting elements: equipment, access, systems and processes, initiatives and staff, as defined by the NCBI. The variables do not take into account indicators that measure the well-being of the individuals in the state, but rather represent the inherent capacity of the state with regard to facilities and resources to provide health care services. With this definition, the set of 18 identified indicators are believed to be sufficient to represent Healthcare Infrastructure.

For the ease of further deliberations, the indicators which function predominantly for healthcare services in the rural areas have been earmarked as Rural Specific Indicators and the rest have been considered to be Non-Rural Specific Indicators. The indicators have been further divided as Built Infrastructure and Human Resources.

The indicators are as follows:

Rural Specific Indicators

Built Infrastructure

1. Primary Health Centers (PHCs):

PHCs are state-owned rural healthcare facilities in India. They are generally single-physician clinics with facilities for minor surgeries catering to 20000 to 30000 people.

2. Community Health Centers (CHCs):

They serve as a referral center for 4 PHCs, provide facilities for obstetric care and specialist consultations. CHCs are established and maintained by the State government under the Minimum Needs Programme/Basic Minimum Services programme.

3. Sub-Health Centers:

A Sub-Health Centre (Sub-centers) is the first point of contact between the primary health care system and the community.

Human Resources

1. Doctors at PHCs:

Refers to the doctors present in the state-owned rural healthcare facilities in India, commonly known as Primary Health Centres. Primary Health Centres are generally single-physician clinics with facilities for minor surgeries.

2. Specialists at CHCs:

Refers to medical practitioners with a postgraduate medical degree, posted in Community Health Centres to provide advanced diagnosis and services including minor surgeries.

3. Lady Health Visitors:

Refers to a female health worker providing a variety of services to urban and rural communities, including basic nursing care, maternal & child health services, health & sanitation advice and training of community workers.

4. Health Assistants:

Refers to the support workers who work under the direction of qualified professionals and provide care to the patients in hospitals or other medical settings.

5. Health Workers:

Refers to the workers who are responsible for delivering health services to patients. This is a broad term encompassing health assistants, midwives, sanitation workers and lady health visitors.

6. Auxiliary Nursing Midwives (ANM):

Refers to the first level female workers in rural areas who provide and ensure effective and safe health care to village communities and achieve targets of the National Health Mission.

Non - Rural Specific Indicators

Built Infrastructure

1. Total Hospitals:

A hospital is a health care institution providing patient treatment with specialized medical and nursing staff and medical equipment.

The number of hospitals considered include hospitals run by Central Government, State and Local Government bodies. PHCs are also included in the number of hospitals.

2. AYUSH Hospitals:

Refers to hospitals that treat patients based on Ayurveda, Unani, Siddha, Naturopathy and Homeopathy systems of medicine registered under a board/council in each state.

3. Hospital beds:

WHO defines a hospital bed as a bed that is regularly maintained and staffed for the accommodation and full-time care of a succession of inpatients and is situated in wards or a part of the hospital where continuous medical care for inpatients is provided.

4. AYUSH Dispensaries:

Refers to dispensaries that sell medicines from Ayurveda, Unani, Siddha, Naturopathy and Homeopathy systems of medicine registered under a board/council in each state.

5. Blood Banks:

A Blood Bank is a place or organization or unit or institute or other arrangements made by such organization, unit or institution for carrying out all or any of the operations for collection, apheresis, storage, processing and distribution of blood drawn from donors and/or tor preparation, storage and distribution of blood components.

Human Resources

1. Registered Doctors:

Refers to an allopathic medical practitioner with recognized medical qualification (under MCI Act) registered under the state medical council for the concerned year.

2. Registered AYUSH Practitioners:

Refers to practitioners in Ayurveda, Unani, Siddha, Naturopathy and Homeopathy systems of medicine registered under a board/council in each state.

3. Registered Nurses and Midwives:

A registered nurse is a nursing programme graduate who has passed the NCLEX-RN examination and holds the license issued by the respective state's nursing board.

Registered Midwife provides skilled care to childbearing women, new-born infants and families throughout pre-pregnancy, birth, postpartum and early weeks of life after completing a midwifery education programme.

4. Pharmacists:

Refers to a specialist in the safe and effective use of medication registered with the Pharmacy council of India holding a pharmacy degree.

The data pertaining to these selected 18 indicators were collected from the National Health Profile published each year by the Central Bureau of Health Intelligence, Ministry of Health and Family Welfare, Government of India.

Some other key indicators such as Medical Laboratories & Diagnostics facilities, Stock of medicines, Number of Ambulances, Supply of medical oxygen and Palliative & End of Life Services were not considered in the report owing to lack of data.

The functioning of indicators such as Postpartum Centres, Urban and Family Welfare Services, Accredited Social Health Activists (ASHA) and Health and Hygiene Professionals are understood to be similar to the already considered indicators and hence overlooked. All Tertiary health services and indicators regarding Eye and other organ banks, Utilization of Health Technology,

Stock of Vaccines, Availability of Medical devices and Dental, Ophthalmic and Mental Health care Facilities have been excluded due to their lack of uniformity and a wide variety.

ELIMINATION OF PERSONAL BIAS

To eliminate differences that may have arisen due to disparities in the population size of different states, the values of all indicators per million people were calculated (Rural Specific Indicators calculated per million of Rural Population).

The per million values were then normalised to further eliminate any other disparities in the data which may have arisen due to differences in the scale of the indicators. To normalise this data, the minimum-maximum normalisation approach was used.

Normalised Values = (Indicator Value - Minimum Value)/(Maximum Value - Minimum Value)

To bridge data gaps for a few indicator values wherein data was unavailable, CAGR was calculated and used to plug in those gaps.

In order for the index to be free of all personal biases, a scientific methodology shall be applied for the calculation of the weights. The Principal Component Analysis/Factor Analysis methodology could help serve the purpose. An output higher than 0.5 on the test and a significance of less than 0.001 shall be considered suitable for the data set.

SCIENTIFIC APPROACH

For the index to gain credibility, it is imperative that it is free from any biases. To ensure that, a scientific and a step by step approach has been used to assign weights to various indicators.

This scientific approach is known as Principal Component Analysis (PCA)/ Factor Analysis methodology.

1. To ensure that the selected data set has enough sampling adequacy and relation, KMO and Barlett's test was done. Only the data set with an output higher than 0.5 on the test and a significance of less than 0.001 was considered suitable for the report.

2. Once the data adequacy was established through the KMO and Barlett's Test, eigenvalues were calculated for all the 18 components or health indicators. Only the components with eigenvalues greater than 1 were considered suitable for the analysis.

3. This was followed by the extraction of the squared loadings, upon which Varimax rotation was applied to extract the rotated sums of squared loadings. Only components with individual variance above 10% and cumulative variance above 60% were taken forward for the analysis.

4. Following this, the rotated component matrix was taken which was squared and then scaled down using the unitary approach. This was used to calculate domain weights and component weights. On multiplying the two, we got the indicators' weights which were again scaled down using the unitary method. These scaled indicators' weights were the final weights to be used for creating the index.

5. To arrive at the final index values for each state and UT, the Mathematical Composite Index mechanism was used in which:

Composite Index Formula =
$\Sigma Ni=1\ wivi/\sigma i$, where

Σ = Summation of all the weighted variables for a particular state
wi = Weight of respective Variable
vi = Variable
σi = Standard Deviation of Variable across states
N = Number of Variables

PCA was used in this report as it was identified to be the most efficient method to generate a synchronized low-dimensional representation of the variables, thus making comprehension of the data easier and accurate. The analysis performed by employing PCA must be, however, assimilated in light of its disadvantages.

1. Independent variables become less interpretable: After implementing PCA on the dataset, the original features get transformed into Principal Components. Principal Components are merely the linear combination of the original features. Principal Components are hence, not as readable and interpretable as original features.

2. Standardisation of Data: PCA does not find the optimal Principal Components if the data is not standardized. If PCA is applied on a feature set, the resultant loadings for features with high variance will also be large. All the categorical variables are required to be converted into numerical variables. Both these have been addressed by the report effectively. Nevertheless, it is universally accepted that the principal components can get biased towards features with high variance.

3. Information Loss: Although Principal Components try to cover maximum variance among the features in a dataset, if the number of Principal Components is not selected with care, it may miss some information as compared to the original list of features. This report, nevertheless, has selected the components as per standards accepted universally, thereby, reducing the loss to the maximum.

.

4. Unsupervised technique: PCA does not take into account the labels of each data point. It looks at the data set as a whole and determines the direction of the highest variance. Hence, the intricate feature of each data point or observation gets overlooked and there can be a small decrease in Accuracy, Homogeneity, Completeness and V-Measure scores.

Note:

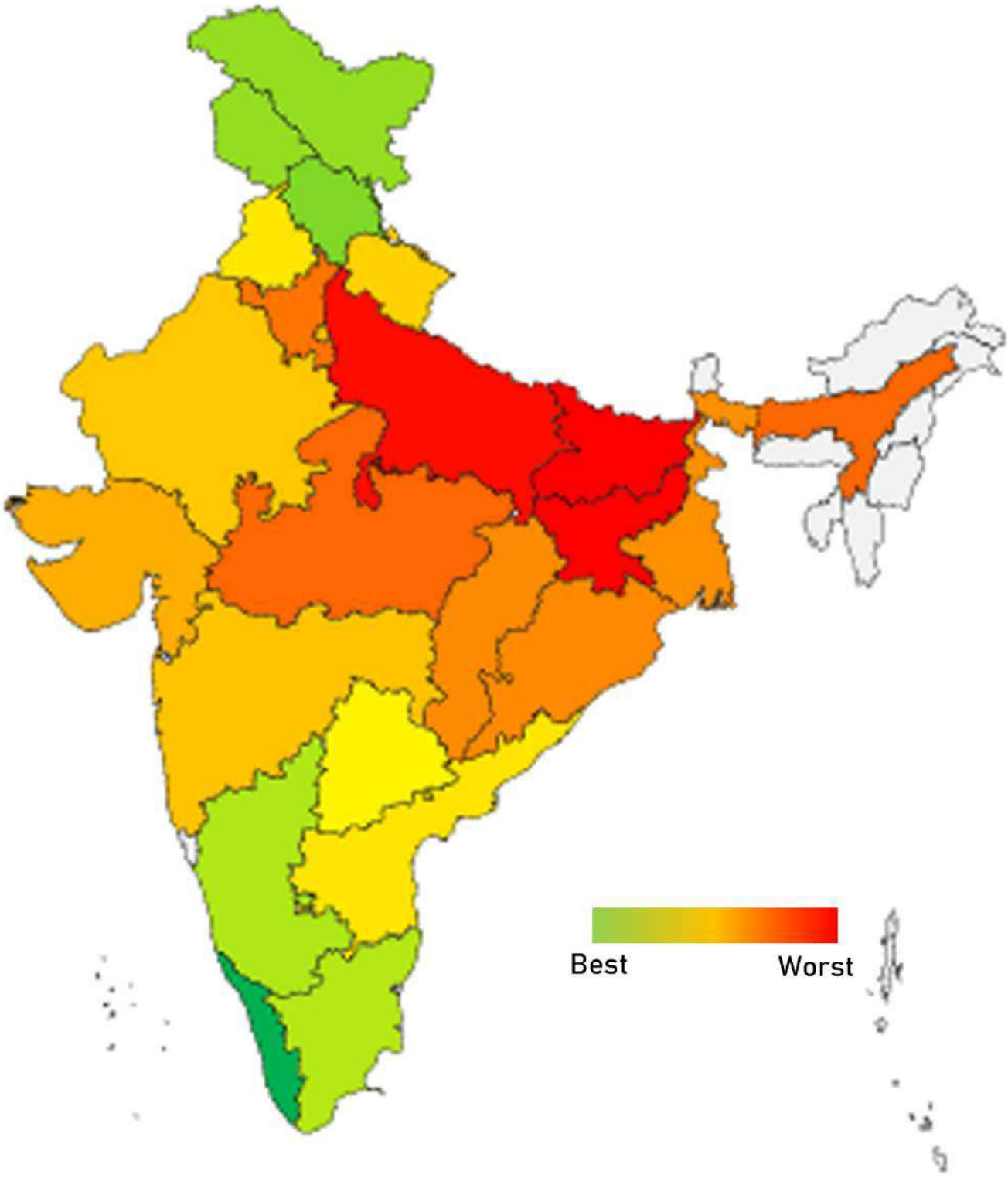
- Similar to the Health Index by NITI Aayog, this report also groups the states into two categories namely, 8 'Small States' and 22 'Large States' (including Delhi).
- Additionally, the States are also classified on the basis of their index scores into, 'Aspirants' (Index Value < 0.3), 'Performers' ($0.3 \leqslant$ Index Value < 0.5) and 'Front-Runners' (Index Value $\geqslant 0.5$).

YEAR IN REVIEW

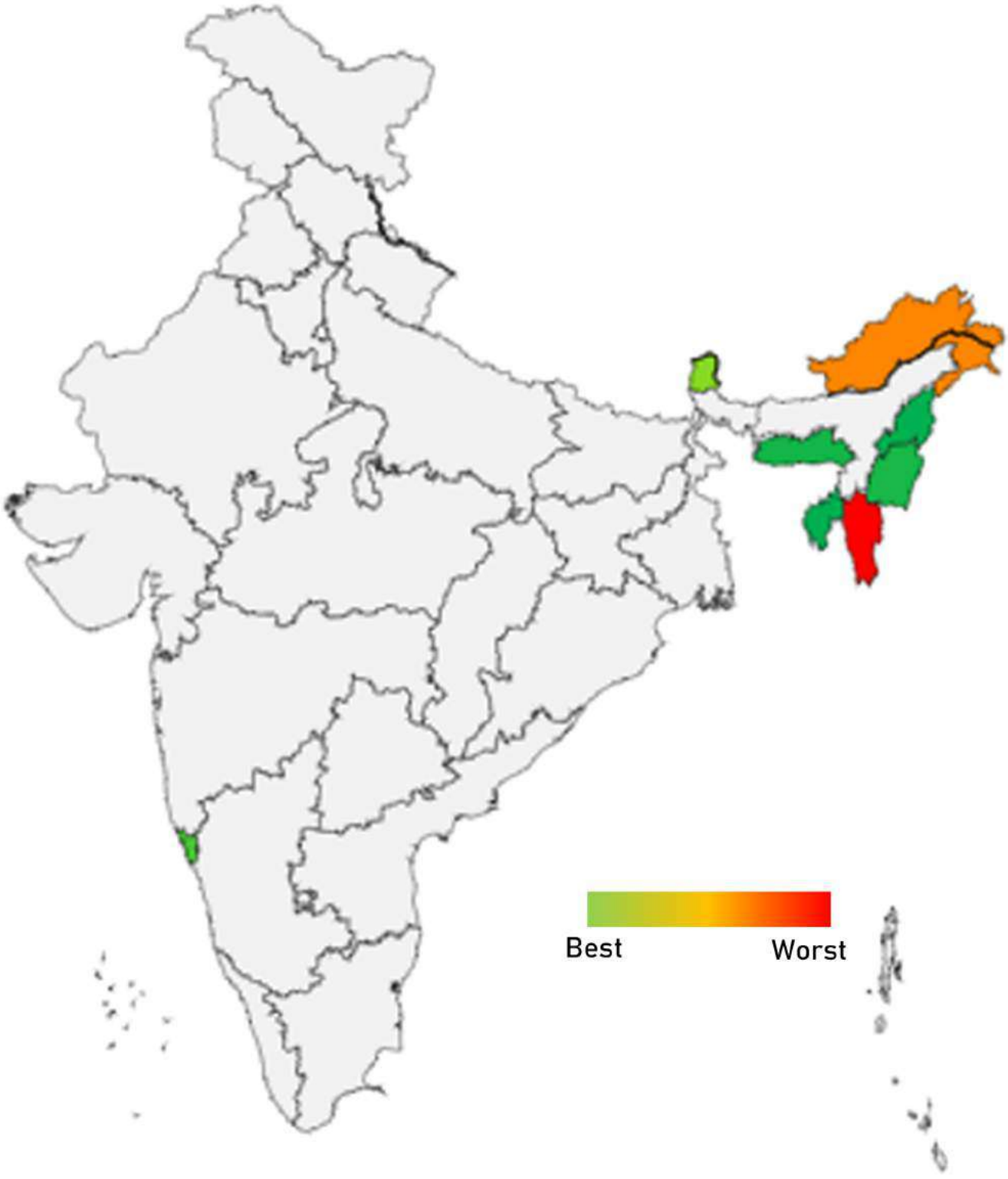
Rank in 2019	Large States	Change from 2018	Magnitude of Change
Front – Runners (Index Value ≥ 0.5)			
1	Kerala	—	0
2	Himachal Pradesh	—	0
3	Jammu & Kashmir	—	0
4	Karnataka	—	0
5	Tamil Nadu	—	0
Performers (0.5 > Index Value ≥ 0.3)			
6	Telangana	▲	1
7	Punjab	▲	1
8	Andhra Pradesh	▲	1
9	Uttarakhand	▼	-3
10	Rajasthan	—	0
11	Maharashtra	—	0
12	Delhi	▲	2
13	Gujarat	▼	-1
Aspirants (Index Value < 0.3)			
14	West Bengal	▲	2
15	Chhattisgarh	▼	-2
16	Odisha	▼	-1
17	Haryana	—	0
18	Assam	▲	1
19	Madhya Pradesh	▼	-1
20	Uttar Pradesh	—	0
21	Jharkhand	▲	1
22	Bihar	▼	-1

Rank in 2019	Small States	Trend from 2018	Magnitude of Change
Front – Runners (Index Value ≥ 0.5)			
1	Mizoram	—	0
2	Arunachal Pradesh	—	0
3	Sikkim	▲	1
Performers (0.5 > Index Value ≥ 0.3)			
4	Goa	▼	-1
5	Manipur	—	0
6	Meghalaya	—	0
7	Nagaland	▲	1
8	Tripura	▼	-1

LARGE STATES



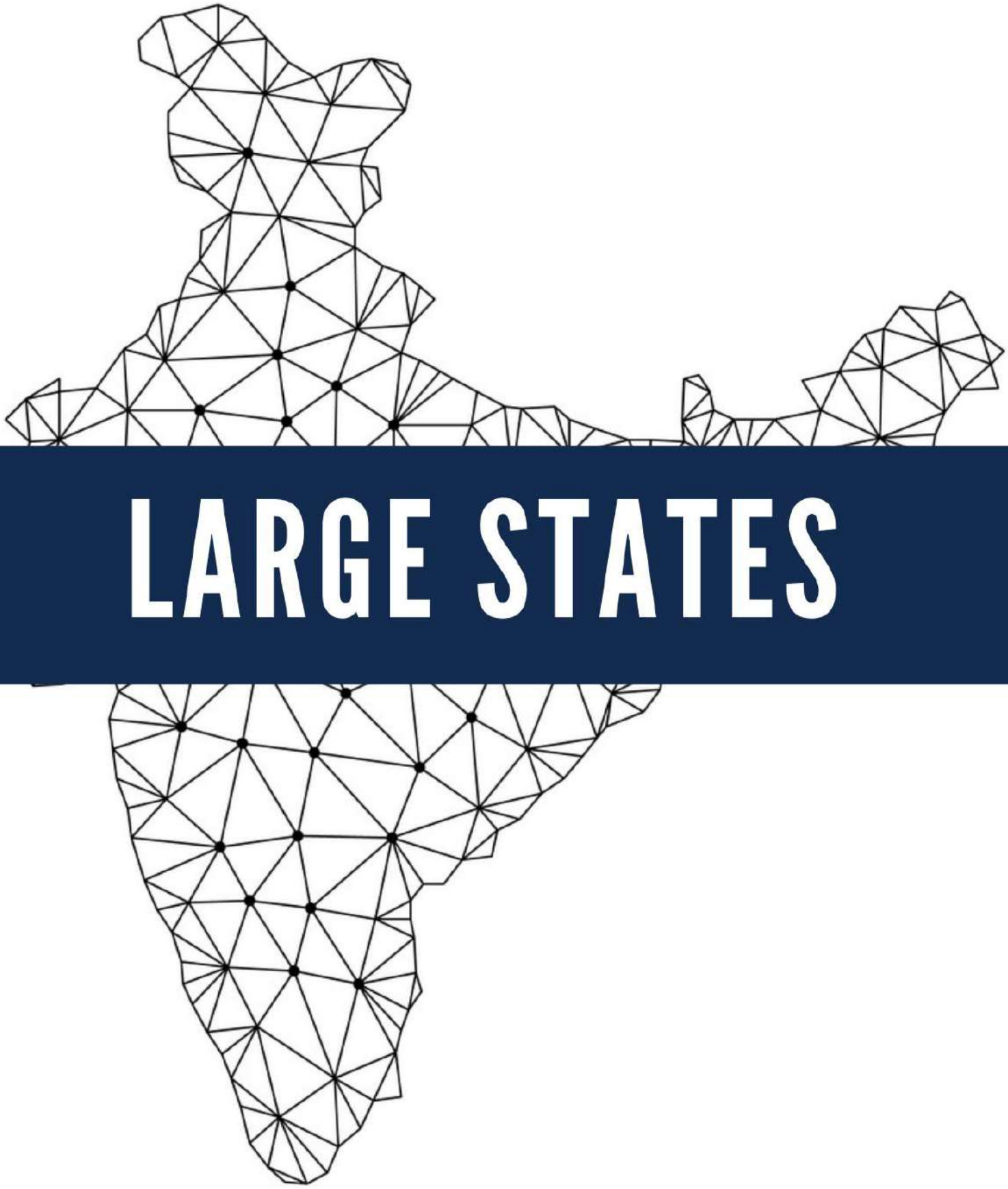
SMALL STATES



TIMELINE

Large States	Ranks							
	2011	2012	2013	2014	2015	2016	2017	2018
Andhra Pradesh	8	6	8	9	11	10	10	9
Assam	17	15	18	16	18	18	19	19
Bihar	20	20	21	21	22	22	21	21
Chhattisgarh	14	14	15	14	15	15	16	13
Delhi	10	10	13	12	12	11	14	14
Gujarat	12	13	12	13	14	14	11	12
Haryana	16	18	19	18	19	17	18	17
Himachal Pradesh	4	4	2	4	3	4	4	2
Jammu and Kashmir	3	2	4	2	4	2	3	3
Jharkhand	21	21	20	20	21	21	22	22
Karnataka	2	3	3	3	2	3	2	4
Kerala	1	1	1	1	1	1	1	1
Madhya Pradesh	15	17	16	17	17	19	17	18
Maharashtra	7	8	9	10	9	12	7	11
Odisha	11	11	10	11	13	13	13	15
Punjab	6	7	6	7	7	6	6	8
Rajasthan	13	9	7	8	8	9	12	10
Tamil Nadu	5	5	5	5	5	5	5	5
Telangana					10	8	9	7
Uttar Pradesh	19	19	17	19	20	20	20	20
Uttarakhand	9	12	11	6	6	7	8	6
West Bengal	18	16	14	15	16	16	15	16

Small States	Ranks							
	2011	2012	2013	2014	2015	2016	2017	2018
Arunachal Pradesh	2	2	2	2	2	2	2	2
Goa	5	4	6	6	6	8	4	3
Manipur	6	6	5	3	3	3	5	5
Meghalaya	7	7	8	8	7	6	6	6
Mizoram	1	1	1	1	1	1	1	1
Nagaland	3	5	4	4	4	4	3	8
Sikkim	4	3	3	5	5	5	7	4
Tripura	8	8	7	7	8	7	8	7



LARGE STATES

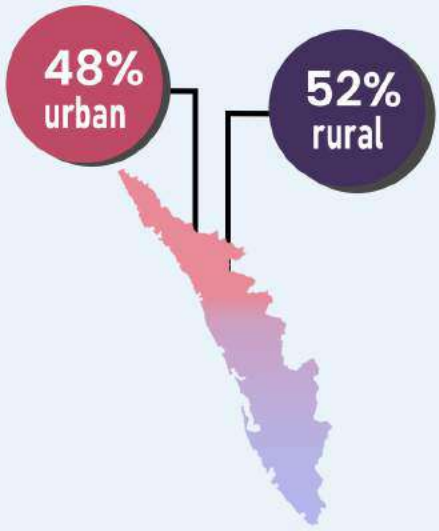
KERALA

DEMOGRAPHICS

860 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

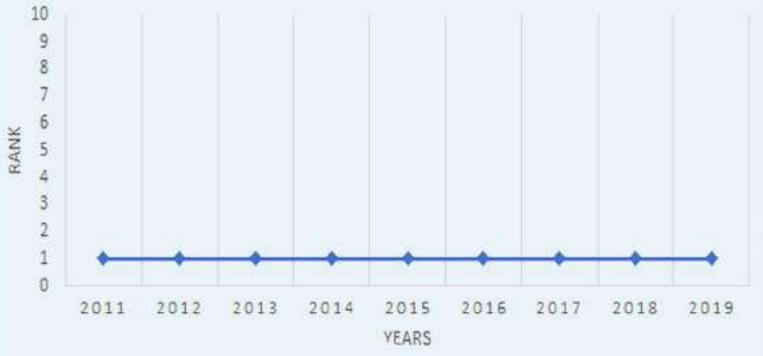
- Specialists at CHCs
- A.N.M
- PHCs
- CHCs
- Doctors at PHCs
- Subcentres
- Health Assistants
- Health Workers
- L.H.V

NON-RURAL SPECIFIC

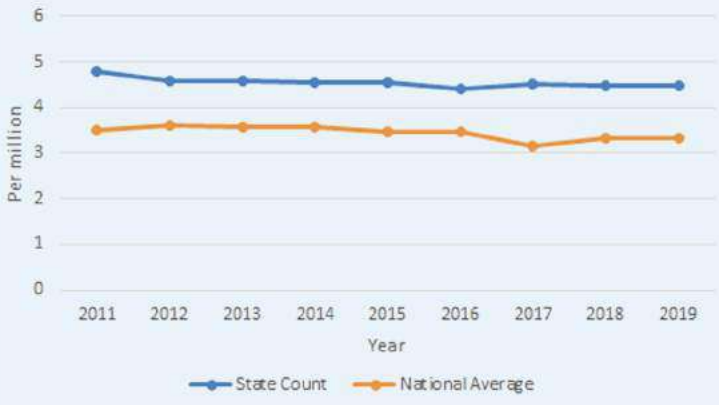
- Hospital Beds
- Total Hospitals
- AYUSH Hospitals
- AYUSH Dispensaries
- Registered Doctors
- Blood Banks
- AYUSH Practitioners
- Pharmacists
- Registered Nurses and Midwives

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: AYUSH HOSPITALS



1 unit = 2000 Nurses

NUMBER OF REGISTERED NURSES AND MIDWIVES

7302.2 Nurses per MILLION

1 unit = 100 Visitors

NUMBER OF LADY HEALTH VISITORS

453.4 Visitors per MILLION

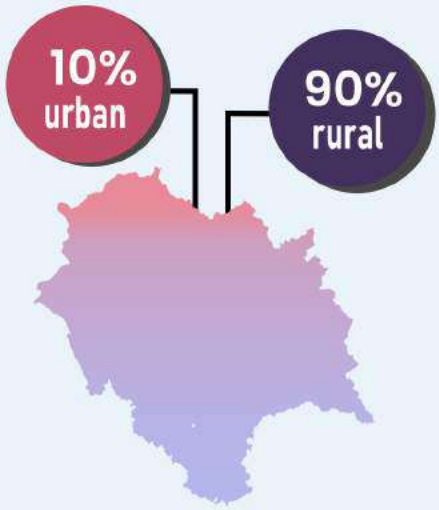
HIMACHAL PRADESH

DEMOGRAPHICS

123 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

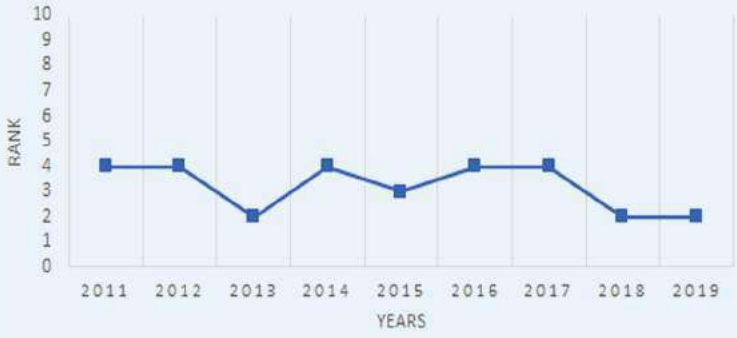
- Specialists at CHCs
- Health Assistants
- Health Workers
- L.H.V
- A.N.M
- Subcentres
- Doctors at PHCs
- CHCs
- PHCs

NON-RURAL SPECIFIC

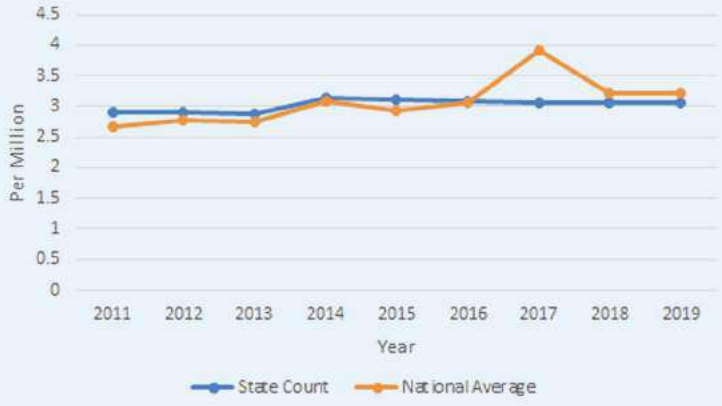
- Registered Doctors
- Blood Banks
- Total Hospitals
- Pharmacists
- AYUSH Practitioners
- Registered Nurses and Midwives
- AYUSH Hospitals
- Hospital Beds
- AYUSH Dispensaries

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: BLOOD BANKS



NUMBER OF AYUSH DISPENSARIES

1 unit = 40 Dispensaries

162.5 Dispensaries per MILLION

NUMBER OF DOCTORS AT PHCs

1 unit = 30 Doctors

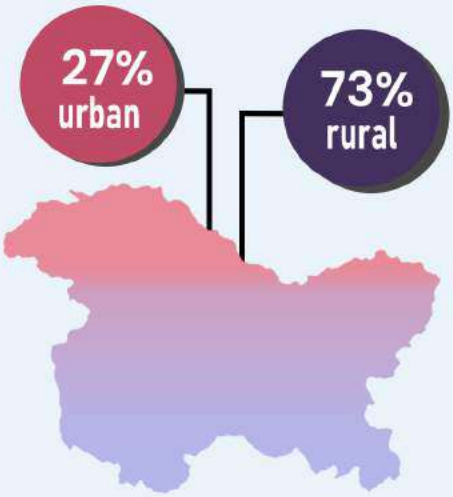
95.9 Doctors per MILLION

JAMMU AND KASHMIR

DEMOGRAPHICS

124
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

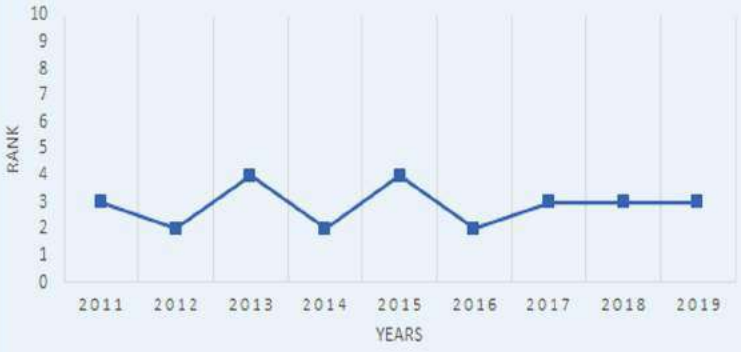
- Health Assistants
- A.N.M
- L.H.V
- Doctors at PHCs
- CHCs
- Health Workers
- PHCs
- Specialists at CHCs
- Subcentres

NON-RURAL SPECIFIC

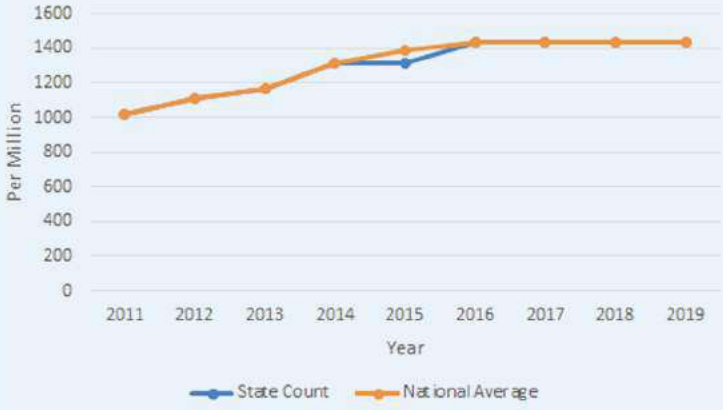
- Pharmacists
- AYUSH Hospitals
- AYUSH Practitioners
- Blood Banks
- Registered Nurses and Midwives
- Hospital Beds
- Registered Doctors
- AYUSH Dispensaries
- Total Hospitals

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: AUXILIARY NURSE MIDWIVES



NUMBER OF SPECIALISTS AT CHCs
1 unit = 10 Specialists

27.8 Specialists per MILLION

NUMBER OF TOTAL HOSPITALS
1 unit = 50 Hospitals

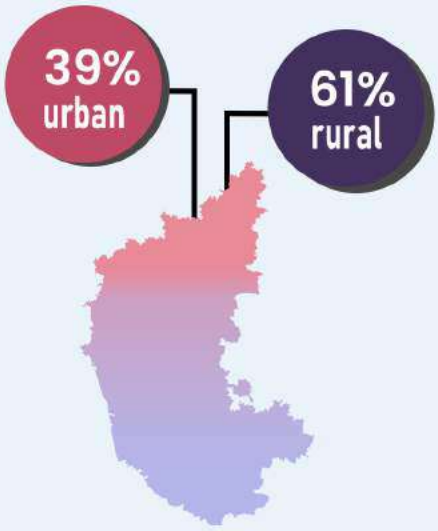
194.9 Hospitals per MILLION

KARNATAKA

DEMOGRAPHICS

319
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

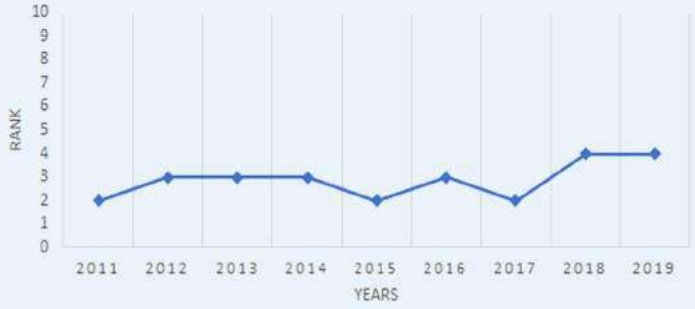
- Health Workers
- CHCs
- A.N.M
- PHCs
- Doctors at PHCs
- Subcentres
- L.H.V
- Specialists at CHCs
- Health Assistants

NON-RURAL SPECIFIC

- AYUSH Dispensaries
- Total Hospitals
- Pharmacists
- Hospital Beds
- AYUSH Practitioners
- Blood Banks
- AYUSH Hospitals
- Registered Nurses and Midwives
- Registered Doctors

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: AYUSH HOSPITALS

1 unit = 6 Specialists

NUMBER OF SPECIALISTS AT CHCs

12.8 Specialists per MILLION

1 unit = 50 Assistants

NUMBER OF HEALTH ASSISTANTS

121.7 Assistants per MILLION

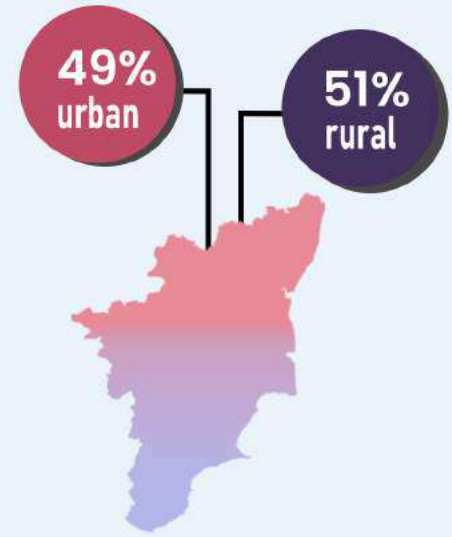
TAMIL NADU

DEMOGRAPHICS

555 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

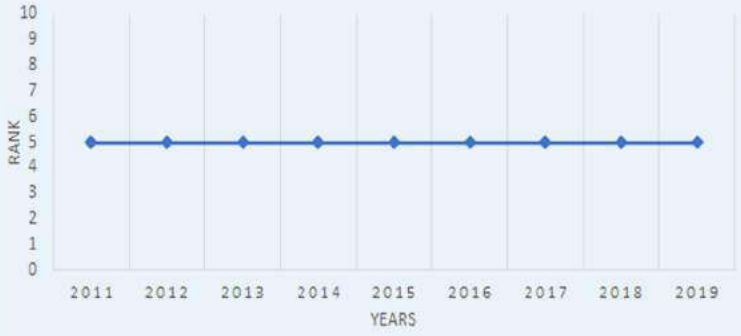
- Health Workers
- PHCs
- CHCs
- Subcentres
- A.N.M
- Specialists at CHCs
- Health Assistants
- Doctors at PHCs
- L.H.V

NON-RURAL SPECIFIC

- AYUSH Dispensaries
- Total Hospitals
- AYUSH Practitioners
- Pharmacists
- Hospital Beds
- AYUSH Hospitals
- Blood Banks
- Registered Nurses and Midwives
- Registered Doctors

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: SPECIALISTS AT CHCs

1 unit = 1000 Nurses

NUMBER OF REGISTERED NURSES AND MIDWIVES

3974 Nurses per MILLION

1 unit = 500 Doctors

NUMBER OF REGISTERED DOCTORS

1903.7 Doctors per MILLION

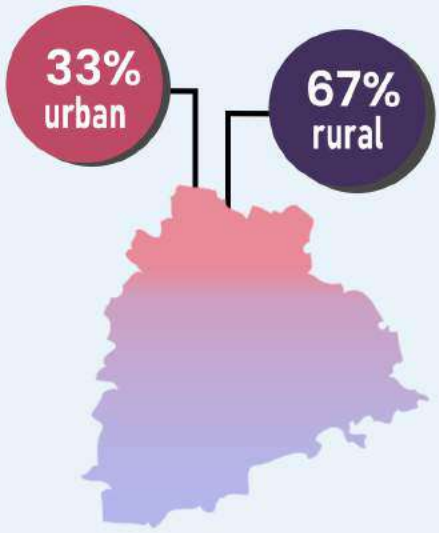
TELENGANA

DEMOGRAPHICS

308 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

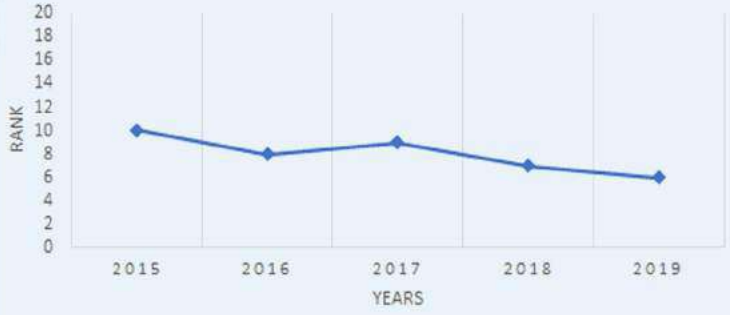
- CHCs
- Subcentres
- PHCs
- L.H.V
- Health Workers
- Doctors at PHCs
- Health Assistants
- Specialists at CHCs
- A.N.M

NON-RURAL SPECIFIC

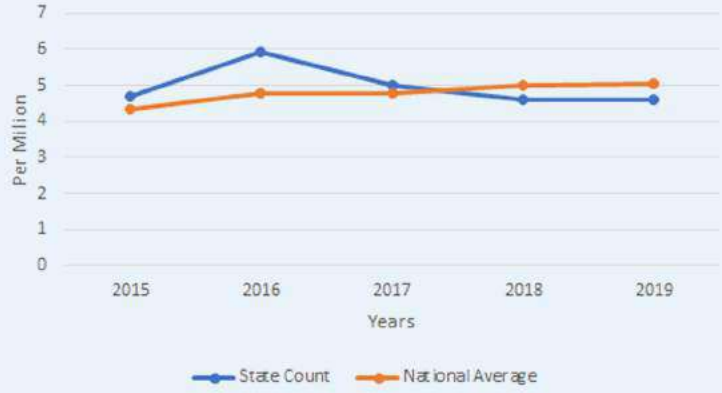
- Total Hospitals
- AYUSH Hospitals
- Registered Nurses and Midwives
- Hospital Beds
- AYUSH Practitioners
- Registered Doctors
- AYUSH Dispensaries
- Pharmacists
- Blood Banks

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: SPECIALISTS AT CHCs



NUMBER OF BLOOD BANKS

1 unit = 2 Blood Banks

4.9 Banks per MILLION

NUMBER OF AUXILIARY NURSE MIDWIVES

1 unit = 500 ANMs

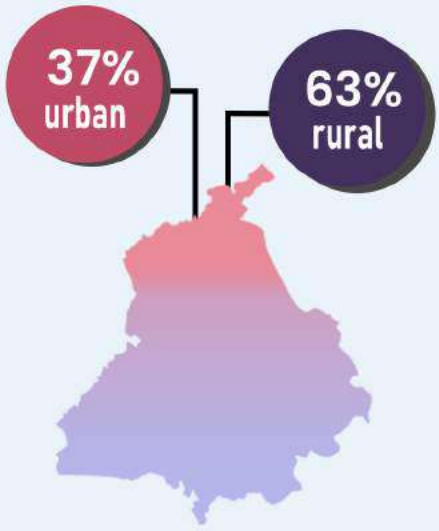
2173.5 Nurses per MILLION

PUNJAB

DEMOGRAPHICS

551
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

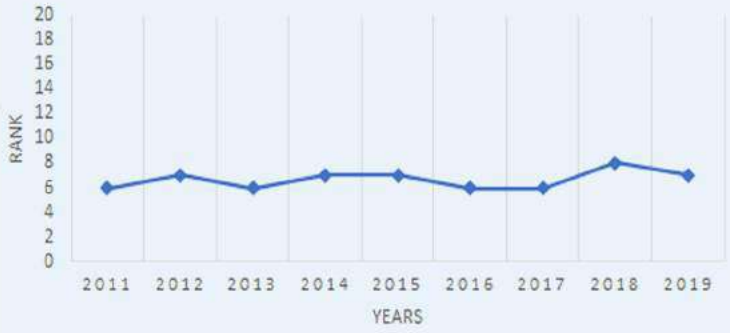
- Doctors at PHCs
- Subcentres
- A.N.M
- Health Workers
- CHCs
- PHCs
- Specialists at CHCs
- Health Assistants
- L.H.V

NON-RURAL SPECIFIC

- Hospital Beds
- AYUSH Hospitals
- Total Hospitals
- AYUSH Practitioners
- AYUSH Dispensaries
- Registered Nurses and Midwives
- Blood Banks
- Registered Doctors
- Pharmacists

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: SPECIALISTS AT CHCs

NUMBER OF LADY HEALTH VISITORS
1 unit = 30 LHVs
140.7 Visitors per MILLION

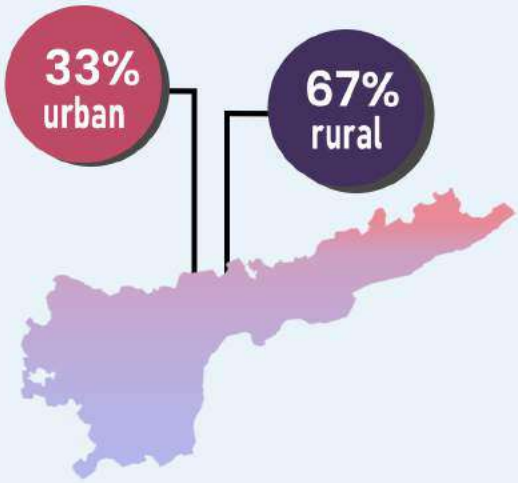
NUMBER OF PHARMACISTS
1 unit = 400 Pharmacists
1592.6 Pharmacists per MILLION

ANDHRA PRADESH

DEMOGRAPHICS

308
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

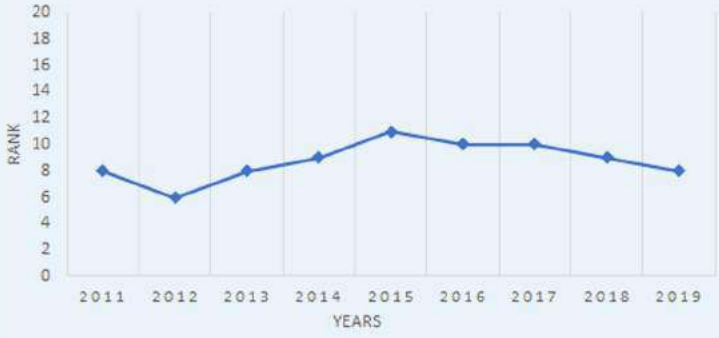
- CHCs
- PHCs
- Subcentres
- L.H.V
- Health Assistants
- Doctors at PHCs
- Health Workers
- Specialists at CHCs
- A.N.M

NON-RURAL SPECIFIC

- Total Hospitals
- AYUSH Hospitals
- AYUSH Practitioners
- Hospital Beds
- AYUSH Dispensaries
- Pharmacists
- Blood Banks
- Registered Doctors
- Registered Nurses and Midwives

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: BLOOD BANKS

1 unit = 800 ANM

NUMBER OF AUXILIARY NURSE MIDWIVES

2450 Nurses per **MILLION**

1 unit = 4 specialists

NUMBER OF SPECIALISTS AT CHCs

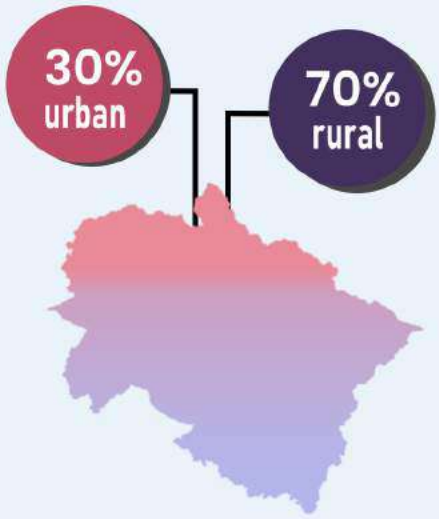
10.6 Specialists per **MILLION**

UTTARAKHAND

DEMOGRAPHICS

189
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

- L.H.V
- Health Workers
- A.N.M
- Health Assistants
- Doctors at PHCs
- Specialists at CHCs
- Subcentres
- PHCs
- CHCs

NON-RURAL SPECIFIC

- Registered Nurses and Midwives
- AYUSH Practitioners
- AYUSH Dispensaries
- Registered Doctors
- Hospital Beds
- Blood Banks
- Pharmacists
- Total Hospitals
- AYUSH Hospitals

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS

IN FOCUS: BLOOD BANKS

1 unit = 10 Hospitals

NUMBER OF AYUSH HOSPITALS

37.2 Hospitals per MILLION

1 unit = 10 Hospitals

NUMBER OF TOTAL HOSPITALS

43.3 Hospitals per MILLION

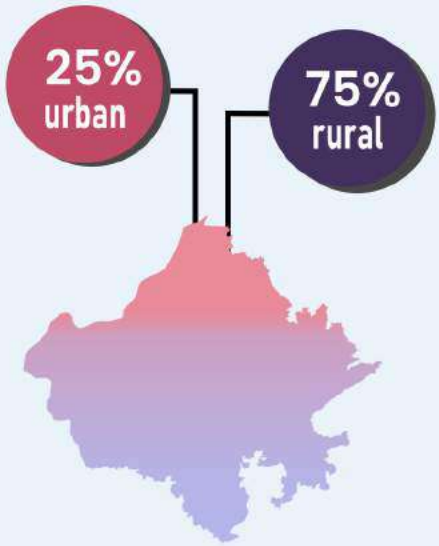
RAJASTHAN

DEMOGRAPHICS

200 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

- PHCs
- Doctors at PHCs
- Subcentres
- CHCs
- L.H.V
- A.N.M
- Health Assistants
- Health Workers
- Specialists at CHCs

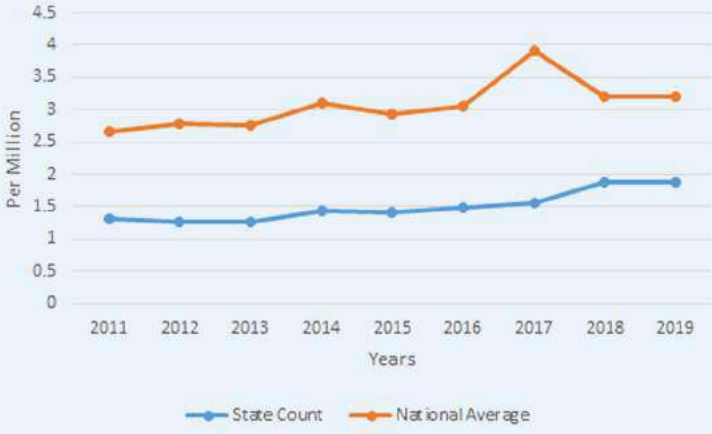
NON-RURAL SPECIFIC

- AYUSH Practitioners
- Blood Banks
- Registered Doctors
- Hospital Beds
- Total Hospitals
- Pharmacists
- AYUSH Hospitals
- Registered Nurses and Midwives
- AYUSH Dispensaries

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS

IN FOCUS: BLOOD BANKS



NUMBER OF AYUSH DISPENSARIES

1 unit = 20 Dispensaries

52.7 Dispensaries per MILLION

NUMBER OF AUXILIARY NURSE MIDWIVES

1 unit = 500 ANM

1956.9 Nurses per MILLION

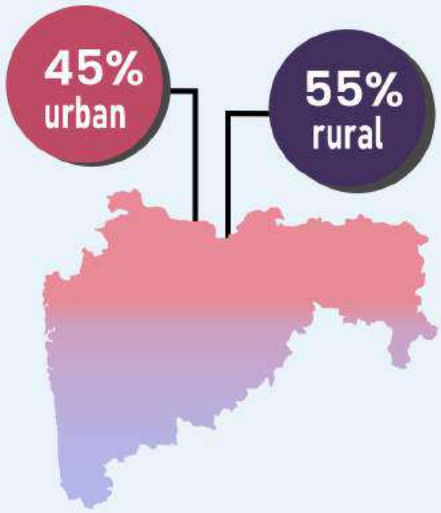
MAHARASHTRA

DEMOGRAPHICS

365 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

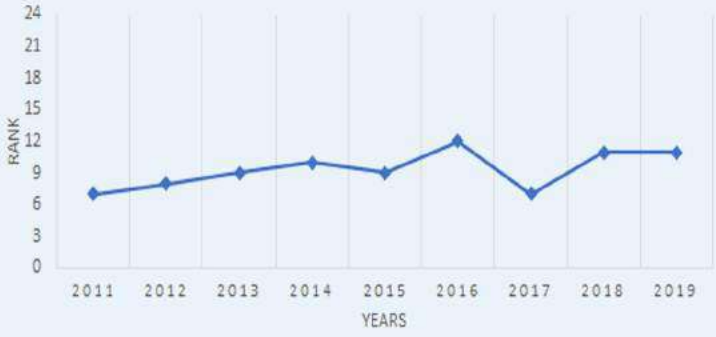
- PHCs
- CHCs
- L.H.V
- Subcentres
- Health Workers
- A.N.M
- Doctors at PHCs
- Health Assistants
- Specialists at CHCs

NON-RURAL SPECIFIC

- AYUSH Dispensaries
- Total Hospitals
- Registered Nurses and Midwives
- Hospital Beds
- Blood Banks
- AYUSH Hospitals
- Registered Doctors
- AYUSH Practitioners
- Pharmacists

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: BLOOD BANKS

1 unit = 500 Pharmacists

NUMBER OF PHARMACISTS

1876.7 Pharmacists per MILLION

1 unit = 400 Doctors

NUMBER OF AYUSH DOCTORS

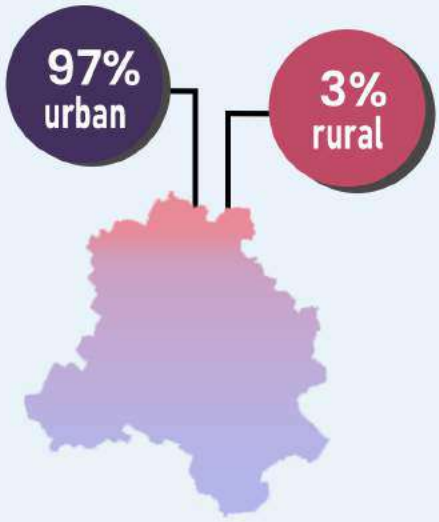
1216.7 Doctors per MILLION

DELHI

DEMOGRAPHICS

382
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

- CHCs
- Subcentres
- Health Workers
- L.H.V
- Specialists at CHCs
- PHCs
- Health Assistants
- Doctors at PHCs
- A.N.M

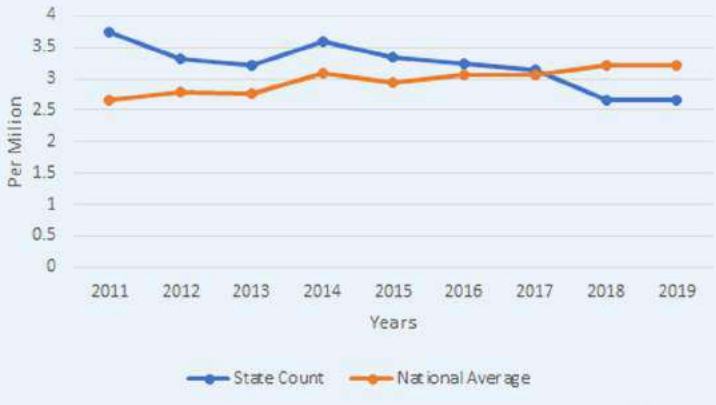
NON-RURAL SPECIFIC

- Total Hospitals
- AYUSH Dispensaries
- AYUSH Hospitals
- Blood Banks
- Registered Doctors
- AYUSH Practitioners
- Pharmacists
- Registered Nurses and Midwives
- Hospital Beds

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS

IN FOCUS: BLOOD BANKS



NUMBER OF HOSPITAL BEDS
1 unit = 500 Beds

1179.2 Beds per MILLION

NUMBER OF AUXILIARY NURSE MIDWIVES
1 unit = 2000 ANM

7913.3 Nurses per MILLION

Note: Mohalla Clinics are not covered by any of the indicators.

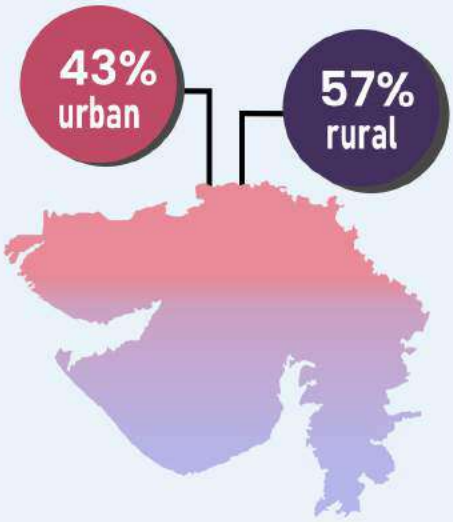
GUJARAT

DEMOGRAPHICS

308 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

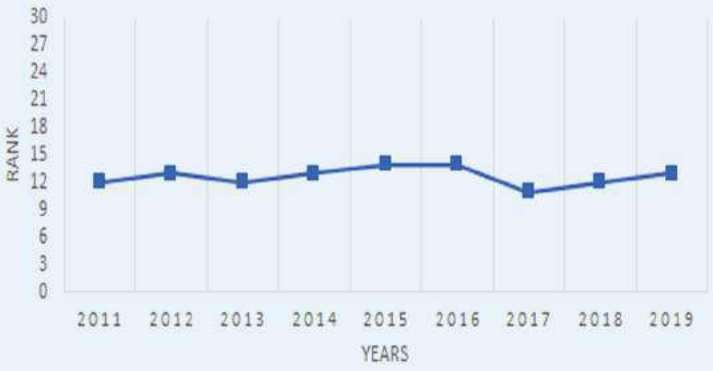
- Specialists at CHCs
- Doctors at PHCs
- PHCs
- CHCs
- A.N.M
- L.H.V
- Health Assistants
- Subcentres
- Health Workers

NON-RURAL SPECIFIC

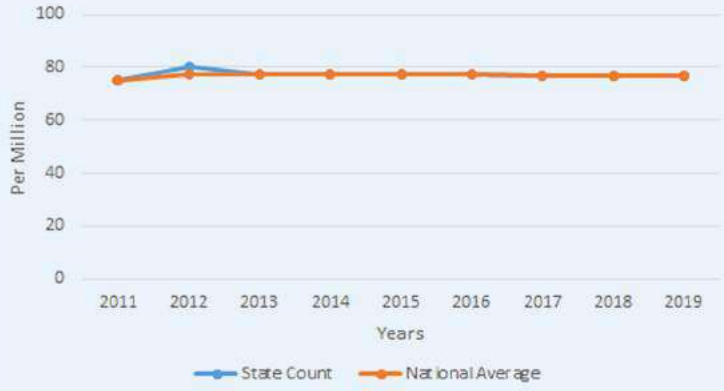
- Hospital Beds
- AYUSH Dispensaries
- Total Hospitals
- Blood Banks
- Registered Nurses and Midwives
- Pharmacists
- Registered Doctors
- AYUSH Hospitals
- AYUSH Practitioners

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: LADY HEALTH VISITORS



1 unit = 200 Practitioners

NUMBER OF AYUSH PRACTITIONERS

778.1 Practitioners per MILLION

1 unit = 20 LHV

NUMBER OF LADY HEALTH VISITORS

76.6 Visitors per MILLION

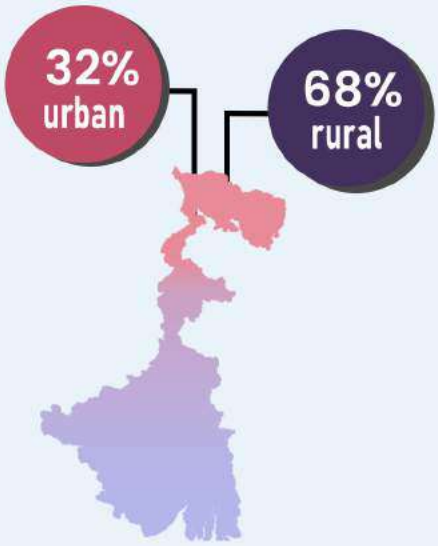
WEST BENGAL

DEMOGRAPHICS

1028 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

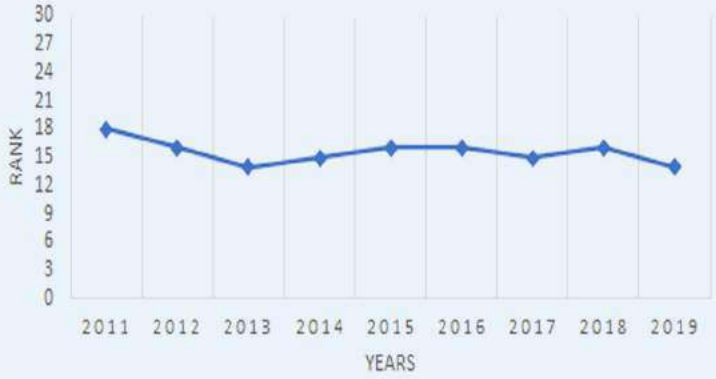
- PHCs
- Health Assistants
- CHCs
- Subcentres
- A.N.M
- Doctors at PHCs
- Health Workers
- Specialists at CHCs
- L.H.V

NON-RURAL SPECIFIC

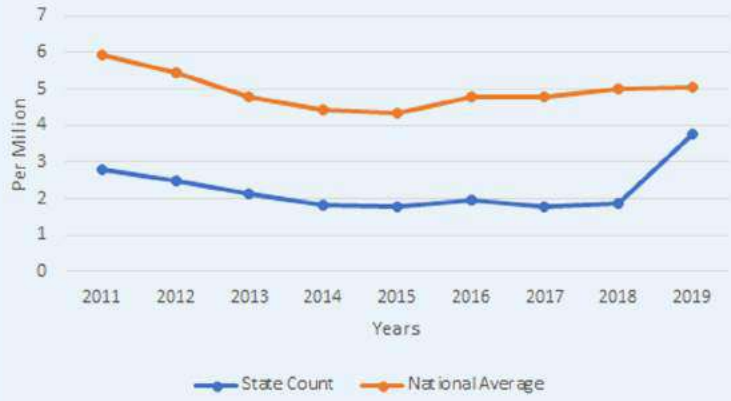
- Blood Banks
- AYUSH Hospitals
- Registered Nurses and Midwives
- AYUSH Practitioners
- Pharmacists
- Registered Doctors
- AYUSH Dispensaries
- Total Hospitals
- Hospital Beds

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: SPECIALISTS AT CHCs



NUMBER OF HOSPITAL BEDS

1 unit = 200 Beds

847.3 Beds per MILLION

NUMBER OF LADY HEALTH VISITORS

1 unit = 50 LHVs

197.5 Visitors per MILLION

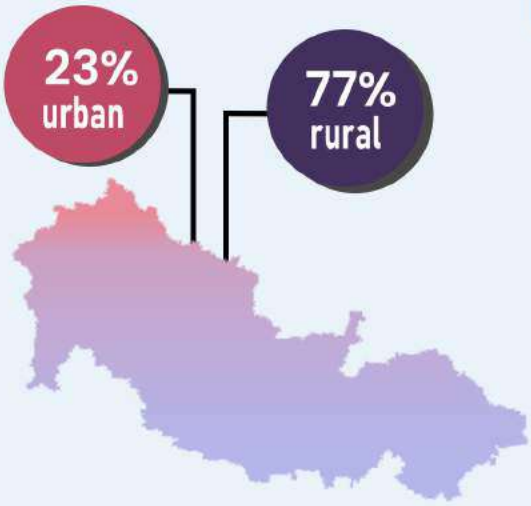
CHHATTISGARH

DEMOGRAPHICS

189 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

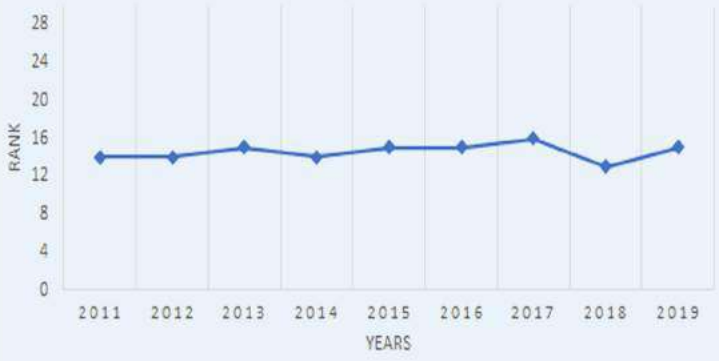
- Doctors at PHCs
- A.N.M
- Specialists at CHCs
- L.H.V
- CHCs
- PHCs
- Subcentres
- Health Workers
- Health Assistants

NON-RURAL SPECIFIC

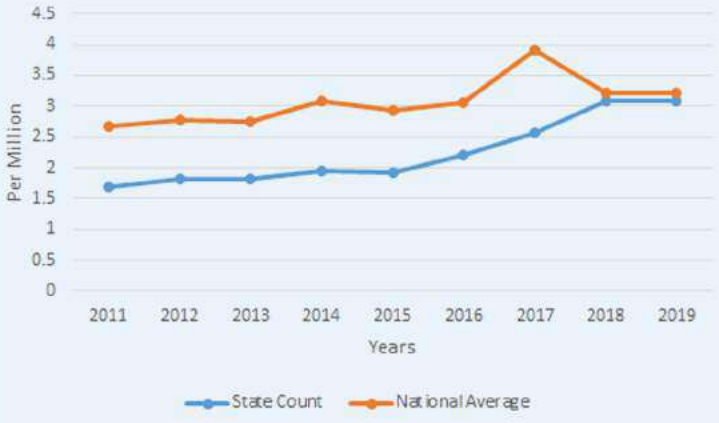
- Registered Doctors
- AYUSH Practitioners
- Pharmacists
- Registered Nurses and Midwives
- Hospital Beds
- AYUSH Hospitals
- Blood Banks
- Total Hospitals
- AYUSH Dispensaries

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: BLOOD BANKS



NUMBER OF AYUSH DISPENSARIES

1 unit = 10 dispensaries

41.3 Dispensaries per MILLION

NUMBER OF HEALTH ASSISTANTS

1 unit = 20 Assistants

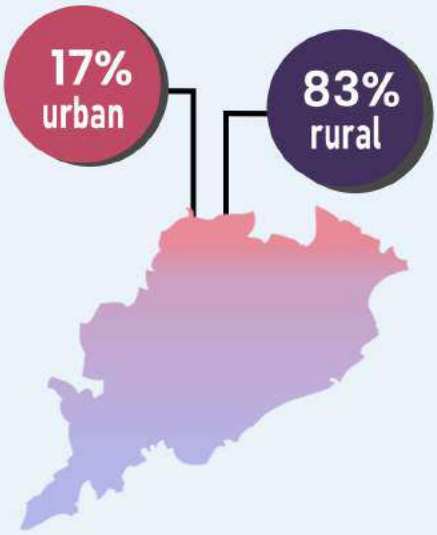
55 Assitants per MILLION

ODISHA

DEMOGRAPHICS

270
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

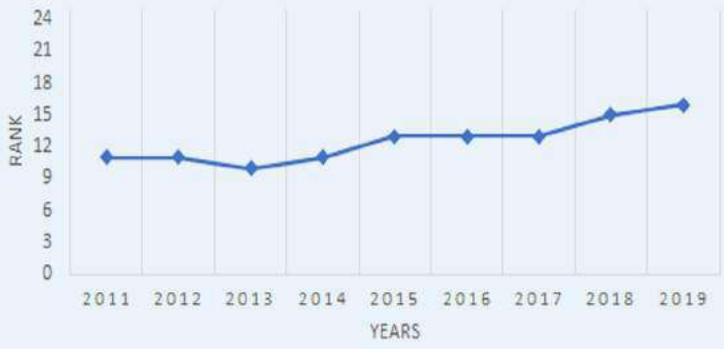
- L.H.V
- Subcentres
- CHCs
- Doctors at PHCs
- Health Workers
- A.N.M
- Health Assistants
- PHCs
- Specialists at CHCs

NON-RURAL SPECIFIC

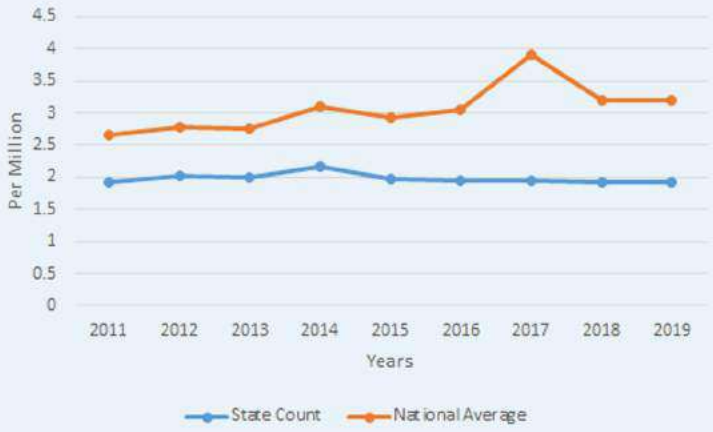
- AYUSH Practitioners
- Blood Banks
- Registered Doctors
- Hospital Beds
- Pharmacists
- AYUSH Hospitals
- Registered Nurses and Midwives
- AYUSH Dispensaries
- Total Hospitals

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: BLOOD BANKS



NUMBER OF TOTAL HOSPITALS
1 unit = 10 Hospitals

41.8 Hospitals per MILLION

NUMBER OF AYUSH DISPENSARIES
1 unit = 10 Dispensaries

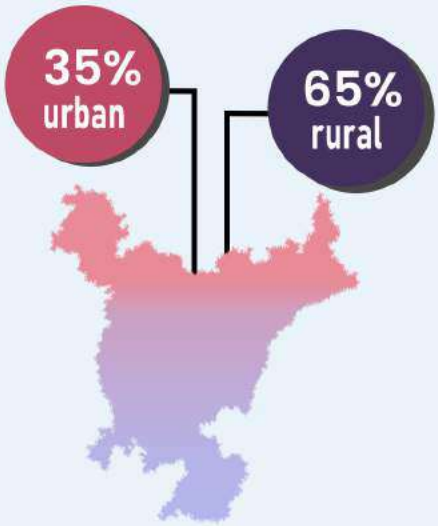
30.9 Dispensaries per MILLION

HARYANA

DEMOGRAPHICS

573
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

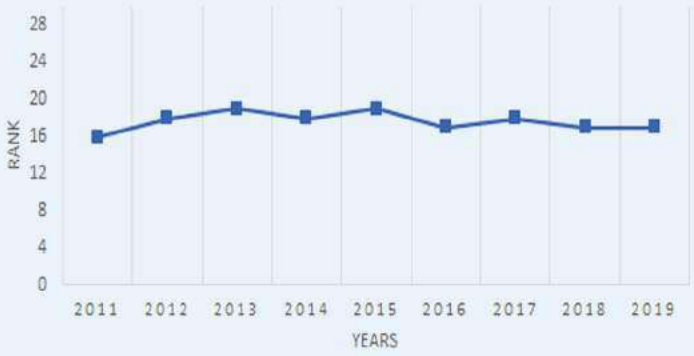
- Specialists at CHCs
- Subcentres
- Doctors at PHCs
- L.H.V
- Health Workers
- Health Assistants
- A.N.M
- PHCs
- CHCs

NON-RURAL SPECIFIC

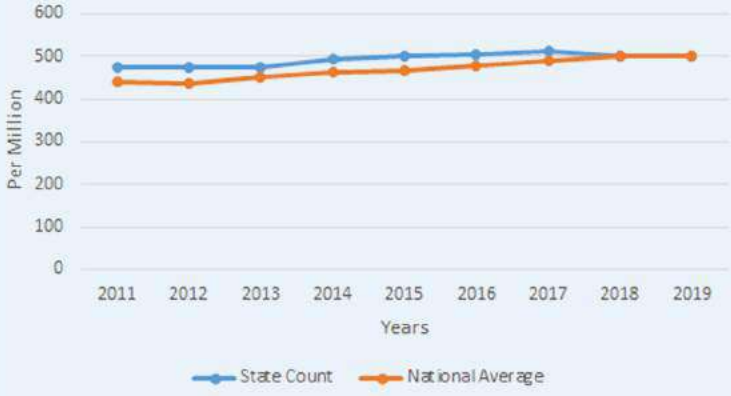
- Registered Doctors
- Total Hospitals
- Hospital Beds
- Registered Nurses and Midwives
- AYUSH Dispensaries
- AYUSH Hospitals
- AYUSH Practitioners
- Pharmacists
- Blood Banks

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: AYUSH DOCTORS



1 unit = 1 Blood Bank

NUMBER OF BLOOD BANKS

3.7 Banks per MILLION

1 unit = 400 Pharmacists

NUMBER OF PHARMACISTS

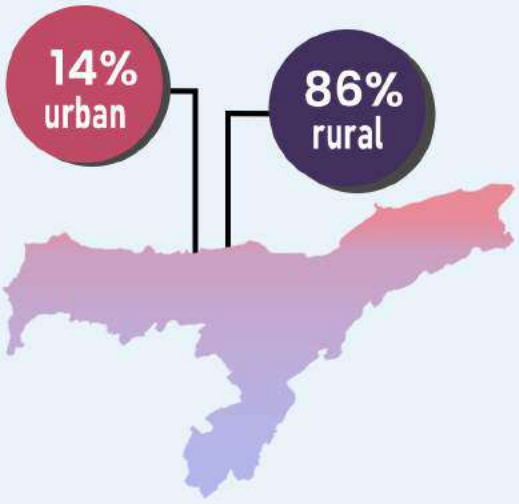
1143.7 Pharmacists per MILLION

ASSAM

DEMOGRAPHICS

397
per sq km

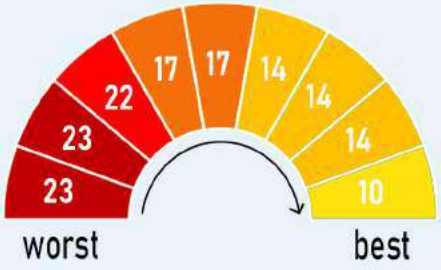
POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC



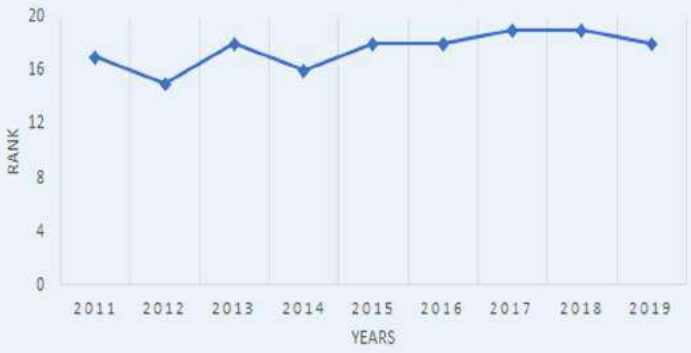
- L.H.V
- A.N.M
- PHCs
- Health Assistants
- CHCs
- Doctors at PHCs
- Subcentres
- Health Workers
- Specialists at CHCs

NON-RURAL SPECIFIC

- AYUSH Hospitals
- AYUSH Practitioners
- Pharmacists
- Registered Nurses and Midwives
- Blood Banks
- Registered Doctors
- AYUSH Dispensaries
- Hospital Beds
- Total Hospitals

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: SPECIALISTS AT CHCs

NUMBER OF TOTAL HOSPITALS
1 unit = 10 Hospitals

37 Hospitals per MILLION

NUMBER OF SPECIALISTS AT CHCs
1 unit = 2 specialists

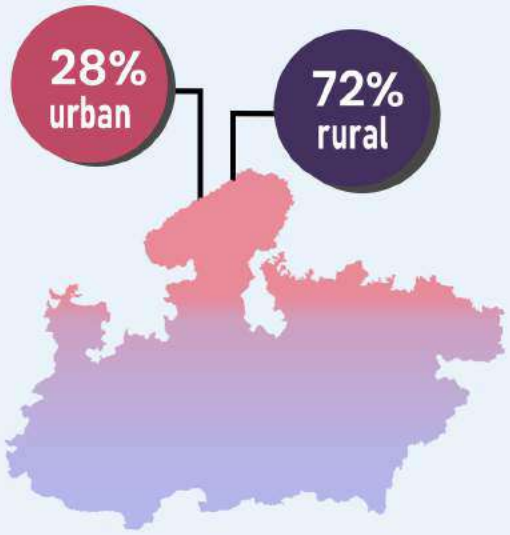
5.5 specialists per MILLION

MADHYA PRADESH

DEMOGRAPHICS

236
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

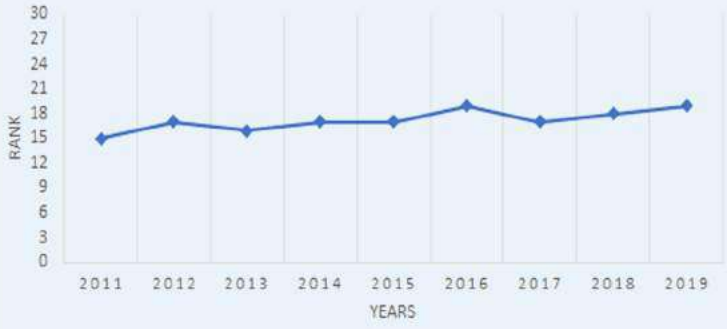
- PHCs
- Doctors at PHCs
- Health Workers
- CHCs
- A.N.M
- L.H.V
- Subcentres
- Specialists at CHCs
- Health Assistants

NON-RURAL SPECIFIC

- Total Hospitals
- Hospital Beds
- Blood Banks
- Pharmacists
- Registered Doctors
- AYUSH Hospitals
- Registered Nurses and Midwives
- AYUSH Dispensaries
- AYUSH Practitioners

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: SPECIALISTS AT CHCs

NUMBER OF AYUSH DOCTORS
1 unit = 200 Doctors

837.8 Doctors per MILLION

NUMBER OF AYUSH DISPENSARIES
1 unit = 10 Dispensaries

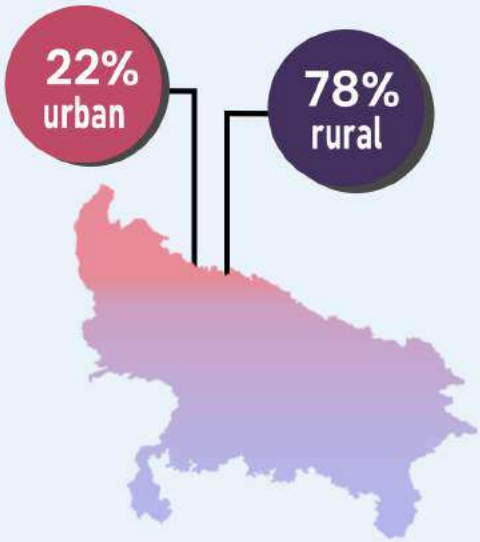
22.1 Dispensaries per MILLION

UTTAR PRADESH

DEMOGRAPHICS

829
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

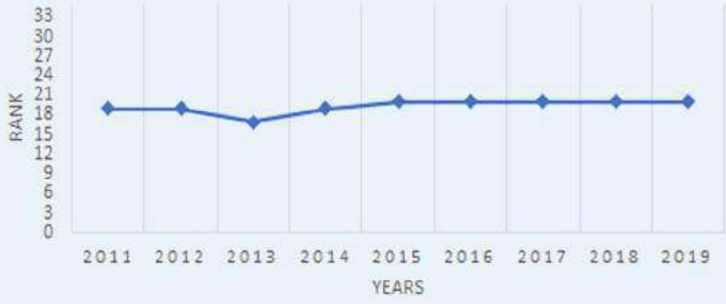
- Doctors at PHCs
- PHCs
- Health Workers
- CHCs
- Subcentres
- A.N.M
- Specialists at CHCs
- L.H.V
- Health Assistants

NON-RURAL SPECIFIC

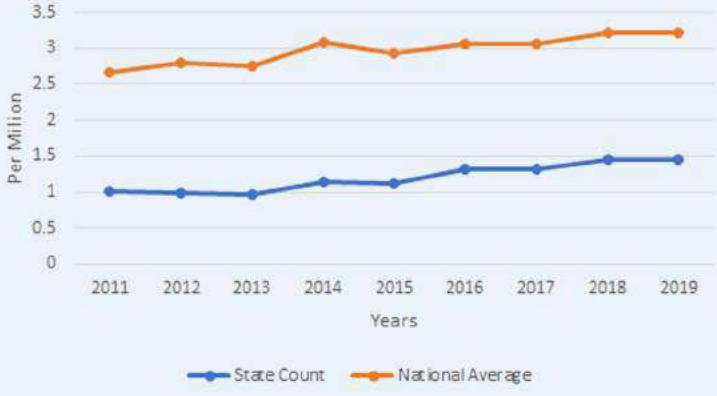
- Total Hospitals
- Hospital Beds
- Blood Banks
- AYUSH Dispensaries
- Registered Nurses and Midwives
- Registered Doctors
- Pharmacists
- AYUSH Practitioners
- AYUSH Hospitals

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: BLOOD BANKS



NUMBER OF AYUSH HOSPITALS
1 unit = 5 Hospitals

10.3 Hospitals per MILLION

NUMBER OF AYUSH DOCTORS
1 unit = 100 Doctors

380.2 Doctors per MILLION

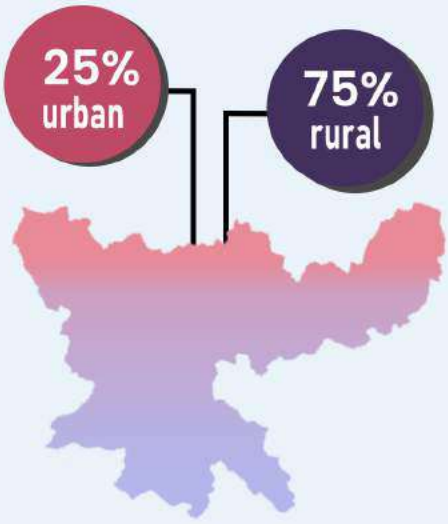
JHARKHAND

DEMOGRAPHICS

414 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

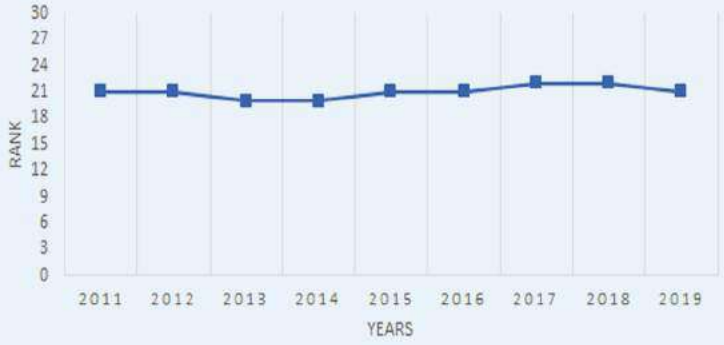
- Health Assistants
- Doctors at PHCs
- A.N.M
- L.H.V
- Subcentres
- PHCs
- Specialists at CHCs
- Health Workers
- CHCs

NON-RURAL SPECIFIC

- Pharmacists
- Registered Doctors
- AYUSH Practitioners
- Registered Nurses and Midwives
- AYUSH Hospitals
- Hospital Beds
- Blood Banks
- AYUSH Dispensaries
- Total Hospitals

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: SPECIALISTS AT CHCs

NUMBER OF TOTAL HOSPITALS

1 unit = 5 Hospitals

16.5 Hospitals per MILLION

NUMBER OF CHCs

1 unit = 0.05 CHCs

0.185 CHCs per MILLION

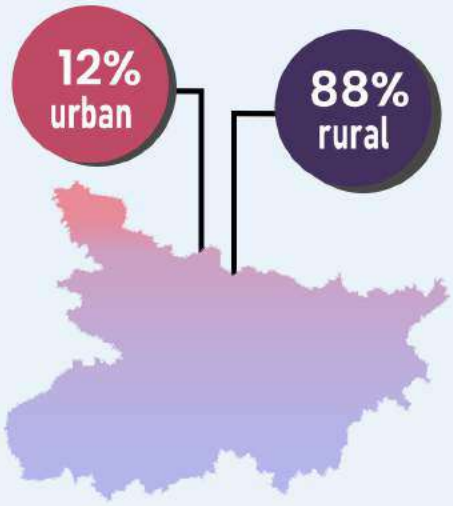
BIHAR

DEMOGRAPHICS

1106 per sq km

POPULATION DENSITY

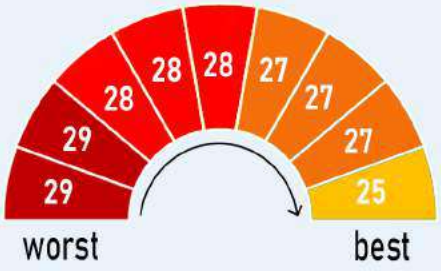
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC



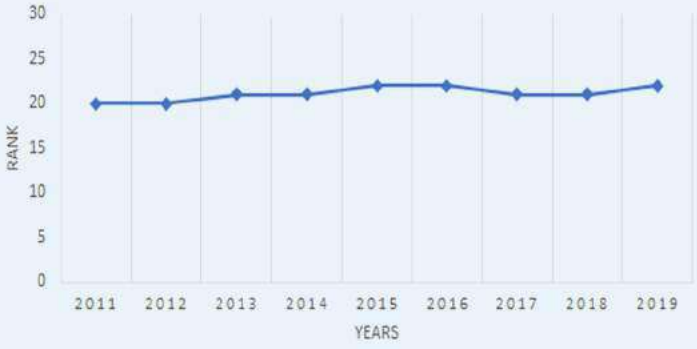
- Subcentres
- CHCs
- Health Assistants
- A.N.M
- PHCs
- L.H.V
- Health Workers
- Doctors at PHCs
- Specialists at CHCs

NON-RURAL SPECIFIC

- AYUSH Hospitals
- Blood Banks
- Hospital Beds
- Registered Nurses and Midwives
- Pharmacists
- Registered Doctors
- Total Hospitals
- AYUSH Dispensaries
- AYUSH Practitioners

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: BLOOD BANKS

NUMBER OF AYUSH PRACTITIONERS

1 unit = 500 practitioners

1285.1 Practitioners per MILLION

NUMBER OF AYUSH DISPENSARIES

1 unit = 10 Dispensaries

20.5 dispensaries per MILLION

SMALL STATES

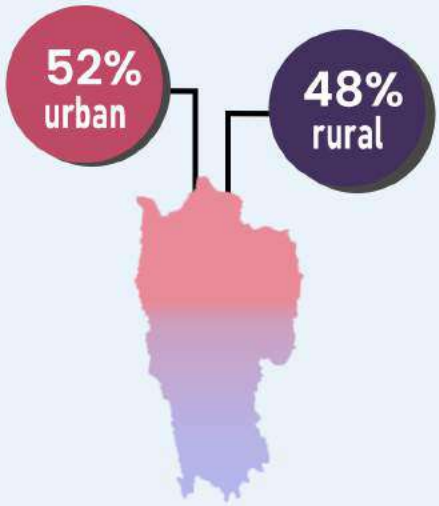
MIZORAM

DEMOGRAPHICS

52 per sq km

POPULATION DENSITY

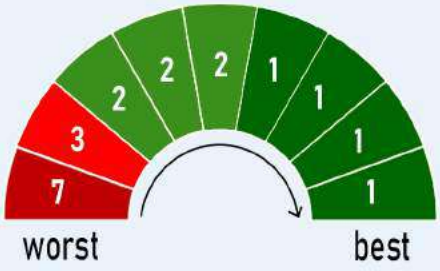
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC



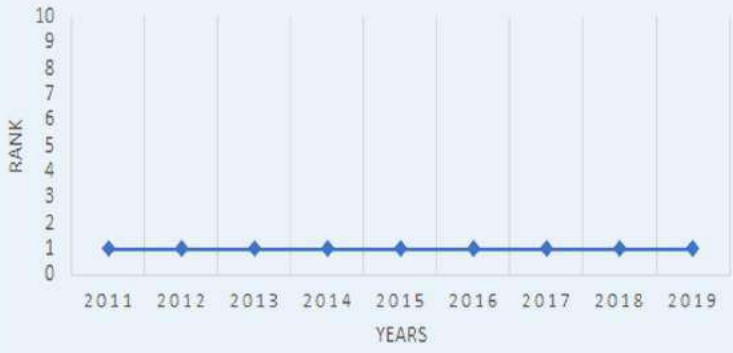
- Specialists at CHCs
- Health Assistants
- Doctors at PHCs
- CHCs
- L.H.V
- Subcentres
- A.N.M
- PHCs
- Health Workers

NON-RURAL SPECIFIC

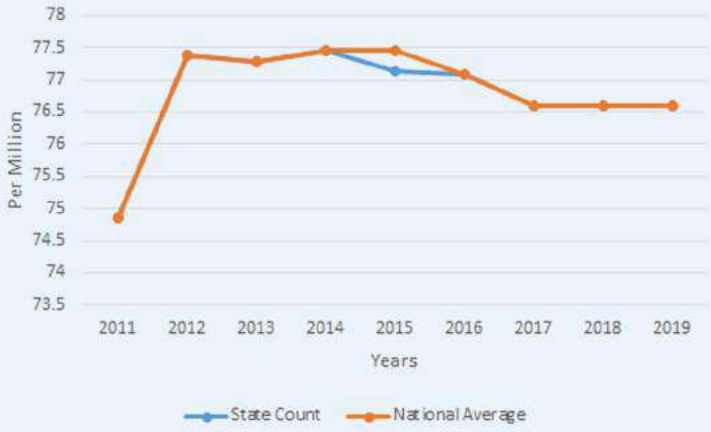
- AYUSH Practitioners
- Pharmacists
- AYUSH Dispensaries
- Total Hospitals
- Registered Doctors
- Hospital Beds
- AYUSH Hospitals
- Blood Banks
- Registered Nurses and Midwives

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: LADY HEALTH VISITORS



NUMBER OF HEALTH WORKERS

1 unit = 500 Workers

1859.1 Workers per MILLION

NUMBER OF BLOOD BANKS

1 unit = 4 Blood Banks

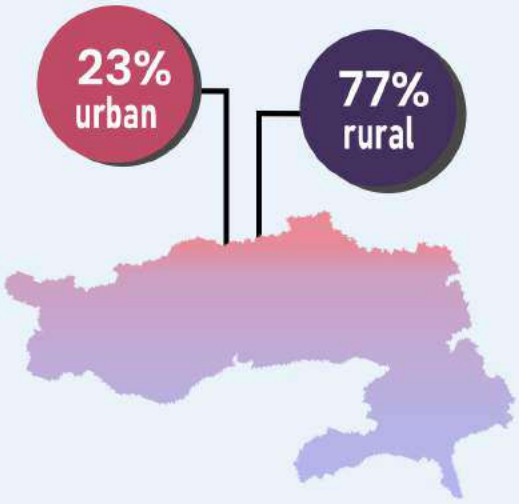
10.1 Banks per MILLION

ARUNACHAL PRADESH

DEMOGRAPHICS

17
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

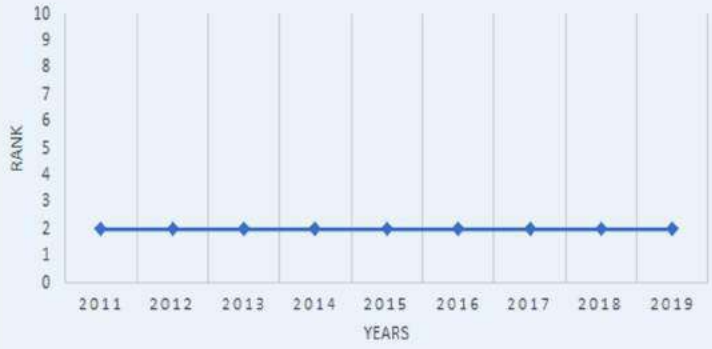
- L.H.V
- A.N.M
- Subcentres
- Health Workers
- Health Assistants
- Doctors at PHCs
- Specialists at CHCs
- PHCs
- CHCs

NON-RURAL SPECIFIC

- Pharmacists
- Registered Doctors
- Registered Nurses and Midwives
- AYUSH Practitioners
- Hospital Beds
- Blood Banks
- AYUSH Hospitals
- AYUSH Dispensaries
- Total Hospitals

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: SPECIALISTS AT CHCs

1 unit = 50 Doctors

NUMBER OF DOCTORS AT PHCs

120.9 Doctors per MILLION

1 unit = 10 CHCs

NUMBER OF CHCs

44.5 CHCs per MILLION

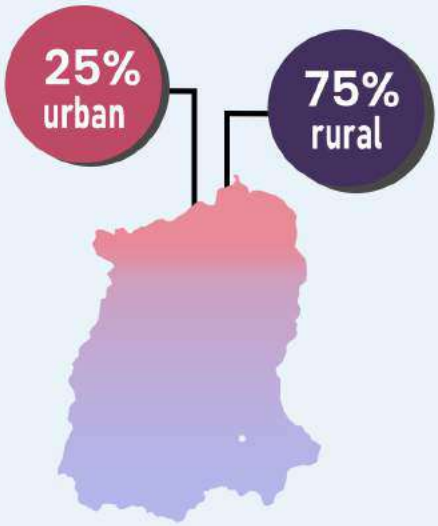
SIKKIM

DEMOGRAPHICS

86
per sq km

POPULATION DENSITY

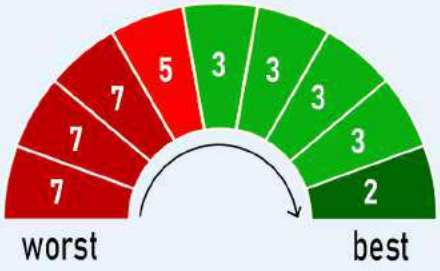
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC



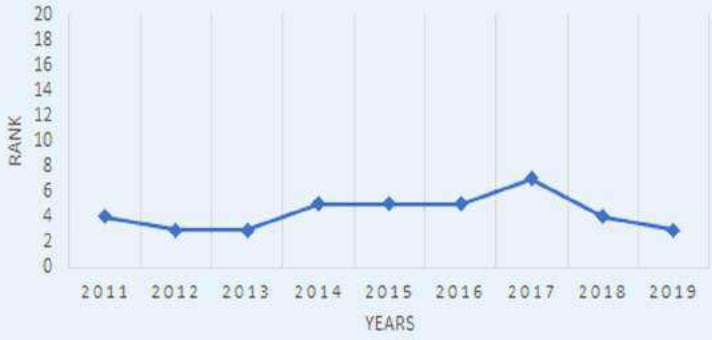
- Doctors at PHCs
- A.N.M
- Specialists at CHCs
- Health Assistants
- Subcentres
- Health Workers
- CHCs
- PHCs
- L.H.V

NON-RURAL SPECIFIC

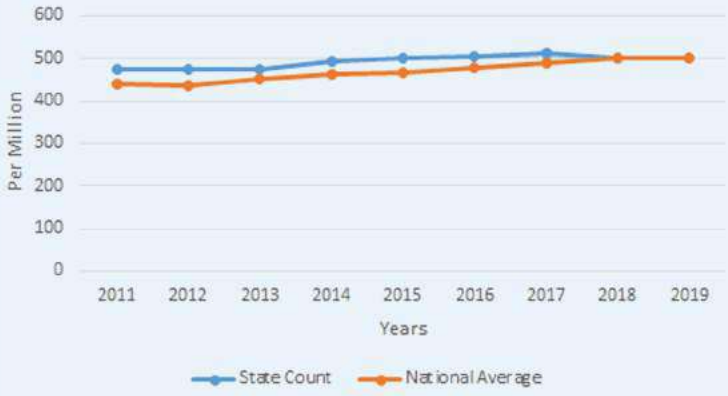
- AYUSH Practitioners
- Registered Nurses and Midwives
- Pharmacists
- AYUSH Hospitals
- AYUSH Dispensaries
- Blood Banks
- Total Hospitals
- Registered Doctors
- Hospital Beds

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: LADY HEALTH VISITORS



NUMBER OF HOSPITAL BEDS

1 unit = 600 Beds

2363.6 Beds per MILLION

NUMBER OF REGISTERED DOCTORS

1 unit = 1000 Doctors

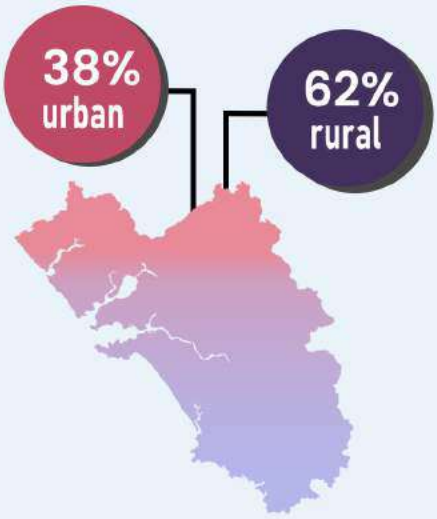
2106.4 Doctors per MILLION

GOA

DEMOGRAPHICS

394
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

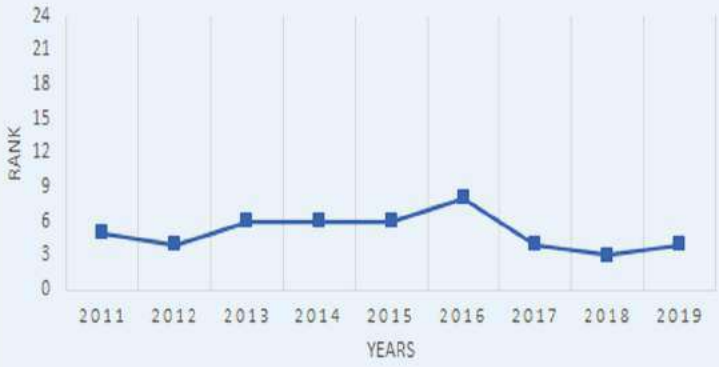
- L.H.V
- A.N.M
- Health Workers
- PHCs
- CHCs
- Health Assistants
- Subcentres
- Doctors at PHCs
- Specialists at CHCs

NON-RURAL SPECIFIC

- Registered Nurses and Midwives
- AYUSH Hospitals
- Blood Banks
- AYUSH Dispensaries
- Hospital Beds
- Total Hospitals
- Registered Doctors
- AYUSH Practitioners
- Pharmacists

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: CHCs

NUMBER OF SPECIALISTS AT CHCs
1 unit = 4 specialists

12.8 Specialists per MILLION

NUMBER OF PHARMACISTS
1 unit = 400 pharmacists

1671.7 Pharmacists per MILLION

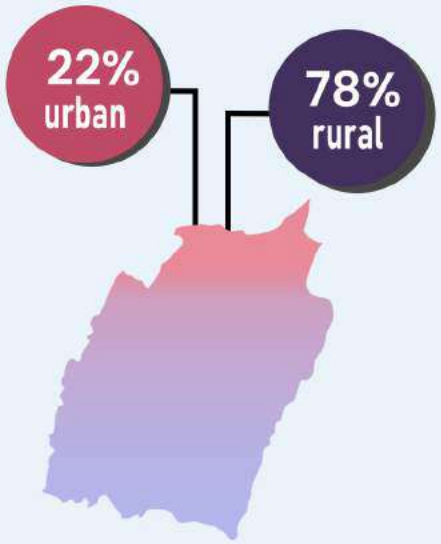
MANIPUR

DEMOGRAPHICS

128 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

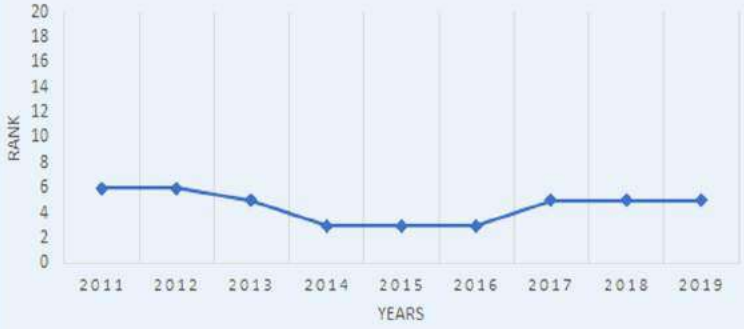
- Subcentres
- PHCs
- CHCs
- Specialists at CHCs
- Health Assistants
- Doctors at PHCs
- L.H.V
- A.N.M
- Health Workers

NON-RURAL SPECIFIC

- Blood Banks
- AYUSH Dispensaries
- Hospital Beds
- Total Hospitals
- Pharmacists
- AYUSH Hospitals
- Registered Doctors
- AYUSH Practitioners
- Registered Nurses and Midwives

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: LADY HEALTH VISITORS

1 unit = 200 Workers

NUMBER OF HEALTH WORKERS

623.2 Workers per MILLION

1 unit = 40 Doctors

NUMBER OF DOCTORS AT PHCs

93.2 Doctors per MILLION

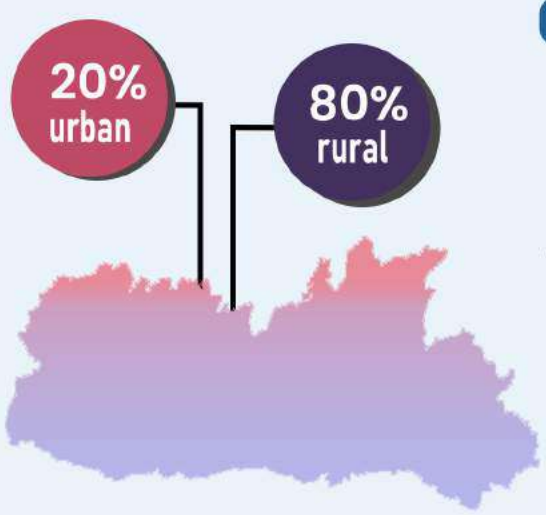
MEGHALAYA

DEMOGRAPHICS

132 per sq km

POPULATION DENSITY

India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

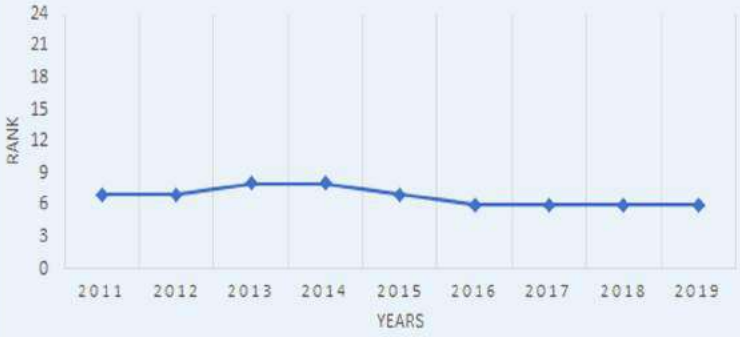
- Subcentres
- Doctors at PHCs
- A.N.M
- PHCs
- CHCs
- Health Workers
- Specialists at CHCs
- Health Assistants
- L.H.V

NON-RURAL SPECIFIC

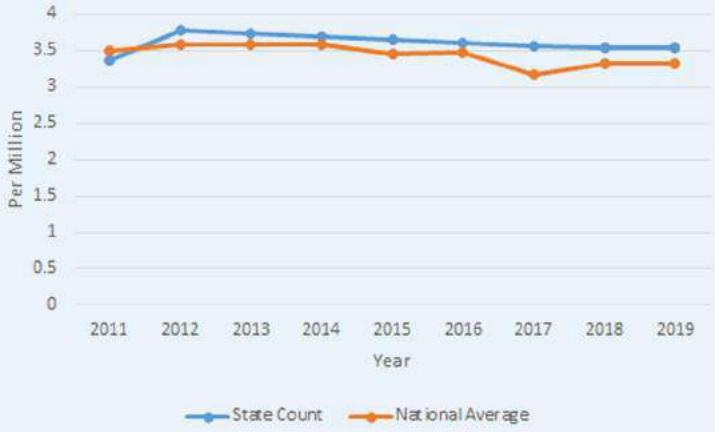
- Pharmacists
- Blood Banks
- AYUSH Dispensaries
- Hospital Beds
- Total Hospitals
- AYUSH Practitioners
- AYUSH Hospitals
- Registered Doctors
- Registered Nurses and Midwives

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: AYUSH HOSPITALS



NUMBER OF CHCs

1 unit = 1 CHC

4.3 CHCs per MILLION

NUMBER OF HEALTH ASSISTANTS

1 unit = 20 Assistants

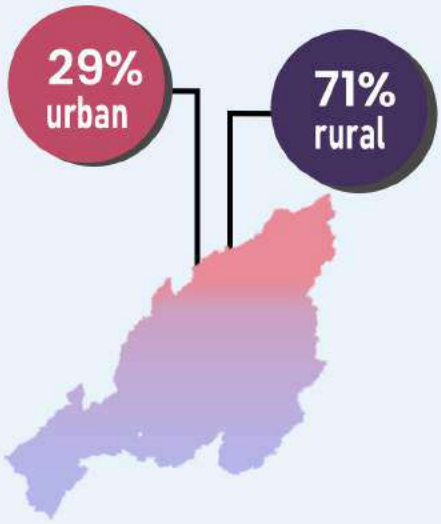
84.4 Assitants per MILLION

NAGALAND

DEMOGRAPHICS

119
per sq km

POPULATION DENSITY
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC

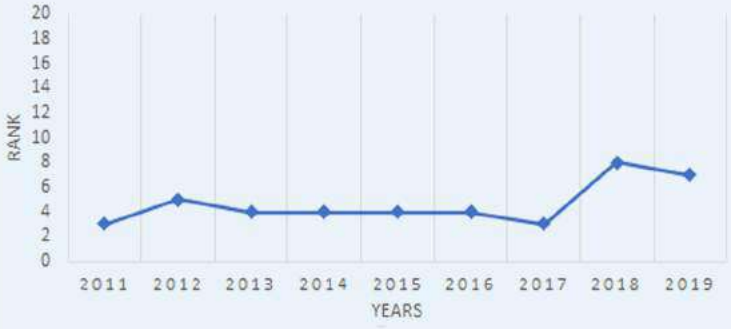
- Health Assistants
- Subcentres
- Health Workers
- Doctors at PHCs
- CHCs
- PHCs
- A.N.M
- Specialists at CHCs
- L.H.V

NON-RURAL SPECIFIC

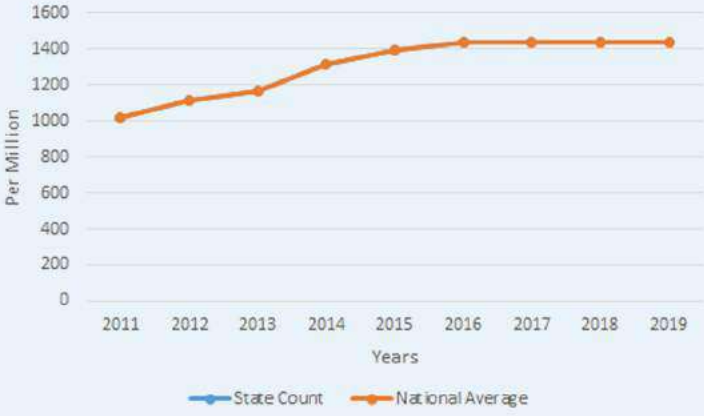
- Registered Doctors
- AYUSH Hospitals
- AYUSH Dispensaries
- Hospital Beds
- Blood Banks
- Total Hospitals
- Pharmacists
- Registered Nurses and Midwives
- AYUSH Practitioners

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: AUXILIARY NURSE MIDWIVES



NUMBER OF PHCs
1 unit = 10 PHCs

29.4 PHCs per MILLION

NUMBER OF CHCs
1 unit = 2 CHC

4.9 CHCs per MILLION

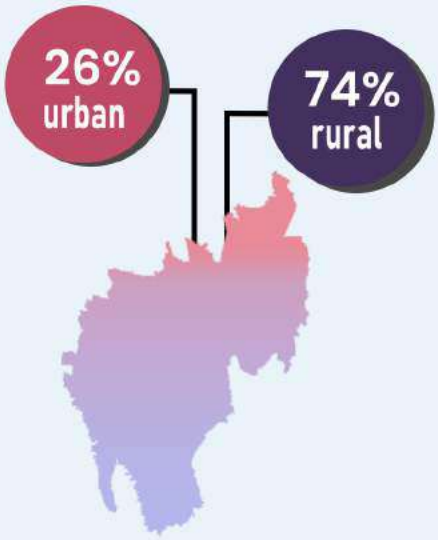
TRIPURA

DEMOGRAPHICS

350 per sq km

POPULATION DENSITY

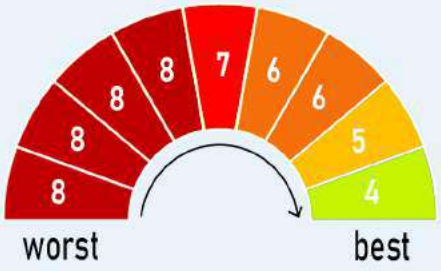
India: 382 per sq km



STATE RANK

INDICATOR-WISE PERFORMANCE

RURAL SPECIFIC



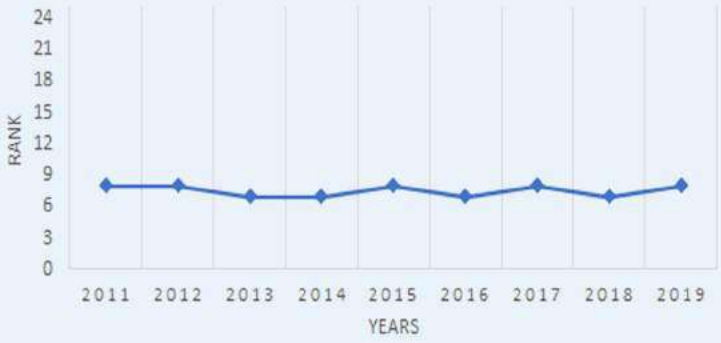
- Doctors at PHCs
- Health Workers
- CHCs
- PHCs
- Health Assistants
- Specialists at CHCs
- L.H.V
- A.N.M
- Subcentres

NON-RURAL SPECIFIC

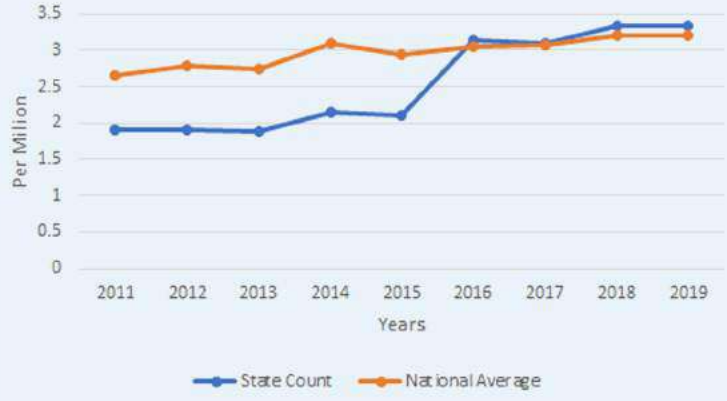
- Total Hospitals
- AYUSH Practitioners
- AYUSH Hospitals
- Registered Nurses and Midwives
- Hospital Beds
- Blood Banks
- Registered Doctors
- Pharmacists
- AYUSH Dispensaries

*the numbers represent the state's rank in indicator performance

PERFORMANCE OVER THE YEARS



IN FOCUS: BLOOD BANKS



1 unit = 100 Subcentres

NUMBER OF SUBCENTRES

333.6 Subcentres per MILLION

1 unit = 500 Beds

NUMBER OF HOSPITAL BEDS

1122.4 Beds per MILLION

COMPARISON WITH THE HEALTH INDEX OF NITI AAYOG

"Healthy States: Progressive India" is a health index report by NITI Aayog to rank the States and Union Territories in the country based on key health outcomes and health service delivery indicators. It has been released by NITI Aayog in collaboration with the Ministry of Health and Family Welfare with technical assistance from the World Bank.

Similar to the "Health Infrastructure Index" (this report), the purpose of the NITI Index is to generate a rank for states and UTs. The reports are also analogous in their intention; to aid the discourse on healthcare policy in the country and thus generate timely accomplishment of desired health outcomes.

While this report studies 18 indicators significant for an efficient impartation of health services, NITI Aayog has identified 23 indicators from the domains of Health Outcome, Governance and Information and Key Inputs/Processes.

In contrast to this report that has evaluated the inputs required for effective healthcare , the NITI index is driven by the output of healthcare system, i.e. they focus chiefly on the health status of the population (such as Infant Mortality Rate, Maternal Mortality Rate, Immunization Coverage etc.), which can be considered as the outcome of the infrastructural indicators.

The NITI Index also, considers certain aspects of health governance and health care programmes, but they are identified as only indirectly related to the infrastructure required for healthcare services.

It is also to be acknowledged that, this report is entirely based on Government / Public Healthcare sourced from a government publication while NITI index, by nature of its objective, considers outcomes of both private and public healthcare sector (to a considerable extent) and has sourced the data directly from each state's health department. It is also a fact that, the nature and level of public and private sector investments in healthcare services differ from state-to-state.

Hence, this report, is bound to have certain deviations in findings, especially in the states with a higher private investments in the healthcare sector when compared with the NITI Index.

The research methodology followed for the analysis, followed in both the reports, "Health Infrastructure Index" and the "Healthy States: Progressive India" are passably dissimilar.

Unlike this report that has employed Principal Component Analysis to condense and assimilate the index values, the NITI Index calculates the index values as a weighted average of the indicators' scaled values.

The index has also dropped missing data points from index calculation while this report has utilized CAGR to cover up unavailable data. It is clear that this report has utilized a statistically robust methodology to abate all possible issues.

The reports are also diverse in the representation of state performances. This report analyses the performance/ranking of each state, even in terms of each indicator, over the years from 2011 to 2019.

"Healthy States: Progressive India" on the other hand has gauged the performance of each state for the reference year (2017-18) against a base year (2015-16). The emphasis here is on the states' incremental performance of the indicators. Nevertheless, the reports are similar in their comparison of the states, as both reports classify the states into large and small states for ease in comprehension and analysis of trends.

Though both the reports are apparently dissimilar, they deal with two interrelated domains. As mentioned earlier, it is natural to assume that the indicator considered for the "Health Infrastructure Index" are the inputs required for better performance of the indicators considered by the "Healthy States: Progressive India" report.

This assumption is validated as the state rankings deduced in this report and the Index have a reasonably positive linear correlation of **0.69925.** Similarly, the index values deduced in the reports correlate at **0.72972** indicating a strong positive correlation.

Additionally, the ranks have a Significance of Correlation (p-value) of **0.000495** while the index value are Significant (p-value) at **0.000205** indicating a strong evidence that the report results are not random.

Nevertheless, it is to be remembered that health outcomes in the population are affected by various socio-economic factors including, but not limited to, Healthcare Infrastructure. Therefore, drawing a direct relationship between the inputs and outputs in the healthcare sector is difficult. For instance, the state of Maharashtra and Gujarat respectively have a rank of 11 and 13 in this report and a rank of 3 and 4 in the NITI index. Similarly, the state of Uttarakhand has a rank of 9 in terms of infrastructure but only 17 in terms of the outcomes. These instances prove that health outcomes are not entirely based on health inputs but also get affected by other factors. Since private healthcare sector, quality of infrastructure and quality of governance were beyond the ambit of this report, such external factors can be assumed to be the factors responsible for a difference in rankings. Hence, an inter-state rank wise comparison of the reports can be incongruous.

Drawing a parallel between health inputs and outputs would require methods of econometric regression by controlling factors. The same is, however, beyond the scope of this report.

Hence, it can be concluded that, though both the reports are diverse in their approach, estimations and indicators, they can complement each other towards formulation of informed policy decisions in the country.

Sl. No	Basis	Healthcare Infrastructure Index	"Healthy States: Progressive India" – NITI Aayog Health Index
1	Indicators	Based on the inputs required for Healthcare services	Based on the output of a Healthcare Service system
2	Nature	Measure the quantity of infrastructure in the healthcare sector	Measures the qualitative aspects and governance of the healthcare sector
3	Scope	Includes data of infrastructure only in the public/government healthcare sector.	Data on health outcomes depend on both private and public healthcare infrastructure.

Table 1: Comparison between Healthcare Infrastructure Index and NITI Aayog Health Index

CONCLUSION

In a paradigm where adequate health infrastructure becomes the most relevant, it is necessary to analyze the status of the same across the country. Through the study, it is found that each of the health indicators in the country has been on an increasing trajectory. Each state has become better off in 2019, with their index values rising by at least 33.26% from that in 2011. However, a disparity between the conditions in each state is observed. This is evident from the Standard Deviation of the state index values which stands at 0.509. This means that the values are closely spread from the mean, indicating a minor but strong inter-state disparity. Relatively, 20% of the states have very low and 6.67% have a very high index score.

A regional trend is also observed in the rankings. The Southern States and a few states from the North East have consistently achieved the top ranks, while the ranks of the Central and Eastern Indian states have been low. It can also be intuitively noted that over the decade most states, except a few, have not had a serious elevation in their rank.

This indicates the need for targeted measures to improve the health infrastructure in each state.

Having good infrastructure alone is not sufficient, the system also requires efficient operations and regular maintenance along with dedicated human resources. This is, however, outside the scope of this report.

The findings of this study, nevertheless, are required to be assimilated in the light of certain limitations. Certain key indicators were not considered for this study for want of data. Also, the quantitative analysis might have subtle variations from the status quo, as some visible discrepancies in the National Health Profile (the primary source for this study) have been corrected through methods in descriptive statistics.

The index has been constructed by employing Principal Component Analysis and is thus certain to have some scientifically accepted and negligible variations as acknowledged before.

Despite all this, active and focused efforts have been undertaken to minimize all possible errors and discrepancies. The robustness of the report was checked by three different means. As mentioned, the findings of this report was contrasted with the "Healthy India: Progressive States" report by NITI Aayog. The correlation between the two findings was obtained to be 0.72972, indicating a strong positive relation.
A positive correlation of 0.64267 was obtained between the per capita health expenditure of each state and the calculated HII index values.

The ranking was prepared again based on the highest and lowest index values of each state over the years. This ranking matched with the final rankings derived with a correlation of 1, indicating a well-executed, robust analysis.

We aspire that this report shall be a guide for future research across a range of ideas relevant to the domain.

An index of the same kind for the Union Territories in the country, or by incorporating more indicators can be prepared. An analysis of the same nature for the population's health statistics or the proportion of state GDP spent on health can also be done. A relative study by incorporating econometric modelling can also be performed.

Our motive behind the preparation of this report has been to assist the policymakers and other stakeholders in our country in terms of engineering better decision making vis-à-vis the Health Infrastructure of India by working on data insights.

Through this, the key reasons for the poor performance of a state in comparison to other states can be pinned down, enabling targeted and informed decision making. It has been our collective well-intentioned effort to add to the discourse on healthcare policy in our country and we remain steadfast in our determination towards a nation better equipped to take care of its citizens, with quality and equity at the core of it all.

ANNEXURE

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.509
Bartlett's Test of Sphericity	Approx. Chi-Square	409.240
	df	153
	Sig.	0.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.833	32.404	32.404	5.833	32.404	32.404	5.515	30.637	30.637
2	3.084	17.136	49.540	3.084	17.136	49.540	2.641	14.672	45.309
3	1.721	9.561	59.101	1.721	9.561	59.101	1.685	9.359	54.668
4	1.362	7.567	66.667	1.362	7.567	66.667	1.654	9.189	63.857
5	1.233	6.850	73.518	1.233	6.850	73.518	1.434	7.965	71.822
6	1.063	5.907	79.425	1.063	5.907	79.425	1.368	7.603	79.425
7	0.876	4.869	84.293						
8	0.818	4.543	88.836						
9	0.701	3.896	92.732						
10	0.393	2.184	94.915						
11	0.326	1.811	96.726						
12	0.247	1.375	98.101						
13	0.104	0.578	98.680						
14	0.083	0.458	99.138						
15	0.065	0.359	99.497						
16	0.044	0.246	99.742						
17	0.033	0.183	99.925						
18	0.014	0.075	100.000						

Extraction Method: Principal Component Analysis

Rotated Component Matrix[a]						
	Component Loadings					
	1	2	3	4	5	6
No. of Doctors	0.183	0.511	0.493	0.381	-0.320	-0.079
No. of Ayush Doctors	-0.471	0.329	0.291	0.024	0.430	-0.026
No. of Pharmacists	-0.036	0.207	0.909	-0.100	0.060	0.098
No. of Blood Banks	0.869	0.206	0.228	-0.044	0.009	0.045
No. of Ayush Hospitals	0.234	-0.143	0.361	-0.147	0.088	-0.601
No. of Ayush Dispenseries	0.232	-0.016	0.001	0.020	0.870	0.001
Doctors at PHCs	0.744	0.228	0.060	0.257	0.313	0.161
Specialists at PHCs	-0.136	0.025	0.018	0.951	-0.070	0.051
Health Assistants	0.382	0.780	-0.020	-0.022	-0.112	-0.090
Health Workers	0.809	0.144	-0.073	-0.042	-0.173	0.206
Total Hospitals	0.425	-0.083	-0.262	0.685	0.297	-0.172
No. of Beds	0.784	0.044	0.222	-0.031	0.170	-0.029
Auxiliary Nurse Midwives	0.192	-0.018	0.259	-0.126	0.041	0.810
Registered Nurses and Midwives	0.098	0.797	0.225	-0.016	0.148	0.421
Lady Health Visitors	-0.011	0.902	0.103	-0.001	0.057	0.001
Subcentres	0.864	0.152	0.043	0.102	0.019	-0.015
PHCs	0.930	-0.046	-0.149	-0.050	0.018	-0.096
CHCs	0.753	-0.039	-0.262	0.045	0.295	-0.191

Rotated Component Matrix[a]						
	Squared Component Loadings					
	1	2	3	4	5	6
No. of Doctors	0.033	0.261	0.243	0.145	0.102	0.006
No. of Ayush Doctors	0.222	0.108	0.085	0.001	0.185	0.001
No. of Pharmacists	0.001	0.043	0.826	0.010	0.004	0.010
No. of Blood Banks	0.756	0.043	0.052	0.002	0.000	0.002
No. of Ayush Hospitals	0.055	0.020	0.131	0.021	0.008	0.361
No. of Ayush Dispenseries	0.054	0.000	0.000	0.000	0.757	0.000
Doctors at PHCs	0.554	0.052	0.004	0.066	0.098	0.026
Specialists at PHCs	0.018	0.001	0.000	0.905	0.005	0.003
Health Assistants	0.146	0.609	0.000	0.000	0.013	0.008
Health Workers	0.655	0.021	0.005	0.002	0.030	0.043
Total Hospitals	0.181	0.007	0.068	0.469	0.088	0.030
No. of Beds	0.614	0.002	0.049	0.001	0.029	0.001
Auxiliary Nurse Midwives	0.037	0.000	0.067	0.016	0.002	0.655
Registered Nurses and Midwives	0.010	0.635	0.051	0.000	0.022	0.177
Lady Health Visitors	0.000	0.813	0.011	0.000	0.003	0.000
Subcentres	0.747	0.023	0.002	0.010	0.000	0.000
PHCs	0.865	0.002	0.022	0.003	0.000	0.009
CHCs	0.568	0.001	0.069	0.002	0.087	0.037

Component Matrix	5.515	2.641	1.685	1.654	1.434	1.368
Total Variance	14.296					
Component Weight	0.386	0.185	0.118	0.116	0.100	0.096

Rotated Component Matrix[a]						
	Divided Component Loadings (Unity Sum)					
	1	2	3	4	5	6
No. of Doctors	0.006	0.099	0.144	0.088	0.071	0.005
No. of Ayush Doctors	0.040	0.041	0.050	0.000	0.129	0.001
No. of Pharmacists	0.000	0.016	0.490	0.006	0.002	0.007
No. of Blood Banks	0.137	0.016	0.031	0.001	0.000	0.001
No. of Ayush Hospitals	0.010	0.008	0.078	0.013	0.005	0.264
No. of Ayush Dispenseries	0.010	0.000	0.000	0.000	0.528	0.000
Doctors at PHCs	0.100	0.020	0.002	0.040	0.068	0.019
Specialists at PHCs	0.003	0.000	0.000	0.547	0.003	0.002
Health Assistants	0.026	0.230	0.000	0.000	0.009	0.006
Health Workers	0.119	0.008	0.003	0.001	0.021	0.031
Total Hospitals	0.033	0.003	0.041	0.284	0.062	0.022
No. of Beds	0.111	0.001	0.029	0.001	0.020	0.001
Auxiliary Nurse Midwives	0.007	0.000	0.040	0.010	0.001	0.479
Registered Nurses and Midwives	0.002	0.240	0.030	0.000	0.015	0.130
Lady Health Visitors	0.000	0.308	0.006	0.000	0.002	0.000
Subcentres	0.135	0.009	0.001	0.006	0.000	0.000
PHCs	0.157	0.001	0.013	0.002	0.000	0.007
CHCs	0.103	0.001	0.041	0.001	0.061	0.027

Rotated Component Matrix[a]				
	Domain Weight (D.W)	Component Weight (C.W)	Weight (D.W*C.W)	Scaled Weight
No. of Doctors	0.099	0.185	0.018	0.023
No. of Ayush Doctors	0.040	0.386	0.016	0.020
No. of Pharmacists	0.490	0.118	0.058	0.073
No. of Blood Banks	0.137	0.386	0.053	0.067
No. of Ayush Hospitals	0.264	0.096	0.025	0.032
No. of Ayush Dispenseries	0.528	0.100	0.053	0.067
Doctors at PHCs	0.100	0.386	0.039	0.049
Specialists at PHCs	0.547	0.116	0.063	0.080
Health Assistants	0.230	0.185	0.043	0.054
Health Workers	0.119	0.386	0.046	0.058
Total Hospitals	0.284	0.116	0.033	0.042
No. of Beds	0.111	0.386	0.043	0.054
Auxiliary Nurse Midwives	0.479	0.096	0.046	0.058
Registered Nurses and Midwives	0.240	0.185	0.044	0.056
Lady Health Visitors	0.308	0.185	0.057	0.072
Subcentres	0.135	0.386	0.052	0.066
PHCs	0.157	0.386	0.060	0.077
CHCs	0.103	0.386	0.040	0.050

States	Andhra Pradesh	Arunachal Pradesh	Assam	Bihar	Chhattisgarh	Goa
No of Doctors	0.0410	0.0235	0.0232	0.0091	0.0069	0.0700
No of AYUSH Doctors	0.0139	0.0157	0.0026	0.0728	0.0110	0.0373
No of Pharmacists	0.1234	0.0198	0.0562	0.0228	0.0422	0.2288
Doctor at PHCs	0.0955	0.2444	0.0506	0.0000	0.0854	0.0783
Specialists at CHC	0.0004	0.0416	0.0002	0.0000	0.0025	0.0042
Health Assisstants	0.0374	0.1858	0.0296	0.0445	0.0906	0.0283
Health workers	0.0836	0.1944	0.0697	0.0193	0.0171	0.1097
Total Hospitals	0.1545	0.0565	0.0809	0.0127	0.0409	0.1865
No. of Beds	0.0543	0.1414	0.0244	0.0055	0.0925	0.0193
No of Blood Banks	0.0822	0.0931	0.0668	0.0358	0.0879	0.0744
No of Ayush Hospitals	0.0003	0.1532	0.0322	0.0062	0.0205	0.0117
No of Ayush Dispenseries	0.0322	0.1678	0.0411	0.0000	0.0257	0.1323
Auxiliary Nurse Midwives	0.0972	0.0377	0.0393	0.0037	0.0263	0.0000
Registered Nurse and Midwives	0.1009	0.0260	0.0251	0.0033	0.0183	0.0000
Lady Health Visitors	0.0326	0.0109	0.0093	0.0041	0.0500	0.0000
Subcentres	0.1054	0.1970	0.0795	0.0474	0.1315	0.1430
PHCs	0.0014	0.2705	0.0024	0.0003	0.0037	0.0377
CHCs	0.0004	0.2700	0.0011	0.0001	0.0019	0.0179

States	Gujarat	Haryana	Himachal Pradesh	Jammu and Kashmir	Jharkhand	Karnataka
No of Doctors	0.0368	0.0015	0.0109	0.0430	0.0000	0.0729
No of AYUSH Doctors	0.0436	0.0276	0.0488	0.0267	0.0100	0.0427
No of Pharmacists	0.1360	0.1535	0.1745	0.0275	0.0000	0.1190
Doctor at PHCs	0.0594	0.1080	0.0838	0.0733	0.0265	0.0967
Specialists at CHC	0.0043	0.0015	0.0218	0.0004	0.0003	0.0154
Health Assisstants	0.0270	0.0402	0.3591	0.0765	0.0227	0.0233
Health workers	0.0483	0.0326	0.1515	0.1163	0.0091	0.0810
Total Hospitals	0.0467	0.0135	0.0090	0.4061	0.0513	0.1868
No. of Beds	0.0764	0.0342	0.0098	0.0252	0.0033	0.2044
No of Blood Banks	0.0700	0.0449	0.0644	0.0960	0.0468	0.0390
No of Ayush Hospitals	0.0023	0.0015	0.0186	0.1879	0.0119	0.0031
No of Ayush Dispenseries	0.0203	0.0297	0.1623	0.0465	0.0213	0.0682
Auxiliary Nurse Midwives	0.0499	0.0539	0.0720	0.0572	0.0073	0.0556
Registered Nurse and Midwives	0.0662	0.0374	0.1077	0.0678	0.0036	0.1355
Lady Health Visitors	0.0569	0.0284	0.0578	0.0569	0.0041	0.1318
Subcentres	0.1275	0.0673	0.1692	0.1726	0.0704	0.1290
PHCs	0.0014	0.0017	0.0329	0.0138	0.0007	0.0021
CHCs	0.0009	0.0013	0.0111	0.0043	0.0011	0.0005

States	Kerala	Madhya Pradesh	Maharashtra	Manipur	Meghalaya	Mizoram
No of Doctors	0.0626	0.0130	0.0522	0.0303	0.0303	0.0303
No of AYUSH Doctors	0.0652	0.0470	0.0688	0.0157	0.0057	0.0000
No of Pharmacists	0.2431	0.0857	0.2580	0.0584	0.0353	0.1613
Doctor at PHCs	0.1434	0.0422	0.0713	0.0414	0.0626	0.3421
Specialists at CHC	0.0207	0.0010	0.0044	0.0174	0.0162	0.0349
Health Assisstants	0.0896	0.0482	0.0080	0.0000	0.0093	0.0482
Health workers	0.0932	0.0198	0.0615	0.1468	0.0854	0.1817
Total Hospitals	0.0309	0.0625	0.1051	0.0210	0.0580	0.0000
No. of Beds	0.1968	0.0539	0.0810	0.1001	0.1417	0.1325
No of Blood Banks	0.1023	0.0373	0.0404	0.1065	0.0960	0.3480
No of Ayush Hospitals	0.0308	0.0014	0.0015	0.0073	0.0099	0.0269
No of Ayush Dispenseries	0.0957	0.0282	0.0322	0.0457	0.1015	0.1743
Auxiliary Nurse Midwives	0.0646	0.0275	0.0391	0.0697	0.0304	0.1664
Registered Nurse and Midwives	0.2687	0.0554	0.0390	0.1101	0.0727	0.1245
Lady Health Visitors	0.3371	0.0225	0.0066	0.0569	0.0657	0.0569
Subcentres	0.1488	0.0868	0.0769	0.1201	0.1063	0.3870
PHCs	0.0031	0.0005	0.0004	0.0426	0.0481	0.2741
CHCs	0.0020	0.0004	0.0003	0.0248	0.0259	0.0947

States	Nagaland	Odisha	Punjab	Rajasthan	Sikkim	Tamil Nadu
No of Doctors	0.0022	0.0150	0.0617	0.0173	0.0825	0.0739
No of AYUSH Doctors	0.0487	0.0184	0.0299	0.0132	0.0000	0.0268
No of Pharmacists	0.0807	0.0967	0.2176	0.0865	0.0505	0.1369
Doctor at PHCs	0.0475	0.0427	0.1153	0.0412	0.1382	0.1250
Specialists at CHC	0.0035	0.0012	0.0011	0.0082	0.0067	0.0193
Health Assisstants	0.0001	0.0678	0.0467	0.1160	0.0394	0.0362
Health workers	0.1040	0.0306	0.0313	0.0599	0.0702	0.1188
Total Hospitals	0.0675	0.1027	0.0827	0.1465	0.0000	0.0848
No. of Beds	0.0000	0.0247	0.0665	0.0412	0.0714	0.0827
No of Blood Banks	0.0879	0.0470	0.0464	0.0533	0.1050	0.0395
No of Ayush Hospitals	0.0106	0.0369	0.0037	0.0057	0.0455	0.0036
No of Ayush Dispenseries	0.0686	0.0320	0.0296	0.0324	0.2270	0.0736
Auxiliary Nurse Midwives	0.0572	0.0691	0.0497	0.0776	0.0032	0.0638
Registered Nurse and Midwives	0.0678	0.0650	0.0961	0.0996	0.0159	0.1462
Lady Health Visitors	0.0569	0.0050	0.1046	0.0366	0.0569	0.2318
Subcentres	0.1286	0.0928	0.0776	0.1224	0.1877	0.1240
PHCs	0.0785	0.0020	0.0018	0.0011	0.2327	0.0013
CHCs	0.0297	0.0015	0.0010	0.0008	0.0364	0.0009

States	Telangana	Tripura	Uttar Pradesh	Uttarakhand	West Bengal	Delhi
No of Doctors	0.0410	0.0303	0.0074	0.0250	0.0237	0.0322
No of AYUSH Doctors	0.0317	0.0054	0.0207	0.0203	0.0265	0.0300
No of Pharmacists	0.2255	0.1620	0.0431	0.1996	0.1188	0.1585
Doctor at PHCs	0.1519	0.0939	0.0256	0.1031	0.0252	0.0696
Specialists at CHC	0.0022	0.0044	0.0479	0.1739	0.0005	0.0007
Health Assisstants	0.0492	0.0610	0.0191	0.0415	0.0452	0.0152
Health workers	0.0619	0.0576	0.0000	0.0413	0.0396	0.0540
Total Hospitals	0.0670	0.0101	0.0160	0.0557	0.0552	0.0000
No. of Beds	0.0650	0.0082	0.0313	0.0321	0.0198	0.0329
No of Blood Banks	0.0572	0.0711	0.0152	0.0317	0.0448	0.0000
No of Ayush Hospitals	0.0007	0.0067	0.0000	0.0383	0.0123	0.0008
No of Ayush Dispenseries	0.0545	0.1020	0.0167	0.0696	0.0743	0.1078
Auxiliary Nurse Midwives	0.0862	0.0310	0.0139	0.0127	0.0388	0.3139
Registered Nurse and Midwives	0.0895	0.0394	0.0124	0.0089	0.0243	0.1035
Lady Health Visitors	0.0289	0.0385	0.0119	0.0014	0.1468	0.0000
Subcentres	0.0906	0.1770	0.0545	0.1243	0.0746	0.0000
PHCs	0.0015	0.0249	0.0000	0.0079	0.0002	0.0008
CHCs	0.0005	0.0095	0.0001	0.0048	0.0003	0.0000

States	Total Sum	Index Value
Andhra Pradesh	1.0566	0.4089
Arunachal Pradesh	2.1491	0.8317
Assam	0.6341	0.2454
Bihar	0.2875	0.1113
Chhattisgarh	0.7547	0.2921
Goa	1.1793	0.4564
Gujarat	0.8740	0.3382
Haryana	0.6787	0.2627
Himachal Pradesh	1.5650	0.6057
Jammu and Kashmir	1.4978	0.5797
Jharkhand	0.2902	0.1123
Karnataka	1.4066	0.5444
Kerala	1.9986	0.7735
Madhya Pradesh	0.6332	0.2450
Maharashtra	0.9467	0.3664

States	Total Sum	Index Value
Manipur	1.0148	0.3928
Meghalaya	1.0009	0.3874
Mizoram	2.5839	1.0000
Nagaland	0.9397	0.3637
Odisha	0.7509	0.2906
Punjab	1.0632	0.4115
Rajasthan	0.9596	0.3714
Sikkim	1.3692	0.5299
Tamil Nadu	1.3891	0.5376
Telangana	1.1050	0.4277
Tripura	0.9330	0.3611
Uttar Pradesh	0.3360	0.1300
Uttarakhand	0.9921	0.3840
West Bengal	0.7711	0.2984
Delhi	0.9198	0.3560

REFERENCES

Source of Data

- Central Bureau of Heath Intelligence. (2019). National Health Profile. http://www.cbhidghs.nic.in/WriteReadData/l892s/8603321691572511495.pdf

Methodology

- AYUSH Doctors, Dispensaries, Hospitals:
Role of AYUSH workforce, therapeutics, and principles in health care delivery with special reference to National Rural Health Mission. (2015). PubMed Central (PMC). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4687239/#:%7E:text=AYUSH%20is%20an%20acronym%20for,some%20of%20the%20developed%20countries

- Auxiliary Nursing Midwife :
Wikipedia contributors. (2021, April 20). Auxiliary nurse midwife. Wikipedia. https://en.wikipedia.org/wiki/Auxiliary_nurse_midwife

- Registered Nursing Midwife :
National Health Mission. (2018). Guidelines on MIDWIFERY SERVICES IN INDIA. https://nhm.gov.in/New_Updates_2018/NHM_Components/RMNCHA/MH/Guidelines/Guidelines_on_Midwifery_Services_in_India.pdf

- Lady Health Visitor :
National Health Mission. (2010). A Handbook for Auxiliary Nurse Midwives Lady Health Visitors & Staff Nurses. https://nhm.gov.in/images/pdf/programmes/maternal-health/guidelines/sba_handbook_for_anm_lhv_sn.pdf

- Pharmacists :
Pharmacy Council of India. (2018). Pharmacy Council of India. https://pci.nic.in/pharmaact_chapter1.html

- Doctors at PHC :
Wikipedia contributors. (2021a, April 16). Primary Health Centre (India). Wikipedia. https://en.wikipedia.org/wiki/Primary_Health_Centre_(India)

- Specialists at CHCs :
Indian Public Health Standards. (2010). Directorate General of Health Services. https://nhm.gov.in/images/pdf/communitisation/task-group-reports/task-group-iphs.pdf&usg=AOvVaw3T_WP3rVPjAQ_zAMEWsT8j

- Health Assistants :
Jobs, T. (2018, June 6). Health Care Assistant Job Description. Telegraph Jobs. https://jobs.telegraph.co.uk/article/health-care-assistant-job-description/#:%7E:text=Health%20Care%20Assistants%2C%20also%20known,ensure%20their%20comfort%20and%20safety

- Health Workers :
The health of the healthcare workers. (2016). PubMed Central (PMC). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5299814/

- Primary Health Centers, Sub-centers, Community Health Centers :
Rural Healthcare System in India. (2021). Vikaspedia. https://vikaspedia.in/health/health-directory/rural-health-care-system-in-india#:~:text=Community%20Health%20Centre%20(CHC)%20%3A,4%20PHCs%20with%20Specialized%20services

- Hospital Beds :
Definitions and Classifications of Hospital Beds and Beds in Nursing and Residential Care Facilities.
https://deputyprimeminister.gov.mt/en/dhir/documents/definitions_and_classifications.pdf

- Blood bank :
Blood Banks. (2021). Vikaspedia. https://vikaspedia.in/health/health-directory/blood-banks

- Kumar, N., Kumar, N., & Profile, V. M. C. (2019). Advantages and Disadvantages of Principal Component Analysis in Machine Learning. The Professionals Point. http://theprofessionalspoint.blogspot.com/2019/03/advantages-and-disadvantages-of_4.html

- Reif, R. (2018, May 9). Limitations of Applying Dimensionality Reduction using PCA. Roberto Reif. https://www.robertoreif.com/blog/2018/1/9/pca

- Kapur, R. (2020). Significance of Health Infrastructure. Published. https://www.researchgate.net/publication/342832865_Significance_of_Health_Infrastructure/citation/download

Further Readings

- Goel, M. M., & Garg, I. (2018). Construction of Health Infrastructure Index in Haryana: An Econometric Approach. Journal of Technology Management for Growing Economies, 9(1), 103–123. https://doi.org/10.15415/jtmge.2018.91005

- Lakshmi, T., & Sahoo, D. (2013). Health Infrastructure and Health Indicators: The Case of Andhra Pradesh, India. IOSR Journal of Humanities and Social Science. Published. https://doi.org/10.9790/0837-0662229

- NITI Aayog, et. al (2019, June). Healthy India: Progressive States. NITI Aayog, GoI. http://social.niti.gov.in/uploads/sample/health_index_report.pdf

- Brookings India Health Monitor:
Ravi, S., Agarwal, S., Dave, H., & Swaminathan, M. Methodology: Brookings India Health Monitor. Brookings India. https://www.brookings.edu/wp-content/uploads/2017/06/bihm-methodology-document.pdf

- Health Infrastructure in Orissa: An Inter-District Analysis
Rout, H. (2007). HEALTH INFRASTRUCTURE IN ORISSA: AN INTER-DISTRICT ANALYSIS. The ICFAI Journal of Infrastructure, 5.

- Observer Research Foundation(2020). State of the States. https://www.orfonline.org/wp-content/uploads/2020/05/ORF_Report_StateOfTheStates1n.pdf

ISHAAN MITTAL
DataLab Director

TEAM MEMBERS
Abhiram Lokanathan
Aman Arora
Hardik Kapoor
Khushi Kapoor
Raya Dhawan
Srishti Jain

THE ECONOMICS SOCIETY, SRCC

WEBSITE
www.ecosocsrcc.com

EMAIL ADDRESS
srcc.ecosoc@gmail.com

CONTACT
Ishaan Mittal
+91-87448-24235
Parth Chowdhary
+91-96018-12006
Himanshu Chhabra
+91-78375-90832