

HEALTH CARE INFRASTRUCTURE IN THE RURAL AREAS OF NORTH-EAST INDIA: CURRENT STATUS AND FUTURE CHALLENGES

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The role of health of the people of a nation in economic growth is universally recognised. While a well developed health care infrastructure is the key determinant of good health, the health care infrastructure in India is quite unsatisfactory, especially in rural areas, even after the National Rural Health Mission (NRHM) launched in 2005 has emphasised on strengthening the rural health care infrastructure. In this light the present study examines the current status of health care infrastructure in the rural areas of north-eastern region of India. The paper specifically looks at the progress in physical infrastructure, available health care facilities, status of existing manpower, etc. and highlights the challenges faced by the rural health care sector in the region. We found that though there has been significant improvement in the health care infrastructure, especially health centres after the implementation of NRHM in 2005, but the condition of the states has been grim in terms of other aspects of health care infrastructure, especially in terms of availability of specialists and well trained manpower, quality of health care services and so on. The results suggest for the need for rigorous State policies to strengthen the rural health care infrastructure in the region.

Key words: health care infrastructure, health policy, quality of health care services, rural health, shortfall of manpower.

JEL Classification: H51, I18, I11, I15.

INTRODUCTION

Health is considered as an important component of human development. Good health is not only a prerequisite for well-being of people; it also augments labour productivity and stimulates economic growth. The contribution of health to economic development is universally recognised. The Commission on Macroeconomics and Health opines that “health is a creator and prerequisite of development” (WHO, 2001). The National Commission on Macroeconomics and Health also remarks that “assuring a minimal level of physical and mental well-being is a critical constituent of the development process” (GOI, 2005). The World Development Report 1993 identifies four channels through which health contributes to economic growth: “it reduces production losses caused by worker illness; it permits the use of natural resources that had been totally or nearly inaccessible because of disease; it increases the enrollment of children in school and makes them better able to learn; and it frees for alternative uses resources that would otherwise have to be spent on treating illness (World Bank, 1993).

Even though India has been achieved accelerated economic growth over the last two decades, it has rated poorly in human development indicators and health indicators (Baru et al., 2010). India compares scantily with developing countries like China, Sri Lanka and Bangladesh in many health indicators such as life expectancy at birth, infant and under-five mortality levels, etc. (GOI, 2005,

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2008, 2010). In 2010, life expectancy at birth in India (65.13 years) is lower than that of China (73.27 years), Sri Lanka (74.72 years), Thailand (73.93 years), Nepal (68.39 years) and Bhutan (68.39 years). India's position is even poor compared to these countries in terms of infant mortality rate, which is 48.6 in India as against 13.7 in China, 10.8 in Sri Lanka, 11.0 in Thailand, 38.6 in Bangladesh, 40.6 in Nepal and 43.6 in Bhutan for the year 2010 (World Bank Online Database). A similar picture is discernable if we compare India's position with these developing countries in terms of other health indicators like maternal mortality rate, total fertility rate, birth rate, death rate, immunization, etc. The poor health condition is one of the major reasons for India's poor rank in the UNDP Human Development Index. Out of the 187 countries, India ranked 134th in the latest UNDP Human Development Index for the year 2011, which is below the rank of the countries like Sri Lanka (97th), China (101st) and Thailand (103rd).

A well developed health care infrastructure plays vital role in determining good health of the people of a nation. However, the health care infrastructure in India is unsatisfactory and in many respect India compares poorly with developing countries like China and Sri Lanka (GOI, 2012). Of late the National Health Policy 2002 and the National Rural Health Mission (NRHM) launched in 2005 has emphasised on strengthening rural health care infrastructure in the country. The NRHM, which is operationalised throughout the country, with special focus on 18 states,¹ is an ambitious step taken up in order to provide accessible, affordable and accountable quality health care services to rural areas. As a result of such initiatives, though India has made significant progress in health care infrastructure, but the improvement has been quite uneven across regions with large-scale inter-state variations. Further, accessibility to health care services is extremely limited to many rural areas and backward regions. While about 70 percent of India's population lives in rural areas, only 20 percent of hospital beds are located in rural areas (Bhandari and Dutta, 2007). In view of the above issues, the present paper seeks to examine the status of health care infrastructure in the rural areas of the north-eastern region (NER) of India, which is one of the most backward regions of the country and where about 81.6 percent of population (Census 2011) lives in the rural areas.²

At this juncture it is worthwhile to point out that the health care infrastructure system is divided into two categories viz. educational infrastructure and service infrastructure. The educational infrastructure include educational institutes, students in graduate, post graduate, degree/diploma courses, etc., whereas service infrastructure include health centres, facilities available in the health centres, manpower in the health centres, quality of health care services, and so on. In this study we focus only on the health care service infrastructure. We specifically look at the available physical infrastructure, facilities available in health centres, status of existing manpower and so on, in the rural areas across the north-eastern states. The paper also highlights the challenges faced by the rural health care sector in these states.

The rest of the paper is organised in the following sections. The next section briefly outlines the existing structure of rural health care system in India, following which we discuss the data source used in this paper. The following section briefly reviews the health situation in the north-eastern states of India. In the next section we examine the status of rural health care infrastructure across the north-eastern states by looking at the progress in health centres, available health care facilities and status of manpower in health centres. The penultimate section highlights the challenges faced

by the rural health care sector in the region. The last section summarises the findings and discusses policy implications.

Rural Health Care System In India

The rural health care infrastructure in India has been developed as a three tier system with Sub Centre, Primary Health Centre (PHC) and Community Health Centre (CHC) being the three pillars. The Sub Centre is the most peripheral and first contact point between the primary health care system and the community, whereas the PHC is the first contact point between village community and the medical officer, and CHC is the referral centre for four PHCs, which also provides facilities for obstetric care and specialist consultations. The growth of these rural health care institutions, especially growth of the Sub Centres is a prerequisite for the overall progress of the entire system. Along with the progress in health centres, other health care facilities, availability of manpower and quality of health care services are other important components of rural health care infrastructure.

The establishment of these health centres is based on certain population norm, which further is different for Plain areas and Hilly/Tribal/Desert areas. The population norm in Plain areas is 5000 per Sub Centre, 30000 per PHC and 120000 per CHC; whereas that for Hilly/Tribal/Desert areas is 3000 per Sub Centres, 20000 per PHC and 80000 per CHC. Further, there will be six Sub Centres per PHC and four PHCs per CHC. The population norm for a female health worker at Sub Centre & PHC and a male health worker at Sub Centre are fixed at 5000 for Plain areas and 3000 for Hilly/Tribal/Desert areas (GOI, 2011b).

DATA SOURCE

This paper is solely based on secondary data. Data has been collected from various sources such as the Bulletin on Rural Health Statistics 2011 and National Health Profile 2011 published by the Ministry of Health and Family Welfare, Government of India; Census 2011 published by Registrar General, Government of India; and the World Bank Online Database (accessed from <http://data.worldbank.org/indicator>).

HEALTH STATUS IN NORTH-EAST INDIA

Before looking at the status of rural health care infrastructure, let us have a glance at the current health status in the region. There is a wide range of indicators to measure the health status of people. We mainly look at three key health indicators namely crude birth rate (CBR), crude death rate (CDR) and infant mortality rate (IMR). Table 1 reports these indicators separately for rural and urban areas across the north-eastern states vis-à-vis the country for the year 2011. From the table it is apparent that the condition of all the north-eastern states except Assam and Meghalaya is better than the national average in terms of all the three indicators in both the rural and urban areas. In particular, Manipur, Nagaland and Sikkim are well ahead of the national average and the other north-eastern states in all the three indicators. For Assam and Meghalaya, on the one hand, the condition is better than the national average in case of CBR and CDR in the urban areas, but their condition is below the national average and other north-eastern states in the rural areas for both the years. On the other hand, in case of IMR the condition of both the states is below the national average as well as other north-eastern states in both the rural and urban areas. Another fact evident from the table is that in all the north-eastern states and even for the country as a whole the health condition in the rural areas is pitiable compared to the urban areas. In view of this rural health care should be an area of utmost priority of any government social sector policy, especially health policy.

Table 1 Birth Rates, Death Rates and Infant Mortality Rates in the North-East India in 2011

States	Crude Birth Rate			Crude Death Rate			Infant Mortality Rate		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
Arunachal Pradesh	19.8	21.4	14.2	5.8	6.8	2.5	32	36	10
Assam	22.8	24.0	15.5	8.0	8.4	5.6	55	58	34
Manipur	14.4	14.2	15.0	4.1	4.1	4.2	11	11	12
Meghalaya	24.1	26.2	14.6	7.8	8.3	5.5	52	54	38
Mizoram	16.6	20.6	12.6	4.4	5.4	3.4	34	43	19
Nagaland	16.1	16.3	15.5	3.3	3.4	2.9	21	21	20
Sikkim	17.6	17.7	16.6	5.6	5.9	3.5	26	28	17
Tripura	14.3	15.1	11.0	5.0	4.9	5.4	29	31	19
All India	21.8	23.3	17.6	7.1	7.6	5.7	44	48	29

Source: Bulletin on Rural Health Statistics in India, 2011.

STATUS OF RURAL HEALTH INFRASTRUCTURE IN NORTH-EAST INDIA

Progress in Health Centres

In this section we look at the progress in the Sub Centres, PHCs and CHCs between 2005 (the year when NRHM was implemented) and 2011 (the latest year for which data is available). Table 2 reports the number of Sub Centres, PHCs and CHCs existing in 2011 as compared to those existing in 2005. It reveals that for the country as a whole the number of Sub Centres has increased from 146026 to 148124 between 2005 and 2011, while number of PHCs has increased from 23236 to 23887 and CHCs from 3346 to 4809 during the same period. The NER as a whole accounted for 5.31 percent of Sub Centres, 4.77 percent of PHCs and 6.43 percent of CHCs of the country in 2005. By 2011 the share of NER in Sub Centres and CHCs has declined to 4.90 percent and 5.07 percent respectively, while share in PHCs has increased to 6.32 percent. Looking at the absolute numbers, the number of Sub Centres in the NER has declined from 7755 to 7259 between 2005 and 2011. The decline is mainly due to the significant decline in the Sub Centres in Assam and Arunachal Pradesh, whereas number of Sub Centres has increased in Tripura and for the rest of the north-eastern states it remained more or less same. The decline in Sub Centres in the region is mainly because many of the Sub Centres have been upgraded to PHCs, which is evident from the fact that the number of PHCs in the region has increased from 1109 to 1510 during 2005 to 2011, and not many new Sub Centres has been established during this period. The story is same in all the states but Mizoram and Sikkim, where the number of PHCs has remained same. The number of CHCs has increased from 215 to 244 for the entire NER during 2005 to 2011. In case of CHCs, all the states but Sikkim has witnessed either progress or has remained stagnant during this period. At the abstract it can be said that except significant progress made by Assam, Nagaland and Arunachal Pradesh in PCHs and by Tripura in Sub Centres, the remaining states have not undertaken much initiative in regard of establishment of health centres even after the implementation of NRHM in 2005. In order to achieve the main goals of the NRHM mission, there is need for establishment of more health centres, especially Sub Centres and the existing health centres need to be upgraded to the next level.

Table 2 Progress in Health Centres in the North-East India

States	March 2005			March 2011		
	Sub Centre *	PHCs #	CHCs	Sub Centre *	PHCs #	CHCs
Arunachal Pradesh	379 (4.5)	85 (2.7)	31	286 (3.0)	97 (2.0)	48
Assam	5109 (8.4)	610 (6.1)	100	4604 (4.9)	938 (8.7)	108
Manipur	420 (5.8)	72 (4.5)	16	420 (5.3)	80 (5.0)	16
Meghalaya	401 (4.0)	101 (4.2)	24	405 (3.7)	109 (3.8)	29
Mizoram	366 (6.4)	57 (6.3)	9	370 (6.5)	57 (6.3)	9
Nagaland	394 (4.5)	87 (4.1)	21	396 (3.1)	126 (6.0)	21
Sikkim	147 (6.1)	24 (6.0)	4	146 (6.1)	24 (12.0)	2
Tripura	539 (7.4)	73 (7.3)	10	632 (8.0)	79 (7.2)	11
NER	7755 (7.0)	1109 (5.2)	215	7259 (4.8)	1510 (6.2)	244
All India	146026 (6.3)	23236 (7.0)	3346	148124 (6.2)	23887 (5.0)	4809

Notes: * Figures within the parenthesis represent number of Sub Centres per PHC.

Figures within the parenthesis represent number of PHCs per CHC.

Source: Same as Table 1.

In view of the fulfillment of the norms of six Sub Centres per PHC, all the north-eastern states but Nagaland have fulfilled the norms in 2005 (Table 2). However, in 2011 except Mizoram, Sikkim and Tripura all other states have failed to fulfill the norms. Similarly, all the states except Arunachal Pradesh have fulfilled the norms of four PHCs per CHC in 2005, while in 2011 Meghalaya joined with Arunachal Pradesh in the failure list. Thus, it can be inferred that the NER is not able to make any significant progress in case of Sub Centre, and in fact, the norms have been deteriorated in 2011 compared to 2005.

Table 3 depicts the current status of health centres in the rural areas of north-eastern states *vis-à-vis* the country as a whole in terms the density of health centres per Lakh rural population (Census 2011-provisional) for 2005 and 2011. It is discernable from the table that in 2005, the density of Sub Centres in all the north-eastern states but Meghalaya is higher than the national average (17.53 Sub Centres per Lakh rural population), whereas all the states except Assam and Tripura have higher density of PHCs and CHCs compared to national average (2.79 PHCs and 0.40 CHCs per Lakh rural population). In 2011, all the states except Assam and Meghalaya have higher density of Sub Centres than the national average (17.78 Sub Centres per Lakh rural population), all the states have higher density of PHCs than the national average (2.87 PHCs per Lakh rural population) and all the states except Assam, Sikkim and Tripura have higher density of CHCs than the national average (0.58 CHCs per Lakh rural population). Now, comparing the values of 2011 with that of 2005 it is evident that by 2011 the density of Sub Centres has declined in Arunachal Pradesh, Assam and Sikkim, while it remained more or less same in Manipur and in the remaining states density has increased. On the other hand, density of PHCs has increased in all the states except Mizoram and Sikkim, where it has remained more or less same in 2011 as compared to 2005. Similarly, density of CHCs has increased Arunachal Pradesh, Assam and Meghalaya during the same period, whereas it has remained more or less same in the remaining north-eastern states except Sikkim, where it has declined.

Table 3 Number of Health Centres per Lakh Rural Population (Census 2011-Provisional)

States	March 2005			March 2011		
	Sub Centres	PHCs	CHCs	Sub Centres	PHCs	CHCs
Arunachal Pradesh	35.45	7.95	2.90	26.75	9.07	4.49
Assam	19.08	2.28	0.37	17.19	3.50	0.40
Manipur	22.11	3.79	0.84	22.11	4.21	0.84
Meghalaya	16.93	4.26	1.01	17.10	4.60	1.22
Mizoram	69.18	10.77	1.70	69.94	10.77	1.70
Nagaland	28.01	6.18	1.49	28.15	8.96	1.49
Sikkim	32.24	5.26	0.88	32.02	5.26	0.44
Tripura	19.89	2.69	0.37	23.32	2.92	0.41
All India	17.53	2.79	0.40	17.78	2.87	0.58

Source: Same as Table 1.

Table 4 shows the average rural population (Census 2011-provisional) covered by a Sub Centre, PHC and CHC as on March 2011. As the table reveals the conditions of all the north-eastern states except Assam and Meghalaya are better than the national average in case of Sub Centres, whereas in case of PHCs all the states are in better position than the national average, and in case of CHCs all the states but Assam, Sikkim and Tripura are in better position than the national average. While for the country as a whole the existing population norms have not been fulfilled in all the three categories, in the NER all the states but Meghalaya are yet to satisfy the population norms in case of Sub Centres, whereas only Arunachal Pradesh, Mizoram, Nagaland and Sikkim have satisfied the norms in case of PHCs; and Arunachal Pradesh, Mizoram and Nagaland have satisfied the norms in case of CHCs. In case of CHCs Assam, Sikkim and Tripura are far-away from the existing norms. Therefore, much more intensive efforts are required in these states in order to increase the number of these health centres so that the existing population norms can be achieved.

Table 4 Average Rural Population (Census 2011-Provisional) covered by a Health Centre (as on March, 2011)

States	Sub Centre	PHC	CHC
Arunachal Pradesh	3738	11022	22274
Assam	5817	28551	247968
Manipur	4523	23745	118727
Meghalaya	5849	21734	81689
Mizoram	1430	9281	58782
Nagaland	3553	11166	66993
Sikkim	3123	18998	227981
Tripura	4288	34304	246368
All India	5624	34876	173235

Source: Same as Table 1.

Facilities Available in Health Centres

Along with the progress in health centres, other facilities available in these centres are another important dimension of the health care system. However, the condition of the north-eastern states in this respect has been grim, except Mizoram whose condition is better than the national average in terms of many indicators. As it is obvious from Table 5 the percentage of Sub Centres with quarters for Auxiliary Nurse Midwife (ANM) is as low as 7.8 percent in Tripura, 17.2 percent in Nagaland, 40 percent in Arunachal Pradesh, whereas not a single Sub Centre in Manipur has ANM Quarter. In this respect the condition of Meghalaya, Mizoram and Sikkim are better than the national average. The percentage of Sub Centres without electricity facility is highest in Assam (67.6 percent) followed by Meghalaya (65.4 percent), Manipur (63.8 percent), Nagaland (49.2) and Tripura (48.1 percent). The condition of all the states are pitiable than the national average in case of percentage of Sub Centres without all weather motorable road connectivity. All the states except Manipur have a better condition compared to the national average in terms of PHCs with labour room. In case of PHCs with operation theatre all the states except Mizoram and Tripura have an abysmal condition than the national average. Similarly, the conditional of all the states but Meghalaya and Sikkim are pitiable than the national average in case availability of water supply in PHCs.

Table 5 Facilities available in Sub Centres and PHCs (as on March 2011)

States	Percentage of Sub Centres				Percentage of PHCs				
	With ANM Quarter	With ANM living in SC Quarter	Without Electric Supply	Without all time road connectivity	With Labour Room	With Operation Theatre	Without Water Supply	With Phone	With Computer
Arunachal Pradesh	39.9	100.0	22.0	33.2	69.1	11.3	29.9	13.4	0.0
Assam	55.2	19.9	67.6	15.0	73.1	3.5	41.8	47.7	59.9
Manipur	0.0	0.0	63.8	27.4	47.5	0.0	68.8	7.5	91.3
Meghalaya	99.0	42.6	65.4	18.0	100.0	0.0	11.9	16.5	78.0
Mizoram	94.6	100.0	0.0	18.6	100.0	100.0	100.0	100.0	78.9
Nagaland	17.2	97.1	49.2	33.3	69.8	31.0	15.9	93.7	19.0
Sikkim	95.2	20.9	2.7	17.1	100.0	91.7	0.0	95.8	91.7
Tripura	7.8	32.7	48.1	31.3	75.9	5.1	15.2	36.7	72.2
All India	55.0	60.8	24.5	6.9	65.7	38.4	12.5	52.2	46.4

Source: Same as Table 1.

Table 6 shows the facilities available in CHCs as on March 2011. It is obvious that no CHCs in any of the north-eastern states except in Assam have all four specialists (surgeons, obstetricians & gynecologists, physicians and pediatricians). While no CHCs in Sikkim has quarter for specialist doctors, the percentage of CHCs with quarters for specialist doctors is as low as 6.25 percent in Arunachal Pradesh, 11.11 percent in Mizoram, 13.79 percent in Meghalaya and 27.27 percent in Tripura, as against the national average of 56.29 percent. Contrarily, though all the CHCs in Manipur have quarter for specialist doctors, but in none of the CHCs the specialist doctors live in quarters.

Surprisingly, although NRHM has focused heavily on child birth and pre-natal care, none of the CHCs in Arunachal Pradesh, Nagaland, Sikkim and Tripura have stabilisation units for new born and except Assam the situation in the other states are pitiable. In case of percentage of CHCs with new born care corner facility, Arunachal Pradesh, Meghalaya and Tripura are below the national average (59.97 percent), whereas all the CHCs in Assam, Mizoram, Nagaland and Sikkim have new born care corner facility. In case of percentage of CHCs with X-ray machine, Nagaland, Arunachal Pradesh and Assam are below the national average. While for the country as a whole only 18.38 percent of CHCs have been functioning as per Indian Public Health Standards (IPHS) norms, no CHCs in any of the north-eastern states except Meghalaya and Tripura have been functioning as per the IPHS norms.

Table 6 Facilities available in CHCs (as on March 2011)

States	Percentage of CHCs with							
	All four Specialities	Quarters for Specialist Doctors	Specialist Doctors living in Quarters	Functional Operation Theatre	Functional Stabilisation Units for New Born	New Born Care Corner	Functional X-ray Machine	Functioning as per IPHS Norms
Arunachal Pradesh	0.00	6.25	6.25	77.08	0.00	16.67	27.08	0.00
Assam	25.93	NA	NA	93.52	77.78	100.00	55.56	NA
Manipur	0.00	100.00	0.00	43.75	NA	75.00	75.00	0.00
Meghalaya	0.00	13.79	13.79	20.69	10.34	41.38	62.07	3.45
Mizoram	0.00	11.11	11.11	100.00	22.22	100.00	100.00	0.00
Nagaland	0.00	90.48	90.48	100.00	0.00	100.00	14.29	0.00
Sikkim	0.00	0.00	0.00	100.00	0.00	100.00	100.00	0.00
Tripura	0.00	27.27	0.00	27.27	0.00	45.45	72.73	9.09
All India	13.33	56.29	41.76	87.13	19.51	59.97	58.45	18.38

Notes: NA- not available.

Source: Same as Table 1.

Table 7 reports the number of beds in rural government hospitals and average rural population served per government hospital bed. In about 587 rural government hospitals in the NER, which is about 8.0 percent of total rural government hospitals in the country, there are about 9285 beds, which is about 5.77 percent of total rural government hospital beds in the country. In terms of population (Census 2011-provisional) served per rural government hospital all the north-eastern states except Assam and Tripura are well ahead of the national average of 113392 persons per rural government hospital. On the other hand, except Assam all the other north-eastern states are in better condition than the national average in terms of population (Census 2011-provisional) served per government hospital bed in the rural areas.

Table 7 Average Rural Population (Census 2011-Provisional) served by Government Hospital Bed

States	No. of Rural Govt. Hospitals	No. of Beds in Rural Govt. Hospitals	Average Rural Population (2011) Served per Govt. Hospital	Average Rural Population (2011) Served per Govt. Hospital Bed	Reference Period
Arunachal Pradesh	146 (1.99)	1356 (0.84)	7323	788	01.01.2009
Assam	108 (1.47)	3240 (2.01)	247968	8266	01.01.2010
Manipur	217 (2.95)	664 (0.41)	8754	2861	01.01.2012
Meghalaya	29 (0.39)	870 (0.54)	81689	2723	01.01.2011
Mizoram	20 (0.27)	770 (0.48)	26452	687	01.01.2012
Nagaland	23 (0.31)	705 (0.44)	61168	1996	01.01.2010
Sikkim	30 (0.41)	730 (0.45)	15199	625	01.01.2012
Tripura	14 (0.19)	950 (0.59)	193575	2853	01.01.2011
All India	7347	160862	113392	5179	01.01.2012

Notes: Figures within the parenthesis represent percentage of all-India total.

Source: National Health Profile, 2011.

Human Resource in Health Centers

The availability of well trained human resources is one of the important prerequisite for the efficient functioning of the health centres. Lack of human resources is as responsible for inadequate provision of health care services as lack of physical infrastructure, especially in rural areas (GOI, 2011a). However, the condition of the north-eastern states in case of availability of manpower is mixed. From Table 8 it is evident that more than 75 percent PHCs in Meghalaya and Mizoram, and 69 percent PHCs in Nagaland have been functioning with only one doctor, while for the other states the percentage of PHCs with only one doctor is less than the national average (62.18 percent). Only Manipur, Tripura and Assam are in better position in case of percentage of PHCs functioning with more than four doctors compared to the national average (6.89 percent). Interestingly, while the NRHM mission emphasises on integrating AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy) in the health care system, no PHCs in Mizoram, Nagaland and Sikkim have AYUSH facility, and only Manipur, Tripura and Meghalaya have more than national average (45.96 percent) of PHCs having AYUSH facility. Further, although the percentage of PHCs having lady doctor is higher than the national average (20.86 percent) in all the states except Arunachal Pradesh and Nagaland, but except for Sikkim and Manipur the figures are not satisfactory for the other states. The lack of lady doctor in the health centres has led to low turnout of female patients in these centres as they may not feel comfortable to discuss their certain health issues with male doctor. In view of this, urgent steps need to be undertaken by the government in order to increase the number of lady doctors in the health centers.

Table 8 Status of Manpower in PHCs (as on March, 2011)

States	Percentage of PHCs Functioning with					
	4+ doctors	3 doctors	2 doctors	1 doctor	Lady doctor	AYUSH
Arunachal Pradesh	2.06	4.12	34.02	49.48	20.62	15.46
Assam	9.17	12.58	46.16	32.09	36.99	40.30
Manipur	47.50	45.00	7.50	0.00	60.00	90.00
Meghalaya	1.83	0.00	13.76	84.40	29.36	49.54
Mizoram	0.00	0.00	5.26	77.19	28.07	0.00
Nagaland	0.00	0.00	16.67	69.05	12.70	0.00
Sikkim	0.00	0.00	58.33	41.67	75.00	0.00
Tripura	16.46	13.92	39.24	30.38	36.71	67.09
All India	3.13	3.76	25.89	62.18	20.86	45.96

Source: Same as Table 1.

Table 9 and 10 depict the current status of manpower in rural health centres in terms of density of manpower and average rural population covered by manpower on March 2011. As it is evident from Table 9 the density of doctors in all the north-eastern states is above the national average. But, in case of specialists the density in all the states except Nagaland is far below the national average. In fact, none of the CHCs in Sikkim and Tripura have a specialist doctor. The density of total paramedical staff for the country as a whole is 48.02 per Lakh rural population, and all the north-eastern states have more than national average density of paramedical staff.³ The density of total paramedical staff is as high as 250.08 per Lakh rural population in Mizoram followed by 131.71 in Nagaland, 117.33 in Sikkim, 104.23 in Manipur, 99.79 in Arunachal Pradesh, 75.13 in Meghalaya, 63.25 in Assam and 49.04 in Tripura. Looking at the different cadres of paramedical staff separately it is apparent from Table 9 that in case of density of nursing staff, pharmacists, female health worker and male health worker, the north-eastern states are well above the national average; while in case of density of radiographer, female health assistant and male health assistant we can see a mixed situation of the states in comparison to the national average. Considering all the manpower in the rural health centres together the density of manpower in all the north-eastern states are above the all India average.⁴ It is to note that there is no norm for density of manpower in rural health centres under the NRHM framework. However, if we consider a threshold level of 250 manpower per Lakh rural population,⁵ then there is acute shortage of manpower in the rural health centres in all the north-eastern states and the same is true for the country as a whole also.

Table 10 reports the average rural population (Census 2011-provisional) covered by manpower in rural health centres as on March 2011. It is obvious that all the north-eastern states except few are above the all India average in terms of average population covered by a doctor, a pharmacist, a nurse, a female health worker and a male health worker; whereas the position of the states are mixed in terms of average population covered by a female health assistant, male health assistant and radiographers. On the other hand, in terms of population covered by a specialist, all the states but Nagaland are far below the all India average.

Table 9 Average Manpower per Lakh of Rural Population (Census 2011-Provisional) (as on March 2011)

States	Doctors * at PHCs	Specialists # at CHCs	Radiographers at CHCs	Pharmacists at PHCs & CHCs	Nursing Staff at PHCs & CHCs	Laboratory Technicians at PHCs & CHCs	Health Worker (F)/ ANM at SCs & PHCs	Health Worker (M) at SCs	Health Assistant (F)/LHV at PHCs	Health Assistant (M) at PHCs
Arunachal Pradesh	8.60	0.09	0.84	5.24	27.40	8.23	36.94	13.84	NA	7.30
Assam	5.81	0.81	0.23	4.71	10.62	4.52	32.57	8.91	1.69	NA
Manipur	10.11	0.21	0.68	7.11	30.22	6.95	34.80	16.85	3.79	3.84
Meghalaya	4.39	0.38	0.93	5.99	17.48	5.66	33.22	5.61	3.33	2.91
Mizoram	6.99	0.38	1.13	6.24	49.52	13.42	117.01	58.79	2.27	1.70
Nagaland	7.18	2.42	0.07	7.96	21.47	7.39	64.47	28.15	1.14	1.07
Sikkim	8.55	0.00	0.22	2.19	7.02	7.02	64.04	30.05	3.95	2.85
Tripura	4.39	0.00	0.26	4.28	14.50	2.32	16.24	10.52	0.26	0.66
All India	3.16	0.83	0.27	2.96	7.84	1.95	24.95	6.27	1.91	1.88

Notes: * Allopathic Doctors. # Specialists includes Surgeons, Obstetricians & Gynecologists, Physicians and Pediatricians. NA-indicates Not Available.

Source: Author's estimation using data from Bulletin on Rural Health Statistics in India, 2011 and Population Census 2011.

Table 10 Average Rural Population (Census 2011-Provisional) covered by Manpower in Rural Health Centres (as on March 2011)

States	Doctors * at PHCs	Specialists # at CHCs	Radiographers at CHCs	Pharmacists at PHCs & CHCs	Nursing Staff at PHCs & CHCs	Laboratory Technicians at PHCs & CHCs	Health Worker (F)/ ANM at SCs & PHCs	Health Worker (M) at SCs	Health Assistant (F)/LHV at PHCs	Health Assistant (M) at PHCs
Arunachal Pradesh	11621	1069165	118796	19092	3649	12150	2707	7224	NA	13707
Assam	17200	123984	439025	21221	9416	22114	3070	11224	59249	NA
Manipur	9894	474906	146125	14071	3309	14391	2874	5936	26384	26022
Meghalaya	22779	263219	107681	16683	5722	17679	3010	17812	29987	34333
Mizoram	14298	264519	88173	16031	2019	7451	855	1701	44086	58782
Nagaland	13929	41378	1406861	12561	4658	13528	1551	3553	87929	93791
Sikkim	11691	0	455962	45596	14249	14249	1562	3328	25331	35074
Tripura	22774	0	387150	23363	6896	43017	6159	9509	387150	150558
All India	31641	120128	375096	33768	12749	51400	4008	15955	52369	53328

Notes: * Allopathic Doctors. # Specialists includes Surgeons, Obstetricians & Gynecologists, Physicians and Pediatricians. NA indicates Not Available.

Source: Author's estimation using data from Bulletin on Rural Health Statistics in India, 2011 and Population Census 2011.

While there are no population coverage norms for other health workers under the NRHM framework, the population coverage norms for a female health worker at Sub Centre & PHC and a male health worker at Sub Centre have been fixed at 5000 for Plain areas and 3000 for Hilly/Tribal/Desert areas. From Table 10 it is obvious that all the states except Assam, Meghalaya and Tripura have fulfilled the population coverage norms for the female health worker at Sub Centre & PHC, and these states are well ahead of the national average of population coverage by a female health worker. However, in case of the population coverage by a male health worker at Sub Centres, all the states except Mizoram are yet to satisfy the norms. Yet all the states except Meghalaya are well ahead of the national average of population coverage by a male health worker at Sub Centres. Further, in respect of the national norms of six male health workers at Sub Centres per male health assistant at PHCs, only Mizoram, Nagaland, Sikkim and Tripura have fulfilled the norms.⁶ On the other hand, in respect of the national norms of six female health workers at Sub Centres & PHCs per female health assistant at PHCs, all the states but Arunachal Pradesh have fulfilled the norms.⁷

CHALLENGES FACED BY RURAL HEALTH CARE SECTOR IN NORTH-EAST INDIA

Despite a steady progress in rural health care infrastructure after the implementation of NRHM in 2005, the rural health care sector in the NER has been facing many challenges over the years. In this section we will highlight some of these challenges, especially shortage of health centres and manpower, quality of rural health care services and regional inequality in the provision of rural health care infrastructure.

Shortfall in Health Centres and Manpower

One of the major problems confronting the rural health care sector of the NER is shortage of health centres and manpower. Table 11 depicts the shortfall of rural health centres and manpower based on provisional rural population from Census, 2011 as on March 2011.⁸ It is evident from the table that while some states have surplus in certain cases, others have been suffering shortages in other cases. For the country as a whole there is shortage of 20 percent of Sub centres, 24 percent of PHCs and 38 percent of CHCs, whereas all the north-eastern states except Mizoram have suffered acute shortage of one or the other health centres. The major concern is Assam, Sikkim and Tripura, which have suffered more than 50 percent shortages of CHCs. Looking at the availability of manpower; it is evident that there is shortfall of doctors in Arunachal Pradesh, Meghalaya, Mizoram and Nagaland. More seriously, all the states have severe shortage of specialist doctors and radiographers in CHCs. There is shortfall of nursing staff in the PHCs and CHCs of Arunachal Pradesh and Sikkim, whereas Arunachal Pradesh, Mizoram, Nagaland and Sikkim have shortages of pharmacists in PHCs and CHCs. While all the states except Tripura have surplus female health worker, all the states have shortage of male health worker, male health assistant and female health assistant. The large shortfall in male health workers and health assistants has resulted in poor male participation in family welfare and other health programmes, and overburdening of the female health workers/ANMs, which further resulted in underperformance of these workers.

What the shortage of manpower implies is that although physical infrastructure is largely present in many states, the absence of manpower results the whole existing facility worthless. For example, Mizoram has surplus of all the three categories of health centres, but the number of doctors is short of the target by 35.1 percent, specialist doctors are short by 94.4 percent, radiographers are short by 33.3 percent, pharmacists are short by 50 percent and female health assistants and male health assistants are short by 79 percent and 84.2 percent respectively. Similarly, Nagaland has surplus of PHCs and CHCs and only 13.4 percent shortfall of Sub Centres, but it has shortfall of 19.8 percent of doctors, 59.5 percent of specialists, 95.2 percent of radiographers, 23.8 percent of pharmacists, 29.3 percent of laboratory technicians, 87.3 percent of female health assistants and 88.1 percent of

male health assistants. Similar explanation can be given for the other states also. Thus, the shortfall of health centres and manpower across the north-eastern states tells a sorry state of affairs of the rural health care sector in the region. Therefore, urgent actions need to be undertaken to eliminate the shortages in all fronts of the rural health care infrastructure in the region.

Table 11 Shortfall of Rural Health Centres and Manpower based on Census 2011 Population (as on March 2011)

	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	All India
Sub Centres	27 (8.63)	1237 (21.18)	72 (14.63)	353 (46.57)	+	61 (13.35)	+	41 (6.09)	35762 (20.06)
Primary Health Centres (PHCs)	+	15 (1.57)	+	5 (4.39)	+	+	+	27 (25.47)	7048 (24.13)
Community Health Centres (CHCs)	+	130 (54.62)	3 (15.79)	+	+	+	2 (50.00)	15 (57.69)	2766 (37.92)
Health Worker (Female)/ANM at Sub-Centres and PHCs	+	+	+	+	+	+	+	271 (38.12)	6555 (3.81)
Health Worker (Male) at Sub-Centres	138 (48.25)	2218 (48.18)	100 (23.81)	272 (67.16)	59 (15.95)	0 (0.00)	9 (6.16)	347 (54.91)	95909 (64.75)
Health Assistant (Female)/LHV at PHCs	NA	486 (51.81)	8 (10.00)	30 (27.52)	45 (78.95)	110 (87.30)	6 (25.00)	72 (91.14)	9036 (37.83)
Health Assistant (Male) at PHCs	19 (19.59)	#	7 (8.75)	40 (36.70)	48 (84.21)	111 (88.10)	11 (45.83)	61 (77.22)	9935 (41.59)
Doctors at PHCs	5 (5.15)	+	+	5 (4.59)	20 (35.09)	25 (19.84)	+	+	2866 (12.00)
Total Specialists at HCs	191 (99.48)	216 (50.00)	60 (93.75)	107 (92.24)	34 (94.44)	50 (59.52)	8 (100.0)	44 (100.0)	12301 (63.95)
Radiographers at HCs	39 (81.25)	47 (43.52)	3 (18.75)	7 (24.14)	3 (33.33)	20 (95.24)	1 (50.00)	4 (36.36)	2593 (53.92)
Pharmacists at PHCs and CHCs	89 (61.38)	+	+	+	33 (50.00)	35 (23.81)	16 (61.54)	+	6444 (22.46)
Lab Technician at PHCs and CHCs	57 (39.31)	+	+	4 (2.90)	+	43 (29.25)	+	27 (30.00)	13611 (47.43)
Nursing Staff at PHCs and CHCs	140 (32.33)	+	+	+	+	+	6 (15.79)	+	13262 (23.04)

Notes: + indicates surplus; # indicates no male health assistant is in-position; NA indicates Not Available.

Figures in the parentheses represent percentage shortfall of the requirement.

Source: Same as Table 1.

Quality of Rural Health Care Services

The quality of rural health care services in the NER has been remained an issue of concern over the year. Even after the NRHM mission has sought to strengthen the rural health care infrastructure in terms of Sub-Centres, PHCs and CHCs since its implementation in 2005, there has been, as we have seen in the previous section, acute shortage of one or the other health centres in all the north-eastern states except Mizoram. Further, as many as 47 percent Sub Centres in Tripura, 41 percent

in Assam and 25 percent in Manipur don't have government building and are located either in rented buildings or rent free Panchayats/Voluntary Society buildings (Table 12). There is also acute shortage of well trained manpower in the health centres across the states. As we have seen in the preceding section, all the states have shortage of male health worker and health assistants (both male and female). Similarly, severe shortage of specialist doctors and radiographers in CHCs is apparent across all the states. Adding to this, the health centres in many states are not well equipped with essential facilities and equipments such as quarters for ANM workers, labour rooms, operation theatres, stabilisation units and care corners for new born babies, electricity supply, water supply, telephone connectivity, X-ray machine, and so on. In the absence of well trained manpower and essential facilities & equipments, the existing health centres and facilities therein are under utilized, leading to closure of those facilities. Additionally, there are reports about large scale absenteeism and low level of participation in providing health care services among the existing health workers (Hammer et al., 2007 and Bhandari and Dutta, 2007). All these problems take their toll on the performance of health centres and the quality health care services provided by these centres.

Table 12 Percentage of Sub Centres, PHCs and CHCs Functioning in Government Buildings
(as on March 2011)

States	Sub Centre	PHCs	CHCs
Arunachal Pradesh	100.00	100.00	100.00
Assam	59.14	94.67	100.00
Manipur	75.24	100.00	100.00
Meghalaya	98.02	100.00	100.00
Mizoram	100.00	100.00	100.00
Nagaland	84.09	91.27	100.00
Sikkim	94.52	100.00	100.00
Tripura	53.01	98.73	100.00
All India	62.70	79.94	95.28

Source: Same as Table 1.

Regional Inequality in Health Care Infrastructure

Another problem faced by the rural health care sector of the NER is regional inequality. The physical infrastructure and manpower available are unevenly spread across the states. As evident from Table 11, Mizoram has surplus of all the three categories of health centres, Arunachal Pradesh and Nagaland have surplus of PHCs and CHCs, and Sikkim has surplus of Sub Centres, whereas Assam and Tripura have shortfall of all the three categories of health centres, Meghalaya has shortfall of Sub Centres and PHCs, and Manipur has shortfall of Sub Centres and CHCs. The distribution of existing manpower in the health centres is also highly skewed across the states, which is discernable from Table 11. Further, it is apparent from Table 13 that a significant portion of the overall shortages in health centers and manpower across the states is actually in the predominantly tribal areas. It is not only the states predominated by tribal population (Arunachal Pradesh, Meghalaya, Mizoram and Nagaland), where almost 100 percent of total shortages in all types of manpower is actually in the tribal areas; even in the non-tribal states also a sizable portion of overall shortages in health centres and manpower are in the tribal dominated areas. For example, in Manipur about 80.6 percent shortage in Sub Centres, 166.7 percent shortage in CHCs, 30 shortage in male health worker, 100 percent shortage in health assistant (both male and female), 33.3 percent shortage in total specialists are in the tribal dominated areas. Similar explanations can be found for the other states also. Thus, it can be said that the poor performance in certain regions (here the tribal areas) ultimately results in poor performance of the state/region. Therefore, efforts need to be made for the development of the lagging regions (the tribal areas) through creation of fronts of health care infrastructure and deployment of more health workers in order to overcome the problem of regional inequality.

Table 13 Shortfall of Health Centres and Manpower in the Tribal Areas of North-East India based on Census 2011 Population (as on March 2011)

	Arunachal Pradesh		Assam		Manipur		Meghalaya		Mizoram		Nagaland		Sikkim		Tripura		
	All	TA	All	TA	All	TA	All	TA	All	TA	All	TA	All	TA	All	TA	
Sub Centres	27	+	1237	370 (29.9)	72	58 (80.6)	353	307 (86.9)	+	+	61	43 (70.5)	+	+	41	55 (134.1)	
Primary Health Centres (PHCs)	+	+	15	+	+	+	5	+	+	+	+	+	+	+	27	17 (62.9)	
Community Health Centres (CHCs)	+	+	130	21 (16.2)	3	5 (166.7)	+	+	+	+	+	+	+	2	15 (50.0)	1 (6.7)	
Health Worker (Female)/ANM at Sub-Centres and PHCs	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Health Worker (Male) at Sub-Centres	138	(100.0)	2218	624 (28.1)	100	30 (30.0)	272	272 (100.0)	59	59 (100.0)	0	0	0	9	347	89 (25.6)	
Health Assistant (Female)/LHV at PHCs	NA	97	486	116 (23.9)	8	8 (100.0)	30	30 (100.0)	45	45 (100.0)	110	110 (100.0)	6	3 (50.0)	72	30 (41.7)	
Health Assistant (Male) at PHCs	19	(100.0)	#	#	7	7 (100.0)	40	40 (100.0)	48	48 (100.0)	111	111 (100.0)	11	11 (100.0)	61	30 (49.2)	
Doctors at PHCs	5	(100.0)	+	+	+	+	5	5 (100.0)	20	20 (100.0)	25	25 (100.0)	+	+	+	+	
Total Specialists at CHCs	191	(100.0)	216	39 (18.1)	60	20 (33.3)	107	107 (100.0)	34	34 (100.0)	50	50 (100.0)	8	0	44	NA	
Radiographers at CHCs	39	(100.0)	47	9 (19.1)	3	4 (133.3)	7	7 (100.0)	3	3 (100.0)	20	20 (100.0)	1	0	4	3 (75.0)	
Pharmacists at PHCs and CHCs	89	(100.0)	+	86	+	+	+	+	33	33 (100.0)	35	35 (100.0)	16	9 (56.3)	+	+	
Lab Technician at PHCs and CHCs	57	(100.0)	+	106	+	+	4	4 (100.0)	+	+	43	43 (100.0)	+	+	27	9 (33.3)	
Nursing Staff at PHCs and CHCs	140	(100.0)	+	+	+	+	+	+	+	+	+	+	+	6	2 (33.3)	+	

Notes: All = Overall Areas, TA = Tribal Areas.

+ indicates surplus, # indicates no male health assistant is in-position, NA indicates Not Available.

Figures within the parenthesis represent the percentage of shortage in Tribal Areas to shortage in Overall Areas.

Source: Same as Table 1.

CONCLUSION AND POLICY IMPLICATIONS

The paper examines the status of health care infrastructure in the rural areas of the NER of India. The status of rural health care infrastructure is discussed in terms of the progress in health centres, facilities available in health centres and manpower available in the health centres in the rural areas across the north-eastern states *vis-à-vis* the country as a whole. The findings suggest that after the implementation of NRHM in 2005 there has been significant improvement in the rural health care infrastructure in the region, especially in case of health centres. Though all the north-eastern states are in better position compared to the all India average in terms of progress in physical health care infrastructure, but states like Mizoram, Arunachal Pradesh, Sikkim and Nagaland are far-away from the national average in terms of density of health centres. Further, many of the states are yet to satisfy the existing population coverage norms in one or the other types of health centres. Additionally, the health centres in many states are not well equipped with essential facilities and equipments such as quarters for ANM workers, labour rooms, operation theatres, stabilisation units and care corners for new born babies, electricity supply, water supply, telephone connectivity, X-ray machine, and so on. Besides, there is widespread regional inequality in terms of physical infrastructure, available facilities and existing manpower across the north-eastern states.

What is more serious is that the rural health care sector in the NER suffers from shortages of one or the other form of infrastructure. There is shortfall not only in health centres, but also well trained manpower, be it specialists doctors, nurses or other health workers. Although the posts of various cadres of health workers are sanctioned, many of them are lying vacant in almost all the states, mainly because most of the health workers, especially the doctors and specialists, don't want to work in the rural areas, which may be because of various reasons. Even though in many instance doctors are there, they don't visit their designated centres, rather they engage in private practices. The large shortage and/or absence of health workers resulted in underutilization of facilities whatever available in the existing health centres, and further leading to closure of those facilities. As all these issues take their toll on the performance of rural health care services delivery mechanism, it can be said that the quality of rural health care services in the NER is not of high quality, which has further its toll on the performance of the region in achieving the basic health indicators.

Thus, even though a well-structured rural health care system exists in the country, the health care sector in the rural areas of NER suffers from inadequate physical infrastructure as well as essential facilities and well trained manpower. In view of these challenges, more often question has been raised about the role of current public health care system. However, the significance of the public health care system should not be overlooked, because the poor people in the rural areas can't afford the costly private health care services. Besides, the presence of private sector in the remote and far flung rural areas is very negligible, and hence, for providing universal access to health care services the public sector health centres have to play a vital role. Therefore, rigorous efforts need to be done to strengthen the rural health care sector in the region. The state governments should undertake more direct policies towards establishment of new health centres, especially Sub Centres and upgrading the existing centres to the next level. More importantly, the existing health centres must be adequately staffed with well trained manpower, and must be well equipped with essential facilities and equipments. Besides, urgent efforts need to be made to improve the quality of health care services and eliminate the regional inequality in the provision of all fronts of health care infrastructure.

Notes

- 1 These states include the eight north-eastern states, eight Empowered Action Group states (Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Uttarakhand, Orissa and Rajasthan), Himachal Pradesh and Jammu & Kashmir.
- 2 The NER of India, which is comprised of eight states of Arunachal Pradesh, Assam, Meghalaya, Mizoram, Manipur, Nagaland, Sikkim and Tripura, together covers 7.9 percent of the total geographical area of the country, accounting for 3.9 percent of total population and 2.7 percent of all-India Net Domestic Product.
- 3 Total paramedical staff includes radiographers, pharmacists, nursing staff, laboratory technicians, health workers (male and females) and health assistants (male and female).
- 4 The figures for the states are 108.48 in Arunachal Pradesh, 69.87 in Assam, 114.56 in Manipur, 79.9 in Meghalaya, 257.45 in Mizoram, 141.32 in Nagaland, 125.89 in Sikkim and 53.43 in Tripura.
- 5 The threshold level of 2.5 health workers per thousand population is pointed out in the Twelve Five Year Plan Document (GOI, 2011a). Here, we convert the figure for per Lakh population.
- 6 The ratio of male health assistant at PHCs to male health worker at Sub Centres as on March 2011 recorded at 1:2 for Arunachal Pradesh, 1:4 for Manipur, 1:2 for Meghalaya, 1:35 for Mizoram, 1:26 for Nagaland, 1:11 for Sikkim and 1:16 for Tripura, whereas the national average is 1:3. For Assam data on male health assistant at PHCs is not available.
- 7 The ratio of female health assistant at PHCs to female health worker at SCs and PHCs as on March 2011 recorded at 1:19 for Assam, 1:9 for Manipur, 1:10 for Meghalaya, 1:52 for Mizoram, 1:57 for Nagaland, 1:16 for Sikkim and 1:63 for Tripura, while the national average is 1:13. For Arunachal Pradesh data on female health assistant at PHCs is not available.
- 8 The shortfall of health centres/manpower is calculated as the difference between the required health centres/manpower (which is calculated using the prescribed population norms on the basis of provisional rural population from Census 2011) and health centre/manpower in-position.

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