

# Rural Health Infrastructure Index and Health Status in India

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## ABSTRACT

The study explores the trends in rural health infrastructure and health status across Indian states, analysing the relationship between the Rural Health Infrastructure Index (R-HII) and the Rural Health Status Index (R-HSI) from 2005 and 2020. Despite the Government of India efforts through initiatives like the National Rural Health Mission (NRHM) and Ayushman Bharat, significant disparities continue in rural healthcare. The study uses secondary data from the Ministry of Health and Family Welfare and applies 12 indicators to assess infrastructure and four to evaluate health outcomes. Findings reveal that states like Arunachal Pradesh and Mizoram have shown remarkable progress in health infrastructure, while states such as Madhya Pradesh and Uttar Pradesh have maintained a high health status index. However, the association between infrastructure and health outcomes is weak, with a regression analysis showing an  $R^2$  value of 0.026, indicating that improved infrastructure alone is not sufficient to ensure better health outcomes. Socio-economic factors, policy implementation, and service delivery also present critical roles in health outcomes, suggesting a multifaceted approach is necessary to address the rural health challenges in India. This study highlights the need for targeted, region-specific interventions to bridge the health disparities between states.

**Keywords:** Health infrastructure, Health Status

## INTRODUCTION

India's healthcare system has made significant steps over the past few decades through targeted policy interventions and national health programs. However, rural healthcare continues to grapple with multiple systemic issues, leading to persistent inequities between rural and urban populations. According to Balarajan et al. (2011), these disparities manifest in the form of insufficient infrastructure, lack of skilled personnel, and limited access to essential services, particularly in rural and remote areas. While initiatives such as the National Rural Health Mission (NRHM) and Ayushman Bharat have aimed to strengthen primary healthcare delivery and enhance affordability, the effectiveness of these

programs remains uneven across states (Bajpai et al., 2011; Selvaraj et al. 2018).

Rural areas often experience challenges not only due to logistical and infrastructural deficiencies but also due to deeper socio-economic factors such as poverty, caste hierarchies, and gender disparities, which influence access to and utilization of healthcare services (Subramanian et al. 2006). States in regions like the North-East and Central India consistently perform poorly on health infrastructure and outcome indicators, despite national averages showing improvement (Saikia & Das, 2012; Gogoi, 2021). Furthermore, there exists considerable inter-state variation in both the availability of rural health infrastructure such as Sub-Centres, Primary Health Centres

(PHCs), and Community Health Centres (CHCs) and in basic health outcomes like infant mortality, maternal health, and disease burden.

In this context, a more nuanced analysis is necessary to assess how rural health infrastructure correlates with health outcomes across Indian states. This study seeks to address this gap by constructing a Rural Health Infrastructure and a Rural Health Status and examining the relationship between the two. Such an analysis will help identify disparities at the state level, enabling more targeted policy interventions and resource allocation strategies.

### Objective

- To analyse the status of Rural Health Infrastructure Index and Rural Health Status Index in Indian by states
- To study the association between Rural Health Infrastructure Index and Rural Health Status Index.

### METHODOLOGY

The study is primarily based on secondary data obtained from the annual reports of Rural Health Statistics published by the Ministry of Health and Family Welfare, Government of India. It covers all the annual reports of Rural Health Statistics published on the Ministry's website from 2005 and 2020 for selected states in India. The study applied the projected populations for 2005 and 2020 to assess the norms for establishing health centres in plain areas. Twelve

indicators are used to construct Health Infrastructure Index (HII) namely – ‘Number of Sub Centre, PHCs, CHCs hospitals, PHC Beds, CHC Beds, ANM [Female], Doctors at PHCs, Pharmacist, Nursing Staff, Surgeons, OB&GY, Physicians & Paediatricians, Radiographer, and Lab Technician per thousand populations. Below formula is used to normalise the indicators (Appendix 3 and 4). Further, the average value of these three indicators is considered as the HII. To construct the Health Status Index four indicators are used namely, Infant mortality rate, Natural growth rate, Birth rate and Death rate.

All indicators were converted to per ten thousand populations and used to construct a Health Infrastructure Index. For example, the number of hospitals and dispensaries per ten thousand populations, the number of primary health centers (PHCs) and sub-centers (SCs) per ten thousand populations, the number of beds per ten thousand populations etc, (Appendix 1 and 2). were all used to construct the index. This study focuses on public sector health infrastructure, not private sector health infrastructure.

By applying this formula, the data is rescaled to a range of 0 to 1, with the minimum value being mapped to 0 and the maximum value being mapped to 1. This normalization process allows for a fair comparison and analysis of the data, eliminating potential biases that may arise due to differences in scale or magnitude.

$$\text{Health Status Index} = \frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}}$$

The average of these normalized indicators provides the HSI for each state. This data framework supports the study's objective to analyse trends in rural health infrastructure and explore the relationship between HII and HSI across the selected states (Hanagodimath S. V. (2012).

### Present Scenario of Rural Health Infrastructure in India

As of March 31, 2023, India's healthcare system includes a vast network of health

facilities spread across rural and urban areas, providing essential services to the population. Sub-Centres (SCs): A total of 1,69,615 Sub-Centres are operational across the country, with 1,65,639 located in rural areas and 3,976 in urban areas. These centres form the foundation of primary healthcare in India, particularly in rural settings. Primary Health Centres (PHCs): There are 31,882 Primary Health Centres serving both rural and urban populations. Out of these, 25,354

are based in rural areas, while 6,528 are located in urban areas, offering more comprehensive healthcare services. Community Health Centres (CHCs): A total of 6,359 Community Health Centres is currently functional. This includes 5,491 in rural areas and 868 in urban areas, providing higher-level care and specialized services compared to PHCs. Sub-Divisional / District Hospitals (SDHs): India has 1,340 Sub-Divisional and District Hospitals operating across both rural and urban regions, providing secondary-level healthcare services. District Hospitals (DHs): There are 714 District Hospitals functioning in various parts of the country, catering to both rural and urban populations with more advanced healthcare services. Medical Colleges (MCs): The country also has 362 Medical

Colleges that are operational, serving both rural and urban areas, contributing to medical education and healthcare service delivery.

### Health Infrastructure Index of Indian States

Rural Health Infrastructure Index (HII) states in India have been provided for the years 2005 and 2020. It is observed from the table that in 2020, Arunachal Pradesh occupied the first position, having improved significantly from third place in 2005, while Delhi remained in the last position across both years with an index of 0.00. Mizoram, which was ranked fifth in 2005, showed notable improvement to secure the second position in 2020. Nagaland, which held the top position in 2005, dropped to the fifth rank in 2020 (Appendix 3; Appendix 4).

**Table 1: Rural Health Infrastructure Index in India**

States	2005		2020	
	Index	Rank	Index	Rank
Andhra Pradesh	0.21	18	0.34	13
Arunachal Pradesh	0.58	3	0.75	1
Delhi	0.00	24	0.00	24
Goa	0.23	15	0.37	11
Gujarat	0.25	14	0.32	15
Haryana	0.20	19	0.18	23
Himachal Pradesh	0.53	4	0.52	6
Jammu & Kashmir	0.37	8	0.59	3
Karnataka	0.31	10	0.37	10
Kerala	0.29	11	0.25	18
Madhya Pradesh	0.13	22	0.26	17
Maharashtra	0.26	12	0.22	20
Manipur	0.31	9	0.35	12
Meghalaya	0.41	6	0.59	4
Mizoram	0.45	5	0.67	2
Nagaland	0.67	1	0.55	5
Odisha	0.25	13	0.27	16
Punjab	0.22	17	0.23	19
Rajasthan	0.37	7	0.48	7
Sikkim	0.63	2	0.42	9
Tamil Nadu	0.23	16	0.32	14
Tripura	0.18	20	0.48	8
Uttar Pradesh	0.11	23	0.21	22
West Bengal	0.13	21	0.22	21
Coefficient of Variation	0.54		0.47	

*Source: Prepared by Author using Available Data from the Rural Health Statistics, Published by the Ministry of health and Family Welfare in India*

States like Kerala, Punjab, and Maharashtra, which are generally known for better health indicators, showed a decline in their rankings

over the period. Kerala dropped from 11th to 18th, while Haryana also slipped from 19th to 23rd. Conversely, states such as Tripura

and Jammu & Kashmir exhibited remarkable improvements, with Tripura moving up from 20th to 8th and Jammu & Kashmir climbing from 8th to 3rd position. The coefficient of variation, presented in the last row of the table, indicates a decrease in inter-state disparity in health infrastructure, dropping from 54% in 2005 to 47% in 2020.

### Health Status Index of Indian States

Rural Health Status Index (HSI) states in India has been provided for the years 2005 and 2020. It is observed from the table that in both 2005 and 2020, Madhya Pradesh maintained the top position with the highest health status index, while Uttar Pradesh consistently held the second position in both years. Nagaland remained in the last position in both 2005 and 2020, with only a slight decrease in its index value (Appendix 5).

**Table 2: Rural Health Status Index in India**

States	2005		2020	
	Index	Rank	Index	Rank
Andhra Pradesh	0.54	9	0.45	9
Arunachal Pradesh	0.51	10	0.44	10
Delhi	0.37	17	0.29	17
Goa	0.22	21	0.16	22
Gujarat	0.70	5	0.59	7
Haryana	0.68	7	0.64	5
Himachal Pradesh	0.49	11	0.39	12
Jammu & Kashmir	0.45	12	0.33	15
Karnataka	0.56	8	0.48	8
Kerala	0.18	22	0.22	20
Madhya Pradesh	0.98	1	0.91	1
Maharashtra	0.43	16	0.36	13
Manipur	0.09	24	0.13	23
Meghalaya	0.70	6	0.73	4
Mizoram	0.45	13	0.22	19
Nagaland	0.16	23	0.11	24
Odisha	0.74	4	0.62	6
Punjab	0.43	15	0.42	11
Rajasthan	0.85	3	0.75	3
Sikkim	0.35	19	0.17	21
Tamil Nadu	0.37	18	0.32	16
Tripura	0.26	20	0.25	18
Uttar Pradesh	0.94	2	0.87	2
West Bengal	0.44	14	0.35	14
Coefficient of Variation	0.47		0.53	

*Source: Prepared by Author using Available Data from the Rural Health Statistics, Published by the Ministry of health and Family Welfare in India*

States like Rajasthan and Meghalaya are also among the top performers, with Rajasthan ranked third and Meghalaya improving from sixth in 2005 to fourth in 2020. Kerala, which is often considered a model state in terms of health outcomes, ranked low in both years, with a slight improvement in its index, moving from 22nd to 20th position. Goa also saw a decline in its rank, moving from 21st to 22nd, while Haryana showed improvement, rising from seventh to fifth.

The coefficient of variation, presented in the last row of the table, shows an increase in inter-state disparity in health status, rising from 47% in 2005 to 53% in 2020. This indicates that the gap between states in terms of health status has widened over the period, with significant variations across regions.

### Categorization of States

In 2020, states were categorized into four groups based on the geometric mean method for index values, as proposed by

Hanagodimath S. V. (2012). In terms of the Health Infrastructure Index (HII), Arunachal Pradesh and Mizoram are classified in the advanced category. In contrast, states such as

Odisha, Madhya Pradesh, Kerala, Punjab, Maharashtra, West Bengal, Uttar Pradesh, Haryana, and Delhi are placed in the underdeveloped category.

**Table 3: Grouping of States by Rural Health Infrastructure Index and Rural Health Status Index - 2020**

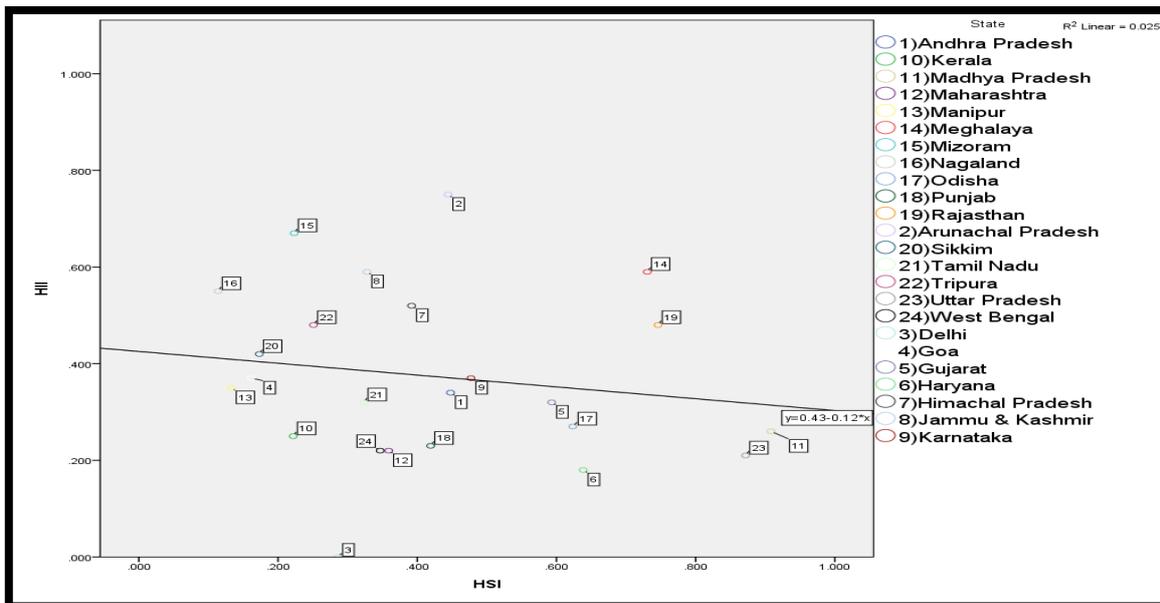
Particulars	Group I – Advanced	Group II –Above Average	Group III –Below Average	Group IV –Under developed
Health Infrastructure Index	Arunachal Pradesh Mizoram	Jammu & Kashmir Meghalaya Nagaland Himachal Pradesh Rajasthan Tripura Sikkim	Karnataka Goa Manipur Andhra Pradesh Tamil Nadu Gujarat	Odisha Madhya Pradesh Kerala Punjab Maharashtra West Bengal Uttar Pradesh Haryana Delhi
Health Status Index	Madhya Pradesh Uttar Pradesh	Rajasthan Meghalaya Haryana Odisha Gujarat Karnataka Andhra Pradesh Arunachal Pradesh Punjab	Himachal Pradesh Maharashtra West Bengal Jammu & Kashmir Tamil Nadu	Delhi Tripura Mizoram Kerala Sikkim Goa Manipur Nagaland

Source: Prepared by Author using Available Data from the Rural Health Statistics, Published by the Ministry of health and Family Welfare in India

For the Health Status Index (HSI), Madhya Pradesh and Uttar Pradesh are placed in the advanced category. In contrast, Delhi, Tripura, Mizoram, Kerala, Sikkim, Goa, Manipur, and Nagaland are categorized as

underdeveloped. The remaining states are divided between the second (above average) and third (below average) groups (Table 1 & 2).

**Figure 1: Association of Rural Health Infrastructure Index and Rural Health Status Index for Indian States, 2020**



### Association of R-HII and R-HIS

To examine the association between the Health Infrastructure Index and the Health Status Index, a scatter diagram has been prepared and is presented in Figure 1.

It is observed from the figure that there is a weak negative association between health infrastructure and health status. The regression analysis shows an  $R^2$  value of 0.026, indicating that the correlation is very weak and almost negligible. This suggests that while infrastructure is an important factor in health outcomes, it is not sufficient on its own to ensure better health status. Other factors such as healthcare delivery, policy implementation, and socio-economic conditions also composition critical roles in determining health status.

### Major Findings

- Tripura and Jammu & Kashmir demonstrated substantial progress, with Tripura advancing from 20th to 8th and Jammu & Kashmir climbing from 8th to 3rd.
- Arunachal Pradesh and Mizoram are classified as advanced in health infrastructure, while states like Odisha, Madhya Pradesh, Kerala, Punjab, Maharashtra, West Bengal, Uttar Pradesh, Haryana, and Delhi fall under the underdeveloped category.
- The coefficient of variation decreased from 54% in 2005 to 47% in 2020, indicating reduced inter-state disparities in health infrastructure.
- Rajasthan and Meghalaya performed well, with Rajasthan ranking 3rd and Meghalaya improving from 6th in 2005 to 4th in 2020.
- Kerala showed only a slight improvement, moving from 22nd to 20th position.
- A scatter diagram and regression analysis show a weak negative correlation between health infrastructure and health status, with an  $R^2$  value of 0.026.

### CONCLUSION

The analysis of rural health infrastructure and health status across Indian states from 2005 to 2020 reveals that even though significant improvements in healthcare infrastructure, particularly in states like Arunachal Pradesh and Mizoram, substantial disparities in both infrastructure and health outcomes persist. The weak correlation between the Rural Health Infrastructure Index (R-HII) and Rural Health Status Index (R-HSI) suggests that while infrastructure improvements are dynamic, they alone are insufficient to ensure better health outcomes. States such as Madhya Pradesh and Uttar Pradesh have consistently ranked high in health status despite varying levels of infrastructure, indicating the importance of other factors such as effective healthcare delivery, policy implementation, and socio-economic conditions. The findings emphasize the need for a more comprehensive, multidimensional approach to rural healthcare, addressing not just infrastructure but also human resources, service quality, and accessibility, particularly in underdeveloped regions. Targeted interventions that account for regional differences in health needs, along with sustained government efforts, are essential to achieving equitable healthcare across India's diverse states. Furthermore, ongoing monitoring and policy adjustments are critical to closing the healthcare gaps between states and ensuring that economic development is matched by equivalent improvements in rural health outcomes.

### LIMITATIONS

The study depends exclusively on secondary data from the Rural Health Statistics reports published by the Ministry of Health and Family Welfare, which, while comprehensive, have certain limitations. Data availability is often inconsistent across states and years, leading to potential gaps in trend analysis. Additionally, the statistics focus primarily on public sector infrastructure, excluding private sector contributions that may significantly influence health outcomes in certain regions.

Furthermore, variations in reporting standards and data quality across states may affect the comparability and accuracy of the indices.

**Declaration by Authors**

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**Appendix 1: Public Health Infrastructure per Ten Thousand Population in Selected States of India, 2005**

Sl. No	State/UT	Sub Centre	PH Cs	CH Cs	Beds	ANM [FEMALE]	Doctors at PHCs	Pharmacist	Nursing Staff 2005	Surgeons, OB&GY, & Paediatricians	Radiographer	Lab Technician
1	Andhra Pradesh	15.70	1.97	0.21	7.80	17.23	2.68	2.05	2.57	0.28	0.18	1.80
2	Arunachal Pradesh	27.81	6.24	2.27	27.81	33.31	5.72	2.27	7.70	0.00	1.61	1.32
3	Goa	9.48	1.05	0.28	24.92	9.87	2.92	1.49	6.56	0.39	0.39	1.38
4	Gujarat	14.05	2.07	0.53	22.97	12.57	1.64	1.56	2.81	0.18	0.22	1.68
5	Haryana	11.39	1.91	0.34	5.24	13.19	4.04	2.17	5.43	0.23	0.50	1.08
6	Himachal Pradesh	27.90	5.92	0.89	29.52	24.15	6.30	5.06	16.98	0.00	0.73	6.23
7	Karnataka	14.69	3.03	0.46	13.15	15.42	3.68	3.39	5.59	1.25	0.05	2.62
8	Kerala	15.10	2.70	0.31	28.99	16.49	2.81	2.54	7.64	0.24	0.05	1.06
9	Madhya Pradesh	10.19	1.37	0.26	7.91	10.73	0.96	0.25	1.04	0.06	0.00	0.44
10	Maharashtra	10.88	1.85	0.40	16.02	11.14	3.29	2.14	2.68	1.14	0.17	1.78
11	Manipur	14.63	2.51	0.56	30.27	16.13	2.33	3.07	2.16	0.66	0.17	1.04
12	Meghalaya	14.45	3.64	0.86	28.10	21.90	4.43	4.36	9.47	0.04	0.94	4.83
13	Mizoram	33.61	5.23	0.83	26.63	31.68	3.21	3.21	11.20	0.00	0.00	2.85
14	Nagaland	20.35	4.49	1.08	101.34	17.67	2.74	4.39	26.86	0.00	0.57	2.32
15	Odisha	15.83	3.42	0.62	13.37	18.07	3.61	5.30	1.70	0.00	0.02	0.83
16	Punjab	11.49	1.95	0.47	8.44	10.46	1.50	3.26	2.57	0.91	0.23	2.41
17	Rajasthan	17.96	2.93	0.56	20.11	19.52	2.57	4.02	14.39	0.99	0.46	3.53
18	Sikkim	23.04	3.76	0.63	72.10	40.75	7.52	0.47	7.05	0.63	0.78	5.02
19	Tamil Nadu	13.49	2.14	0.05	25.92	15.71	3.51	1.95	0.26	0.07	0.04	1.34
20	Tripura	12.49	1.69	0.23	9.50	13.00	3.52	1.46	6.35	0.05	0.09	1.00
21	Uttar Pradesh	10.79	1.92	0.20	6.26	9.54	0.00	0.00	0.00	0.00	0.00	0.00
22	West Bengal	12.30	1.39	0.11	5.98	10.77	1.57	1.46	1.76	0.16	0.09	0.40

23	Delhi	0.25	0.05	0.00	0.00	0.31	0.14	0.07	0.02	0.00	0.00	0.03
24	Jammu & Kashmir	17.22	3.06	0.64	16.68	14.55	5.89	4.18	0.62	1.30	0.56	3.62

**Appendix 2: Public Health Infrastructure per Ten Thousand Population in Selected States of India, 2020**

Sl. No	State/UT	Sub Centre	PH Cs	CH Cs	PHC Beds	CHC Beds	ANM [FEMALE]	Doctors at PHCs	Pharmacist, 2022	Nursing Staff	Surgeons, OB&GY, Physicians & Paediatricians	Radiographer	Lab Technician
1	Andhra Pradesh	1.41	0.22	0.03	0.22	0.03	2.99	0.34	0.20	0.59	0.06	0.01	0.17
2	Arunachal Pradesh	2.34	0.78	0.39	0.32	0.01	3.09	1.27	0.71	4.46	0.09	0.09	0.79
3	Goa	1.40	0.35	0.04	0.08	0.03	2.23	0.48	0.37	1.76	0.09	0.01	0.28
4	Gujarat	1.32	0.21	0.05	0.16	0.05	1.38	0.22	0.22	0.43	0.00	0.02	0.21
5	Haryana	0.90	0.13	0.04	0.10	0.01	1.55	0.17	0.14	0.75	0.01	0.01	0.14
6	Himachal Pradesh	2.84	0.77	0.12	0.23	0.03	2.26	0.64	0.69	0.33	0.03	0.04	0.07
7	Karnataka	1.38	0.33	0.03	0.30	0.03	2.01	0.31	0.26	0.71	0.04	0.02	0.26
8	Kerala	1.53	0.22	0.06	0.03	0.02	1.67	0.29	0.22	0.50	0.05	0.00	0.16
9	Madhya Pradesh	1.22	0.14	0.04	0.14	0.04	1.44	0.13	0.16	0.34	0.01	0.02	0.10
10	Maharashtra	0.86	0.15	0.02	0.15	0.02	1.04	0.23	0.16	0.26	0.03	0.01	0.13
11	Manipur	1.33	0.27	0.05	0.21	0.01	3.19	0.99	0.48	1.07	0.01	0.03	0.36
12	Meghalaya	1.35	0.36	0.09	0.33	0.08	3.19	0.58	0.51	2.31	0.01	0.07	0.59
13	Mizoram	2.58	0.47	0.07	0.47	0.07	2.87	0.48	0.35	2.03	0.00	0.07	0.61
14	Nagaland	1.81	0.60	0.10	0.39	0.02	4.13	0.55	0.61	1.45	0.04	0.01	0.66
15	Odisha	1.47	0.28	0.08	0.02	0.01	1.98	0.18	0.37	0.55	0.07	0.01	0.16
16	Punjab	0.98	0.14	0.05	0.08	0.02	1.23	0.13	0.21	0.57	0.05	0.04	0.17
17	Rajasthan	1.71	0.27	0.07	0.27	0.07	1.90	0.23	0.14	1.04	0.06	0.04	0.25
18	Sikkim	2.19	0.36	0.03	0.33	0.00	3.99	0.51	0.19	1.37	0.03	0.06	0.55
19	Tamil Nadu	1.14	0.19	0.05	0.13	0.05	1.38	0.36	0.21	0.93	0.03	0.02	0.15
20	Tripura	2.39	0.26	0.05	0.26	0.05	1.69	0.55	0.42	1.85	0.00	0.03	0.36
21	Uttar Pradesh	0.91	0.13	0.03	0.07	0.03	1.03	0.12	0.18	0.32	0.04	0.01	0.08
22	West Bengal	1.06	0.09	0.04	0.03	0.03	1.90	0.11	0.15	0.80	0.07	0.02	0.07
23	Delhi	0.01	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00

24	Jammu & Kashmir	1.85	0.69	0.06	0.29	0.04	3.38	0.70	0.79	1.04	0.00	0.16	0.66
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**Appendix 3: Normalized Index of Public Health Infrastructure in Selected Indian States, 2005**

Sl. No	State/UT	Sub Centre	PHCs	CHCs	Beds	ANM [Female]	Doctors at PHCs	Pharmacist	Nursing Staff 2005	Surgeons, OB&GY, Physicians & Paediatricians	Radiographer	Lab Technician
1	Andhra Pradesh	0.46	0.31	0.09	0.08	0.42	0.36	0.39	0.10	0.22	0.11	0.29
2	Arunachal Pradesh	0.83	1.00	1.00	0.27	0.82	0.76	0.43	0.29	0.00	1.00	0.21
3	Goa	0.28	0.16	0.12	0.25	0.24	0.39	0.28	0.24	0.30	0.24	0.22
4	Gujarat	0.41	0.33	0.23	0.23	0.30	0.22	0.29	0.10	0.14	0.14	0.27
5	Haryana	0.33	0.30	0.15	0.05	0.32	0.54	0.41	0.20	0.18	0.31	0.17
6	Himachal Pradesh	0.83	0.95	0.39	0.29	0.59	0.84	0.95	0.63	0.00	0.45	1.00
7	Karnataka	0.43	0.48	0.20	0.13	0.37	0.49	0.64	0.21	0.96	0.03	0.42
8	Kerala	0.45	0.43	0.14	0.29	0.40	0.37	0.48	0.28	0.19	0.03	0.17
9	Madhya Pradesh	0.30	0.21	0.12	0.08	0.26	0.13	0.05	0.04	0.04	0.00	0.07
10	Maharashtra	0.32	0.29	0.17	0.16	0.27	0.44	0.40	0.10	0.88	0.10	0.29
11	Manipur	0.43	0.40	0.25	0.30	0.39	0.31	0.58	0.08	0.51	0.11	0.17
12	Meghalaya	0.43	0.58	0.38	0.28	0.53	0.59	0.82	0.35	0.03	0.58	0.77
13	Mizoram	1.00	0.84	0.36	0.26	0.78	0.43	0.61	0.42	0.00	0.00	0.46
14	Nagaland	0.60	0.72	0.48	1.00	0.43	0.36	0.83	1.00	0.00	0.35	0.37
15	Odisha	0.47	0.55	0.27	0.13	0.44	0.48	1.00	0.06	0.00	0.01	0.13
16	Punjab	0.34	0.31	0.20	0.08	0.25	0.20	0.62	0.10	0.70	0.14	0.39
17	Rajasthan	0.53	0.47	0.24	0.20	0.47	0.34	0.76	0.54	0.76	0.28	0.57
18	Sikkim	0.68	0.60	0.28	0.71	1.00	1.00	0.09	0.26	0.48	0.49	0.80
19	Tamil Nadu	0.40	0.34	0.02	0.26	0.38	0.47	0.37	0.01	0.06	0.03	0.21
20	Tripura	0.37	0.27	0.10	0.09	0.31	0.47	0.28	0.24	0.04	0.06	0.16
21	Uttar Pradesh	0.32	0.30	0.09	0.06	0.23	0.00	0.00	0.00	0.00	0.00	0.00
22	West Bengal	0.36	0.22	0.05	0.06	0.26	0.21	0.28	0.07	0.12	0.06	0.06
23	Delhi	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
24	Jammu & Kashmir	0.51	0.49	0.28	0.16	0.35	0.78	0.79	0.02	1.00	0.35	0.58

**Appendix 4: Normalized Index of Public Health Infrastructure in Selected Indian States, 2020**

Sl. No	State/UT	Sub Centre	PH Cs	CH Cs	PHC Beds	CHC Beds	ANM [FEMALE]	Doctors at PHCs	Pharmacist, 2022	Nursing Staff	Surgeons, OB&GY, Physicians & Paediatricians	Radiographer	Lab Technician
1	Andhra Pradesh	0.50	0.28	0.07	0.46	0.35	0.72	0.26	0.25	0.13	0.65	0.07	0.22
2	Arunachal Pradesh	0.82	1.00	1.00	0.67	0.17	0.75	1.00	0.89	1.00	1.00	0.55	1.00
3	Goa	0.49	0.45	0.10	0.16	0.42	0.54	0.37	0.46	0.39	0.98	0.08	0.36
4	Gujarat	0.47	0.27	0.13	0.35	0.62	0.33	0.16	0.28	0.10	0.02	0.12	0.27
5	Haryana	0.31	0.17	0.10	0.21	0.17	0.37	0.13	0.17	0.17	0.10	0.08	0.17
6	Himachal Pradesh	1.00	0.98	0.29	0.50	0.39	0.54	0.50	0.87	0.07	0.31	0.23	0.08
7	Karnataka	0.49	0.42	0.07	0.63	0.36	0.48	0.24	0.33	0.16	0.41	0.12	0.33
8	Kerala	0.54	0.28	0.15	0.07	0.25	0.40	0.22	0.27	0.11	0.53	0.02	0.20
9	Madhya Pradesh	0.43	0.18	0.09	0.29	0.48	0.35	0.09	0.20	0.08	0.06	0.14	0.12
10	Maharashtra	0.30	0.19	0.06	0.31	0.30	0.25	0.17	0.20	0.06	0.35	0.05	0.16
11	Manipur	0.47	0.34	0.14	0.45	0.08	0.77	0.77	0.61	0.24	0.14	0.18	0.45
12	Meghalaya	0.47	0.46	0.22	0.70	1.00	0.77	0.45	0.65	0.52	0.13	0.47	0.75
13	Mizoram	0.91	0.60	0.19	1.00	0.97	0.69	0.37	0.44	0.45	0.00	0.43	0.78
14	Nagaland	0.64	0.76	0.24	0.82	0.30	1.00	0.43	0.76	0.32	0.45	0.09	0.83
15	Odisha	0.52	0.36	0.21	0.05	0.19	0.48	0.14	0.47	0.12	0.75	0.09	0.20
16	Punjab	0.34	0.18	0.12	0.16	0.27	0.29	0.10	0.26	0.13	0.50	0.26	0.22
17	Rajasthan	0.60	0.34	0.18	0.56	0.91	0.46	0.18	0.18	0.23	0.61	0.27	0.32
18	Sikkim	0.77	0.46	0.08	0.69	0.00	0.96	0.39	0.24	0.31	0.32	0.38	0.70
19	Tamil Nadu	0.40	0.24	0.13	0.28	0.64	0.33	0.27	0.26	0.21	0.33	0.12	0.19
20	Tripura	0.84	0.34	0.14	0.56	0.71	0.41	0.43	0.53	0.41	0.03	0.21	0.46
21	Uttar Pradesh	0.32	0.16	0.08	0.15	0.39	0.25	0.09	0.23	0.07	0.39	0.05	0.10
22	West Bengal	0.37	0.12	0.09	0.06	0.36	0.46	0.08	0.19	0.18	0.71	0.11	0.09
23	Delhi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Jammu & Kashmir	0.65	0.88	0.15	0.62	0.54	0.82	0.55	1.00	0.23	0.00	1.00	0.84

**Appendix 5: Normalized Health Indicator Index for Selected Indian States, 2005 and 2020**

Sl. No	States	Normalized Index 2005				Normalized Index 2020			
		Infant mortality rate	Natural growth rate	Birth rate	Death rate	Infant mortality rate	Natural growth rate	Birth rate	Death rate
1	Andhra Pradesh	0.75	0.40	0.35	0.66	0.52	0.26	0.30	0.71
2	Arunachal Pradesh	0.40	0.78	0.59	0.25	0.43	0.45	0.42	0.47
3	Delhi	0.47	0.47	0.29	0.25	0.39	0.43	0.26	0.07
4	Goa	0.06	0.00	0.00	0.83	0.09	0.00	0.00	0.56
5	Gujarat	0.75	0.70	0.66	0.68	0.55	0.69	0.65	0.49
6	Haryana	0.76	0.77	0.67	0.51	0.64	0.66	0.66	0.60
7	Himachal Pradesh	0.56	0.48	0.38	0.53	0.34	0.24	0.28	0.71
8	Jammu & Kashmir	0.60	0.54	0.36	0.29	0.34	0.42	0.31	0.24
9	Karnataka	0.62	0.51	0.46	0.66	0.41	0.36	0.40	0.73
10	Kerala	0.04	0.21	0.07	0.39	0.02	0.06	0.10	0.71
11	Madhya Pradesh	1.00	0.94	1.00	0.98	1.00	0.97	0.99	0.67
12	Maharashtra	0.43	0.40	0.32	0.58	0.39	0.27	0.25	0.53
13	Manipur	0.00	0.31	0.03	0.00	0.07	0.29	0.13	0.04
14	Meghalaya	0.56	0.80	0.76	0.66	0.61	1.00	0.93	0.38
15	Mizoram	0.21	0.68	0.53	0.37	0.00	0.54	0.35	0.00
16	Nagaland	0.07	0.42	0.15	0.00	0.09	0.26	0.08	0.02
17	Odisha	0.97	0.47	0.53	1.00	0.77	0.41	0.49	0.82
18	Punjab	0.54	0.37	0.28	0.54	0.36	0.09	0.22	1.00
19	Rajasthan	0.93	1.00	0.92	0.54	0.73	0.93	0.88	0.44
20	Sikkim	0.28	0.56	0.36	0.20	0.11	0.31	0.16	0.11
21	Tamil Nadu	0.40	0.21	0.17	0.71	0.27	0.10	0.16	0.76
22	Tripura	0.28	0.32	0.15	0.29	0.34	0.19	0.12	0.36
23	Uttar Pradesh	0.96	0.96	0.98	0.86	0.84	0.98	1.00	0.67
24	West Bengal	0.41	0.55	0.41	0.39	0.36	0.38	0.31	0.33