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## **Effectiveness of Health Workforce and Manpower Deployment in Health Care Institutions in North-East India**

Farhat Hossain

The effectiveness of skilled health workforce is most influencing factor to the health status of the population and its ratio to population across space and regions. This paper explores the availability of health care institutions as per Indian Public Health Standards (IPHS) norms and the nature of shortfall and surplus of health workforce in accessing health care services to the people of North-East India. The region is considered to be one of the economically depressed regions in India and has low health workforce-population ratio and unskilled due to absence of training centres. Health Care Institutions consists of Sub-Centres (SCs), Primary Health Centres (PHCs) and Community Health Centre (CHCs) that provide complete health care delivery to the population. The deficit of health care institutions is very high in densely populated states like Assam and it is favourable in lower density states i.e. Arunachal Pradesh. The numerical deficits are greatest in case of specialized doctors and numerical surpluses realised for Para-medical staffs which is likely to affect adversely the utilization of health care services in CHCs in North-East India. The co-efficient of variation for health workforce shows that the regional disparities is widening and worsening because of uneven health workforce availability in the health care institutions.

**Keywords:** Health workforce, Indian Public Health Standards (IPHS), Sub-Centres (SCs), Primary Health Centres (PHCs), Community Health Centres (CHCs)

### **Introduction**

Manpower resources in health workforce are described as the central component in health care delivery system in any country which provides better health outcomes and quality health services to the people. The sustainable economic development of a country is depending upon the skilled human resources in the sectors like health, education and other service areas. Human resource for health through the expansion

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of professional and technical education is very important for increasing the availability of skilled professionals. The effectiveness of skilled health manpower is influencing the health status of the population and it varies with the ratios of health workers to population in different regions. R.Kolehmainen-Aitken (1993) discuss about the 1986 Acapulco Conference arranged by the WHO on Health Manpower out of Balance which identified five different categories of human resource for health imbalances. These were the discrepancies between numbers, types, functions, distribution, and quality of health workers on the one hand and on the other, a country's needs for their services and its ability to employ, support, and maintain them. According to the World Health Statistics 2015, India had only 0.70 physicians, 1.71 nursing and mid-wifery personnel, 0.1 dentistry personnel and 0.5 pharmaceutical personnel respectively per 1000 population. Sarma.et.al. (2013) found that the scarcity of physicians in India is about short of six lakh doctors, ten lakh nurses and two lakh dental surgeons, 40,000 Indian doctors are serving 50% of the British population, and around 50,000 Indian doctors are working in the United States. The medical educational infrastructure in the country has shown rapid growth during last 20 years but in case of North-East India, the extension is very low during the last two decades. This shows the negligence of central government towards North-East India and role of the respective state governments in expanding medical educational infrastructure. The North-East India is considered as economically depressed regions in India and has low health workforce-population ratio and unskilled due to adequate number of training centres and medical colleges. These types of inequalities in the availability of health workers may enhance inequities in health outcomes across the states of North-East India. According to National health profile (2012), the country has 356 medical colleges with total admission capacity of 39,474 students. In North-East India, there are only 11 medical colleges with 1176 student admission capacity which is very low as a proportion to all India level. The total number medical colleges and admission capacity is highest in Assam. There are five medical colleges in Assam, two each in Manipur and Tripura and one each in Meghalaya and Sikkim. There is no medical colleges exist in Mizoram, Nagaland and Arunachal Pradesh. There are nine medical colleges and health institution in Assam and one medical college in Mizoram as per the information displayed by Ministry of Development of North-Eastern Region (DONER) in their website. Arunachal Pradesh and Nagaland do not have any medical colleges and institutes which is responsible for manpower deficiency in health sector resulting in worst situation in terms of health outcomes. Assam and Meghalaya has only one each Health and Family Welfare Training Centre (HFWTC) and no Multi-Purpose Worker (MPW) Training School, whereas Mizoram and Tripura have only one each MPW Training School and no HFWTC. The North-East India is ignored by training centres which is very essential for providing health care facility and skilling health manpower. Only Manipur has both the training centre i.e. HFWTC and MPW Training school (NRHM State Data Fact Sheet for March, 2011).

The North-East India has 30 schools for Auxillary Nurse and Mid-Wife (ANM)<sup>1</sup> or Health Worker (Female) and only four promotional training schools for Lady Health Visitors (LHV)<sup>2</sup> or Health Assistant (Female) funded by Government of In-

dia whereas at all India level there are 319 and 34 school respectively. Assam has highest number of both the schools i.e. 18 schools for ANM and only one schools for LHV. Assam, Manipur, Sikkim and Tripura have only one each school for LHV out of the four schools exist in North-East India whereas the remaining states of North-East India do not have any school for LHV/HA (F). There are three schools for ANM/HW (F) in Manipur whereas for Meghalaya, Nagaland and Tripura have only two each ANM schools and Arunachal Pradesh and Sikkim both have only one each ANM schools (Training Division of Ministry of Health & Family Welfare, March, 2010). The regional disparities are widened in North-East India because of inequitable distribution of health care institutions impacting the health workforce in the region.

### *Study Area*

India is known for her unity in diversity but, possibly it is not very widely known that there is a region called North-East India in the country where diversity is much more vivid and varied within a small spatial sphere. The socio-cultural and economic environment of the states in the North-East India is in wide divergence with the rest of the country. The North-East India shares about 17 percent of country's total forests with 12.5 million hectares of area. The percentage of forest area to total geographical area is 49 percent (Ashokvardhan, 2004:2). It consists of eight states such as Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. These states are linked with the rest of the country through a narrow corridor in the northern region of West Bengal known as *Siliguri Corridor* while Assam provides the corridor for the other six states of the region except Sikkim. The North-East India has distinct regional personality. The general economic profile of this region is one of extreme backwardness reflecting by and large a low level of living standards. The infrastructure remains underdeveloped and intra-regional links are weak. The North-East India has immense resource potential but the technical knowhow is still deficient. The North-Eastern Council (NEC) is established in 1973 with an objective of addressing its special needs and requirements including those related to security. The health care facilities in North-East India are still different from the rest of the country. The North-East India is known for the richness of natural resources and has high potentiality for development but it is not growing as it is expected. There exists economic backwardness within the states due to the inaccessible terrain and local geographic conditions. Although the North-East India is considered under the special focus states with 10 percent outlay for health and family welfare but the health outcomes are not satisfactory. In North-East India the average availability of skilled health workforce such as total number of government allopathic doctors and total number of registered nurses and midwives are minimum with respect to the other Indian states. Average population served per hospital bed for North-East India is 1061 persons in comparison to 1947 in India, which seem to be satisfactory due its low population size. The health indicators like LEB, IMR, MMR and TFR in North-East India are better than the national average but it is below in comparison to other better performing states in India such as Kerala and Punjab (12th Five Year Plan GOI, Social Development Report 2010, National health profile 2012).

*Objectives*

Against the above-mentioned backdrop the present paper focuses the following objectives:

1. To investigate the levels of availability of Health Care Institutions in generating health workforce in North-East India.
2. To identify the gaps and the nature of shortfall and surplus of health workforce impacting health care services to the people of North-East India.
3. To measure the disparities of Health Care Institutions and Health Workforce in the states of North-East India.

**Health Care Institutions and their service areas in North-East India**

Health Care Institutions are the non-profit organizations in the state that provide complete health care delivery to the population under the three tier structure of health care system. The three tier health care institutions include Sub-Centre (SCs)<sup>3</sup> Primary Health Centre (PHCs)<sup>4</sup> and Community Health Centres (CHCs)<sup>5</sup>. According to the Indian Public Health Standards (IPHS, 2012:3), the SCs are the most peripheral and first contact point between the primary health care system and the community. A Sub-Centre provides interface with the community at grass root level, providing all the primary health care services. The purpose of the Sub-Centre is largely preventive and promotive but it also provides a basic level of curative care. As per population norms, there shall be one Sub-Centre established for every 5000 population in plain areas and for every 3000 population in hilly/tribal/desert areas. There are 148366 SCs functioning in the country as per the National Rural Health Mission (NRHM)<sup>6</sup> The National Rural Health Mission (NRHM) was launched by the Hon'ble Prime Minister on 12<sup>th</sup> April 2005, to provide accessible, affordable and quality health care to the rural population, especially the vulnerable groups. Under the NRHM North-Eastern States have been given Special focus. The thrust of the mission is on establishing a fully functional, community owned, decentralized health delivery system with inter-sectoral convergence at all levels, to ensure simultaneous action on a wide range of determinants of health such as water, sanitation, education, nutrition, social and gender equality. Assam has largest number of PHCs i.e. 975 PHCs in the North-East India followed by Nagaland (126) and Meghalaya (107). The lowest number of PHCs is 24 in Sikkim and 57 in Mizoram. All The PHCs should have assured services that covers all the essential elements of preventive, promotive, curative and rehabilitative primary health care. The CHCs were designed to provide referral as well as specialist health care to the rural population. These centres are however fulfilling the tasks entrusted to them only to a limited extent. In order to provide quality care in these CHCs, Indian Public Health Standards (IPHS) are being prescribed to provide optimal expert care to the community and achieve and maintain an acceptable standard of quality of care. These standards would help to monitor and improve the functioning of the CHCs. Health care delivery in India has been envisaged at three levels namely primary, secondary and tertiary. The Secondary level of health care essentially includes CHCs, constituting the First Referral Units (FRUs) and the district hospitals. Four PHCs are included under each CHC thus catering to approxi-

mately 80,000 populations in tribal/hilly areas and 1, 20,000 populations in plain areas. CHCs are supposed to be 30 bedded hospital providing specialist care in Medicine, Obstetrics and Gynaecology, Surgery and Paediatrics (IPHS, 2012:3). There are 4,833 CHCs established in the country and in North- East India has 246 CHCs.

Average actual population served per SC exceeds the IPHS norms in all the states in North-East India except Mizoram state which served 2949 population as required of 3000 population. The three states in North East India such as Arunachal Pradesh, Nagaland and Mizoram served 14254, 15719 and 19141 populations per PHC which is far below the population norms i.e 20000 population/per SC and the remaining states covered more population than the IPHS norm. Arunachal Pradesh is the only state where actual population served per CHC (28804) is far below the population norms of 80000 per CHC. In all the remaining states of North East India, population pressure per CHC is too much in terms of required situation. Actual population served per CHC in Sikkim is about 303844 population/per CHC against the population norms of 80000/CHC. The deficit of health care institutions is understood from the difference between actual numbers of health care institutions exists in the state and required numbers of health care institutions as per the IPHS norms. Assam has the highest number of deficits in SCs, PHCs and CHSs not fulfilling the population norms. Mizoram is the state which have surplus of all the health care institutions i.e. SCs, PHCs and CHCs. The surplus for PHCs and CHCs are highest for Arunachal Pradesh only. It is observed from Table-1 that the deficit of health care institutions is huge for higher density and large populated States and it is positive for lower density and low populated states.

### **Health Workforce and Health Care Institutions (SCs, PHCs and CHCs)**

According to the Indian Public Health Standard (IPHS, 2012:5) guidelines, the minimum requirement for manpower facilities for SCs should be two ANM (one essential and one desirable) and one Health Worker Male (essential) for Type A SCs. For Type B SCs, it is recommended to provide two ANMs (essential), one Health Worker Male (essential) and one Staff Nurse or ANM (Desirable). PHCs are expected to provide 24 hour service with basic Obstetric and nursing facilities. In terms of service delivery angle, PHCs may be of two types, depending upon the delivery case load: Type A and Type B. Type A PHCs categorized with delivery load of less than 20 deliveries in a month and Type B PHC with delivery load of 20 or more deliveries in a month. Under NRHM, Type A PHCs are being operationalized for providing 24 X 7 services in various phases by placing at least 3 Staff Nurses and one Medical Officer (MBBS), one health assistant male, one health assistant female or lady health visitor, one laboratory technician, two multi-skilled Group D worker and one sanitary worker cum watchman in terms health facilities. For Type B PHCs, additional staff in the form of one MBBS Medical Officer (desirable, if the case load of delivery cases is more than 30 per month) and one staff nurse and one sanitary worker-cum-watchman are to be provided to take care of additional delivery case load. The manpower requirement scheme provide for four posts of medical specialists, one each in Surgery, Medicine, Paediatrics and Gynaecology. As regards to manpower, three spe-

**Table 1: State-wise Shortfall and Surplus of Health Care Institutions in NEI**

Notes: As per IPHS, one Sub-Centre established for every 5000 population in plain areas and for every 3000 population in hilly/tribal/desert areas whereas a Primary Health Centre (PHC) covers a population of 20,000 in hilly, tribal or difficult areas and 30,000 populations in plain areas and each CHC thus catering to approxi-

States	Population	Actual No of Health Care Institutions			Actual Population Served per Institution			Required No of Institutions as Per the IPHS Norms			(-) Deficit of Health Care Institutions		
		SCs	PHCs	CHCs	SCs	PHCs	CHCs	SCs	PHCs	CHCs	SCs	PHCs	CHCs
Arunachal Pradesh	1382611	286	97	48	4834	14254	28804	461	69	17	-175	28	31
Assam	31169272	4604	975	109	6770	31968	285957	6234	1039	260	-1630	-64	-151
Manipur	2721756	420	80	16	6480	34022	170110	907	136	34	-487	-56	-18
Meghalaya	2964007	397	109	29	7466	27193	102207	988	148	37	-591	-39	-8
Mizoram	1091014	370	57	9	2949	19141	121224	364	55	14	6	2	3
Nagaland	1980602	396	126	21	5002	15719	94314	660	99	25	-264	27	-4
Sikkim	607688	147	24	2	4134	25320	303844	203	30	8	-56	-6	-6
Tripura	3671032	719	79	12	5106	46469	305919	734	122	31	-15	-43	-19
North-East India	45587982	7339	1547	246	6212	29469	185317	10550	1699	425	-3211	-152	-179

cialists namely, Anaesthetist, Eye surgeon and Public Health Programme Manager will be provided on contractual basis in addition to the available four specialists. The CHCs should be equipped with the required number of para-medical staff, such as seven Nurse Mid Wives (NMWs), one Compounder, one Laboratory Technician and one Radiographer. The provision of supporting staff at each CHCs such as, two posts of Ward Boys, one Dhobi, three Sweepers and one Aya.

### 3.1 Sub-centres and Manpower Availability

In the Table.2, it is seen that the manpower availability of health worker (male) is too low in North-East India and as compare to India. The availability of health worker (female) or ANM is more in North-East in comparison to India. Nagaland is the only state with full manpower availability of health worker (male) and female/ (ANM). Although the actual figure for SCs without ANM is high in Tripura but in percentage term it is highest in Arunachal Pradesh with 19.58 percent followed by Tripura (18.51 percent) and Mizoram (7.29 percent) but higher than the national average of 3.23 percent. Assam, Manipur, Nagaland and Sikkim are the four states where all the SCs has 100 percent manpower requirement of health worker female or ANMs. In Meghalaya 3.45 percent SCs functions without ANM and it is near to the national average. All the states in North-East India have better manpower in terms of health worker (female) than the national scenario. In Assam 48.17 percent of SCs works without health worker (male) and it is near to the national average (49.06 percent).

Table 2-Numbers of SCs without the Manpower availability or Without ANM/Health Worker (Female) and Health Worker (Male)

States	Sub-Centre	Without HW (F)/ANM	Without HW (M)
Arunachal Pradesh	286 (100.00)	56 (19.58)	138 (44.75)
Assam	4604 (100.00)	0 (0.0)	2218 (48.17)
Manipur	420 (100.00)	0 (0.0)	89 (21.19)
Meghalaya	405 (100.00)	14 (3.45)	123 (30.37)
Mizoram	370 (100.00)	27 (7.29)	73 (19.72)
Nagaland	396 (100.00)	0 (0.0)	0 (0.0)
Sikkim	146 (100.00)	0 (0.0)	9 (6.16)
Tripura	632 (100.00)	117 (18.51)	227 (35.91)
NE India	7259 (100.00)	214 2.94	2877 (39.63)
<b>India</b>	148124 (100.00)	4791 (3.23)	72677 (49.06)

Note: Data for 2010 repeated for Health Worker Male (In bracket percentage figure is given)  
Source: NRHM State Data Fact Sheet for March, 2011



### 3.2 Primary Health Centres (PHCs) and Manpower Availability

According to the IPHS norms, at least one Medical Officer is necessary for the functioning of the PHCs. The requirement of Medical Officer further increased if the utilization of PHCs goes up. Manpower availability is too low in PHCs in North-East India as reflected in the Table 3. The requirement of the doctors is much higher than the doctors in position. In North-East India some of the PHCs in the states like Arunachal Pradesh, Mizoram and Nagaland having no doctors at all. Very few PHCs have more than four doctors. The PHCs in Mizoram, Nagaland and Sikkim have been working without four plus doctors and three plus doctors. In North-East India only 9.33 percent of PHCs functioning with the availability of four plus doctors and it is 3.13 percent at all India level. Manipur is the only state where 47.50 percent of PHCs functioning with four plus doctors and 45 percent with three plus doctors followed by Tripura (16.45 percent and 13.92 percent respectively) which exceeds the situation prevailing in India. Assam is very close to the North-East India figure i.e. 9.17 percent in terms of PHCs with four plus doctors and 12.57 percent with three doctors. Arunachal Pradesh is the least performing in terms of four plus and three plus doctors availability in PHCs. About 58.33 percent of PHCs in Sikkim functioning with the availability of two doctors only followed by Assam (46.16 percent) and Tripura (39.24 percent) which is more than the overall situation of North-East India (36.82 percent) and above all India level (25.89 percent). In North-East India, about 34.83 percent of PHCs having the facility of lady doctor whereas in India, it is much lower at 20.86 percent. Sikkim and Manipur have good percentage share of lady doctors in PHCs. In Sikkim only 25 percent of PHCs do not have lady doctors and in Manipur it is 40 percent. The lower percentages of PHCs with lady doctor are found in the state of Nagaland (12.69 percent) and Arunachal Pradesh (20.61 percent).

There is also deficiency of Para-medical staff in the PHCs in North-East India but it is relatively better than all India average. Only 10.46 percent of PHCs functioning without laboratory technician as compared to the national figure of 32.56 percent. Arunachal Pradesh and Nagaland are the states where 56.70 percent and 54.76 percent PHCs performing without the availability of laboratory technician than followed by Tripura (15.18 percent). The non-availability of laboratory technician and pharmacist can be a major cause for inaccessible health care services in the states. Manipur (10.00 percent) and Mizoram (10.52 percent) are close to the average percent of North-East India in terms of PHCs without laboratory technician and in Meghalaya only 7.33 percent of PHCs do not have laboratory technician. In India 23.61 percent of PHCs do not have pharmacist where the picture for North-East India is far better and it is just 9.47 percent. Sikkim and Arunachal Pradesh are the state with a deficiency of pharmacist. About 70.83 percent of PHCs in Sikkim and 65.87 percent PHCs in Arunachal Pradesh are functioning without pharmacists. But in Meghalaya and Tripura only 1.83 percent and 3.79 percent of PHC do not have pharmacist.

### 3.3 Community Health Centres (CHCs) and Manpower Availability

Availability of adequate human resources is an essential component of health infrastructure. The Table 4 and 5 show that there is a huge shortfall of specialized doctors such as Surgeons, Obstetrician / Gynaecologist, Paediatrics, Total Specialist and Radiographer at

Table 3- Numbers of PHCs With Doctors and Without Doctors /Lab Technicians/ Pharmacists

States	PHCs	With four+ Doctor	With three Doctor	With two Doctor	With one Doctor	Without Doctor	Without lab tech	Without Pharm.	With Lady Doctor
Arunachal Pradesh	97 (100.00)	2 (2.06)	4 (4.12)	33 (34.02)	48 (49.48)	10 (10.30)	55 (56.70)	64 (65.97)	20 (20.61)
Assam	938 (100.00)	86 (9.17)	118 (12.57)	433 (46.16)	301 (32.08)	0 (0.00)	NA	NA	347 (36.99)
Mamipur	80 (100.00)	38 (47.50)	36 (45.00)	6 (7.50)	0 (0.00)	0 (0.00)	8 (10.00)	12 (15.00)	48 (60.00)
Meghalaya	109 (100.00)	2 (1.83)	0 (0.00)	15 (13.76)	92 (84.40)	0 (0.00)	8 (7.33)	2 (1.83)	32 (29.35)
Mizoram	57 (100.00)	0 (0.00)	0 (0.00)	3 (5.26)	44 (77.19)	10 (17.54)	6 (10.52)	13 (22.80)	16 (28.07)
Nagaland	126 (100.00)	0 (0.00)	0 (0.00)	21 (16.66)	87 (69.04)	18 (14.28)	69 (54.76)	32 (25.39)	16 (12.69)
Sikkim	24 (100.00)	0 (0.00)	0 (0.00)	14 (58.33)	10 (41.66)	0 (0.00)	0 (0.00)	17 (70.83)	18 (75.00)
Tripura	79 (100.00)	13 (16.45)	11 (13.92)	31 (39.24)	24 (30.37)	0 (0.00)	12 (15.18)	3 (3.79)	29 (36.70)
NE India	1510 (100.00)	141 (9.33)	169 (11.19)	556 (36.82)	606 (40.13)	38 (2.51)	158 (10.46)	143 (9.47)	526 (34.83)
India	23887 (100.00)	747 (3.13)	897 (3.75)	6185 (25.89)	14852 (62.17)	1099 (4.60)	7778 (32.56)	5640 (23.61)	4983 (20.86)

Source: Computed from NRHM State Data Fact Sheet, March 2011

CHCs. The pictures look gloomy which presents the actual availability of medical specialists against the requirement and the gap between requirement and in position is very prominent. The large number of shortfall in CHCs is obviously the greatest handicap in delivering specialized health care services to the rural people, for which these institutions

are created. The existence of shortfall could be due to the non-availability of specialists, resource constraints of the state governments and less number of medical and training institutes in North-East India. In case of Para-medical staff such as Health Worker (female) at SCs, Health Assistant (female) at PHCs, Pharmacist at PHCs and CHCs, Laboratory Technician at PHCs and CHCs and Nurse staff in PHCs and CHCs the picture is slightly acceptable. The Para-medical staffs in position are excess of their requirement. This is likely to affect adversely the utilization of health care services in CHCs.

Table 5 shows that there is a shortage of health worker male and surplus of health worker female or ANM at SCs in North-East India. This also happens in case of health assistant (male) and health assistant (female) at PHCs in North-East India. It is due to females are more prone to nursing activities than the male as male workers are unwilling to work at a lower wage. The largest health worker male shortage is shown in Meghalaya with 66.49 percent shortfall. Most of the states in North-East India have shortfall of health worker male except Sikkim, Manipur, and Mizoram. Sikkim have experienced huge surplus of health worker male and it is more than ten times of the requirement. About 95 percent surplus of health worker female or ANM and more than hundred percent surpluses of nursing staff at PHCs and CHCs in Manipur clearly indicate that girls are actively involved in health sector than man. In case of nursing staff in PHCs and CHCs in North-East India, there is about 75.37 percent of surplus. Tripura have highest percentage of surplus in nursing staff in PHCs and CHCs. Only Arunachal Pradesh and Sikkim have shortfall of 32.33 percent and 36.84 percent respectively for nurses in PHCs and CHCs. Arunachal Pradesh is the only state in North-East India which is deprived by health workforce.

Only in case of MBBS doctors (Medical Officer) there is a surplus but for specialist doctors there is huge insufficiency in every CHC in North-East India. More than 80 percent shortage of experienced surgeons, paediatricians and total specialists in CHCs and about 69.10 percent deficit of obstetrics and gynaecology in CHCs in North-East India. Although the average picture for North-East India for the availability of doctors is showing good but when we go for individual states the situation looks gloomy. Out of the eight states in the region four states of Arunachal Pradesh, Meghalaya Mizoram and Nagaland have shortage of doctors. Nagaland stands first in terms for shortfall of doctors and it is about 21.42 percent. More than hundred percent surpluses of doctors are found in Manipur and more than fifty percent surplus of doctors is found in Assam and Tripura. The other Para-medical staffs like Radiographer has 50 percent shortage than the requirement and in case of pharmacist and laboratory technician there is a surplus of 2.39 percent and 1.95 percent respectively in North-East India. Table 5 indicates the inequitable distribution of health workforce exist different states in North-East India. The gender dimension of health workforce in case of doctors and health workers like nursing staff, ANM etc. shows adequate representation in all the states of North-East India.

In Table 4 below: P stands for man in position; R stands for manpower required; M stands for Male; F stands for Female; NA stands for Not Available. In bracket shortfall of Health Workforce is shown in absolute figures. Source: Computed from RHS bulletin, March 2012, Ministry of Health and Family Welfare, Government of India.



Table 5:

Categories of Health Workforce	Status of Shortfall / Surplus of Health Workforce												North-East					
	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura										
Health Assist (M) at PHCs	19	-48.25	2218	-48.17	49	+11.66	264	-66.49	24	+6.48	162	-40.90	1445	+982.99	176	-24.47	1440	-19.62
Health Worker (F) at SCs	12	+3.13	3144	+56.35	475	+95.00	281	+55.53	223	+5.2.22	345	+66.09	120	+70.17	371	+46.49	4981	+56.05
		-19.58	975	100.00	15	-18.75	40	-36.69	35	-61.40	126	100.00	12	-50.00	61	+77.21	1161	-75.04
Health Assist(F) at PHCs	NA	NA	523	-53.64	16	-20.00	30	-27.52	38	-66.66	89	-70.63	4	-16.66	76	+96.20	721	-46.60
Doctor at PHCs	5	-5.15	503	+51.58	90	+112.5	5	-4.58	8	-14.03	27	-21.42	8	+33.33	40	+50.63	596	+38.52
Surgeon at CHCs	48	100.00	66	-61.11	16	-100.00	28	-96.55	8	-88.88	9	-42.85	2	-100.00	11	-100.00	199	-81.55
Obster& Gynae. atCHCs	48	100.00	40	-36.69	16	-100.00	24	-82.75	9	100.00	19	-90.47	2	-100.00	12	-100.00	170	-69.10
Paedia at CHCs	47	-97.91	89	-81.65	15	-93.75	28	-96.55	9	100.00	17	-80.95	2	-100.00	12	-100.00	219	-89.02
Total Specialist at CHCs	190	-99.47	314	-72.01	63	-98.43	107	-92.24	36	100.00	75	-89.28	8	-100.00	48	-100.00	841	-85.55
Radiographer at CHCs	39	-81.25	44	-40.36	4	-25.00	7	24.13	4	-44.44	21	100.00	0	0.00	5	-41.66	124	-50.40
Pharmacist at PHCs &CHCs	89	-61.37	219	+20.20	31	+32.29	4	+2.89	20	-30.30	87	-59.18	16	-61.53	1	+1.09	43	+2.39
Lab tech at PHCs.&CHCs	57	-39.31	159	+14.66	36	+37.50	4	-2.89	5	-7.57	77	-52.38	2	+7.69	19	-20.87	35	+1.95
Nurse staff at PHCs&CHCs	140	-32.33	1057	+60.81	382	+198.95	102	+32.69	33	+27.50	109	+39.92	14	-36.84	935	+573.61	2464	+75.37

Table 5 shows state-wise shortfall and surplus of health workforce in health care institutions (SCs, PHCs and CHCs).

It is understood that there is lack of availability of Health Care Institutions in North East India for accessing quality health service to the population at large. More than two hundred percent of variation is seen in case of CHCs than the other health care institutions. The mean is negative for all the health care institution and for SCs it is about -401. The deficit of SCs is highest in Assam (1630) and lowest are found in Mizoram with surplus of 6 SCs. Assam has shortfall of 64 PHCs and 151 CHCs whereas Arunachal Pradesh has surplus of 28 PHCs and 31 CHCs respectively. The performance of health workforce at various centres in the North-East India is also very important in determining the proper availability and accessibility of health care facilities. The numerical deficits are greatest in case of specialized doctors such as Surgeons, Obstetrician / Gynaecologist, Paediatrics, Total Specialist and Radiographer at CHCs which basically handicaps the health care delivery system in North-East India. The descriptive statistics like mean, standard deviation, coefficient of variation and minimum and maximum values of health workforce in North-East India is described in Table 6. The positive values (in percentage) representing the surplus of health workforce and negative is for shortfall of health workforce. Most of the mean value is negative. The mean value is positive i.e. surplus for health worker at SCs (male and female both), doctor at PHCs and nursing staff at PHCs and CHCs. The Coefficient of variation in health workforce basically explains the extent of variation in its use in the health inequality measurement (Spinakis et.al, 2011). The mean value is lowest at (-) 93.93 i.e. the average percentage shortfall is highest for total specialist at CHCs. The mean value for nursing staff at PHCs is highest at 108.04 percent of surplus. The coefficient of variation is more than hundred percentages for health worker (M) at SCs, health assistant (M) at PHCs, health assistant (F) at PHCs, Doctor at PHCs, Pharmacist, laboratory technician and nursing staff at PHCs and CHCs. The variations showing the regional disparities is widening and worsening for health workforce which indicates the inequitable distribution of health workforce exists in different states of North-East India.

#### 4. Concluding Observations and Remarks

The summary of the observations and findings of the present study are the followings:

- 1) The availability of health care institutions in North East India is not fulfilling the IPHS norms and gaps are prominent between actual numbers of health care institutions exists in the states and required numbers of health care institutions. The drawback of IPHS is that it includes only the population size, different infrastructural facility available in health care institution irrespective of the local geography, inaccessible terrain and transport and communication facilities in the region. Though the states Arunachal Pradesh, Nagaland and Mizoram served 14254, 15719 and 19141 populations per PHC which is far below the population norms i.e. 20000 population per PHC and the remaining states covered more population than the required numbers. Arunachal Pradesh is the only state which served 14254 populations per PHCs and 28804 populations per CHCs as against the requirement of 20000 and 80000

Table 6: Shortfall and Surplus of Health Care Institutions and Health Workforce in North-East India

Health Care Institutions (HCIs) in No. & Health Workforce (in percent)	Mean	S.D	C.V	Min	Max
HCIs (SCs)	-401	542	135.07	-1630 (Assam)	6 (Mizoram)
HCIs (PHCs)	-19	37	192.50	-64 (Assam)	28 (Arunachal Pradesh)
HCIs (CHCs)	-21	54	254.40	-151 (Assam)	31 (Arunachal Pradesh)
Health Worker (M) at SC	96.61	359.19	371.81	-66.49 (Meghalaya)	982.99 (Sikkim)
Health Worker (F) at SC	55.62	25.97	46.70	3.13 (Arunachal Pradesh)	95.00 (Manipur)
Health Assistant (M) at PHCs	-38.65	56.52	146.23	-100.00 (Assam, Nagaland)	77.21 (Tripura)
Health Assistant (F) at PHCs	-22.70	56.85	250.42	-70.63 (Nagaland)	96.20 (Tripura)
Doctor at PHCs	25.36	45.59	179.80	-21.42 (Nagaland)	112.50 (Manipur)
Surgeon at CHCs	-86.17	21.99	-25.52	-100.00 (AP,Mani,Sik,Tri)	-42.85 (Nagaland)
Obstetrics & Gynaecology at CHCs	-88.74	21.98	-24.77	-100.00 (AP, Man,Miz,Sik,Tri)	-36.69 (Assam)
Paediatrician at CHCs	-93.85	8.04	-8.57	-100.00 (Miz, Sik, Tri)	-80.95 (Nagaland)
Total Specialists at CHCs	-93.93	9.76	-10.39	-100.00 (Miz,Sik, Tri)	-72.01 (Assam)
Radiographer at CHCs	-44.61	32.14	-72.06	-100.00 (Nagaland)	0.00 (Sikkim)
Pharmacist at PHCs & CHCs	-19.49	38.53	197.73	-61.53 (Sikkim)	32.29 (Manipur)
Laboratory Technician at PHCs & CHCs	-7.90	29.21	369.89	-52.38 (Nagaland)	37.50 (Manipur)
Nursing staff at PHCs & CHCs	108.04	201.69	186.68	-36.84 (Sikkim)	573.61 (Tripura)

[Note: Man stands for Manipur; Miz stands Mizoram; Sik stands for Sikkim; Tri stands for Tripura; and AP stands for Arunachal Pradesh.]

population whereas for SCs it served over 4834 population as against 3000 population. Actual population served per CHC in Sikkim is highest of about 303844 populations per CHC against the population norms of 80000 populations. The deficit of health care institution is highest in Assam whereas Mizoram has surplus of all the health care institutions. The surplus for PHCs and CHCs are highest for Arunachal Pradesh as per population norms.

2) The status of manpower deployment in health care institutions shows inequitable distribution of Para-medical staff and specialist doctors in all the states in North East India. There is acute shortage of specialized doctors such as Surgeons, Obstetrician/Gynaecologist, Paediatrics, Total Specialist and Radiographer at CHCs and

about 80 percent shortage is experienced in surgeons, paediatricians and total specialists and 69.10 percent deficits of obstetrics and gynaecology in CHCs in North-East India.

3) In case of Para-medical staff such as Health Worker (female) at SCs, Health Assistant (female) at PHCs, Pharmacist at PHCs and CHCs, Laboratory Technician at PHCs and CHCs and Nurse staff in PHCs and CHCs, the picture is slightly acceptable and surplus exists in all the cases. The Para-medical staffs in position are excess of their requirements and about 95 percent surplus of health worker female or ANM and more than hundred percent surpluses of nursing staff at PHCs and CHCs in Manipur and Tripura. There are about 75.37 percent of surplus of nursing staffs in PHCs and CHCs in North-East India.

The health care institutions are facing huge gap between the requirement and persons in position and overall manpower availability. The availability of proper manpower are creating biggest barrier in providing health care access to all in North-East India. Rao (2012) also mention that the distribution of health worker remains a serious obstacle to universal health coverage. There should be coordination between the two major components of health system: health care delivery and health manpower development. Unfortunately, such coordination is lacking in most of the cases in North-East India. Lack of coordination exists not only between the two major components of the health system but also among the sub-system within each component. In relation to health manpower, the gap is visible and existing between manpower planning and manpower production, administration and management. Government should be giving more focus about the problem of non-availability and uneven distribution of skilled manpower i.e. specialists at CHCs which is revealed in the present study. Although Government has introduced inclusive development for minimising the regional disparities but there still exists the skewed rural/urban availability of public health services, inequitable distribution of health personnel among the health care institutions. In North-East India most of the hill/tribal states are practicing traditional medicine to cure common ailments but there is absence of the integration between indigenous medical practitioners with modern medical practitioners. There is a need to establish medical colleges and training institutes for doctors, nurses and mid-wives to bridge the gap of health workforce impacting health care facilities in the region.

### Notes

<sup>1</sup> Auxiliary nurse midwife have some training in secondary school. A period of on the job training may be included, and sometimes formalised in apprenticeships. An auxiliary nurse midwife has basic nursing skills and no training in nursing decision making. Auxiliary nurse midwives assist in the provision of maternal and newborn health care, particularly during childbirth but also in the prenatal and postpartum periods. They possess some of the competencies in midwifery but are not fully qualified as midwives (UNFPA 2011, WHO: 2010).

<sup>2</sup> Lady Health visitors are nationally registered nurses and midwives who have undertaken further training to as part of a primary health care team. As their name suggests, their role is to promote mental, physical, and social well-being in the



community by giving advice and support to families in all age groups. Limited resources and staff within the NHS have traditionally meant that their work has been focused on childhood development, but the scope to expand their roles is slowly improving.

<sup>3</sup> A health Sub-centre covers a population of 5000 in plain areas and 3000 in hilly and difficult terrains. All primary health care services are being provided at the door steps of the community.

<sup>4</sup> Primary health centre (PHC) is the cornerstone of rural healthcare. Primary health centre and their sub-centre are supposed to meet the health care needs of rural population. Each primary health centre covers a population of 30000 and is spread over about 100 villages .A medical officer, block extension educator, one female health assistant, a compounder, a driver and laboratory technician look after the PHC. It is equipped with a jeep and necessary facilities to carry out small surgeries. The PHC are established and maintained by the State Governments under the Minimum Needs Programme (MNP) and Basic Minimum Services Programme (BMS).A PHC acts as a referral unit for 6 sub-centres. It has 4-6 beds for patients. The activity of primary health centres involves curative, preventive, primitive and Family Welfare Services.

<sup>5</sup> The Community health centre (CHC) is the third tier of the network of rural health care institution, was required to act primarily as a referral centre for every four PHCs & for the patient requiring specialized health care services.

<sup>6</sup> The National Rural Health Mission (NRHM) was launched by the Hon'ble Prime Minister on 12<sup>th</sup> April 2005, to provide accessible, affordable and quality health care to the rural population, especially the vulnerable groups. Under the NRHM North – Eastern States have been given Special focus. The thrust of the mission is on establishing a fully functional, community owned, decentralized health delivery system with inter-sectoral convergence at all levels, to ensure simultaneous action on a wide range of determinants of health such as water, sanitation, education, nutrition, social and gender equality.

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