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Half empty or half filled? notes on universal health coverage in northeast India

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Abstract

India's Northeast is a home to numerous and diverse ethnic communities, each with its own unique socio-cultural characteristics and over 80 per cent of the population live in the rural areas. Many areas within the region are difficult to access. In addition, the region shares long international borders. Economic development has been slow but there has been growth in recent times and many societies are going through a transitional phase. Natural disaster such as floods are of regular occurrences in many areas, which wipes out many developmental gains made previously. Given these complexities, health problems of the masses acquire extra dimensions different to the rest of the country. This review outlines the state of health care infrastructure and availability of services including key health indices and sheds light on universal health coverage in the seven north-eastern states vis-à-vis national scenario using 2005 as the base year, the year in which National Rural Health Mission (NRHM) was launched, which is now renamed as National Health Mission (NHM). The concept of universal health coverage and challenges that India faces are briefly discussed at the outset to describe the context. Based on the survey and critical appraisals, strategic approach required for speedy achievement of universal coverages discussed focussing on the India's north-east.

Keywords: Health, NRHM, Northeast, Natural disaster, healthcare

1. Introduction

Health is wealth. Therefore, the primary purpose of the health system is to improve the healthfor its entirepopulation.[2]The key purpose of this review is to discuss the strategic approach required for speedy achievement of universal coverage focussing on the India's north-east. In doing so, it outlines the state of healthcare infrastructure and availability of services including key health indices and sheds light on universal health coverage in the seven north-eastern states vis-à-vis national scenario using 2005 as the base year, the year in which National Rural Health Mission (NRHM) was launched, now renamed as National Health Mission (NHM). However, in order to describe the context, the paper begins with a brief discussion of the concept of universal health coverage and

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challenges that the country faces.

2. Universal Health Coverage

Although, the need for Health for all were recognised way back in 1978 inthe Alma-Ata Declaration signatorieswhere it wasargued that Health for All would not only contribute to a better quality of life but would promote global peace and security,however, only in 2005, the declaration of Alma Ata was recognised by the Member States of the World Health Organization (WHO) who arrived at a consensusto develop their respective health financing systems so that "all people have access to services" and do not suffer financial hardship paying for them.[3] This goal was defined as a universal coverage, sometimes called the universal health coverage, which must ensure that the health coverage remains fair and impartial and initiate genuine means to surveil and assess progress.However, the key question that arises here as to what restricts countries from moving closer to universal coverage? In fact, there are three fundamental and interrelated problems identified by WHO. They are:

- Amount of resources available (in the poorest countries, few services are available to all)
- Commitment to pay directly for services at the moment of need (this include paying for medicines, doctor's consultation fees and payment for the procedures followed)
- Inefficacious and inequitable use of resources (at a conservative estimate 20–40per cent of health resources are being wasted), restrict countries from moving closer to universal coverage[4]

Therefore, the countries must raise sufficient funds, reduce the reliance on direct payments by the patients to avail services when they need, and improve efficiency and equity.

In India, of all the limiting conditions cited above, obligation to pay directly for healthcare is the key obstacle. According to WHO, India is one of the weakest countries in the world on overall health performances.[5]

3. Universal Health in India: Current State Availability of Resources

The Indian economy, which recovers slowly from the global financial crisis, is currently growing at the rate of 5.3 per cent. According to the estimates of the World Bank, in 2013 its gross domestic product (GDP) stands at $1.877 trillion. However, the total health expenditure (both public and private) is 4.1% of its GDP.[6] This health expenditure embraces health services (both preventive and curative) like nutrition activities, family planning activities, and emergency aid delegatedto health for all.[7]This spending on health however is meagre when compared to many countries— for examples, in 2012 Brazil spent 9.3% of its GDP on public health; similarly Afghanistan, Argentina, Switzerland, Guatemala China, UK and the USA spends respectively 8.7%, 8.5%, 11.3%, 6.7%, 5.4%, 9.4% and 17.9% of its GDP on public health.[8] Please refer to Table 1 for Budget Highlights (2014-2015) of the Government of India (GOI) on Public Health and NRHM.

Table 1: Budget Highlights

GOI allocation for Medical and Public Health in 2014-15	30,645 (INR in crores)
Allocations for National Rural Health Mission (NRHM) in 2014-15	24, 491 (INR in crores)

Sources: Budget Briefs, NRHM, GOI, 2014-2015 and Part-III, Plan Outlay, 2014-2015, Expenditure Budget Vol.I, 2014-2015

4. Free Services at the Point of Care

India boasts medical institutions in the private sector in the major cities that rival the best in the world.[9] However, private healthcare is one of the most commercialised in the world, where good care is overshadowed by frequently exploitative unregulated poor-quality (Patel$_a$ *et al.,* 2011). Moreover, in the rest of country, that is, in the tier three cities and rural areas, availability of good quality healthcare remain limited. Health expenditure has become an important cause of household impoverishment as out-of-pocket expenditures on health in India are among the highest in the world. More than three-quarters of health spending is paid privatelywith about 39 million Indian people being pushed into the scourge of poverty every year (Kumar *et al.,* 2011; Balarajan *et al.,* 2011). Ironically, the healthcare needs of 47 per cent of rural India and 31per cent of urban India are financed by

loans and (or) sale of assets.[10]Please refer to Panel 1 that highlights the state of public health of India.

5. Healthcare and Equity

"Economic transformation since the early 1990s without corresponding positive change in social development [with] growing disparities across regions, castes, sex and other characteristics," this is how India's achievement has been described by the UNICEF.[11]Every second,a young child in India is malnourished, less than ¼ of rural population use toilets (Bhattacharyya, 2014) and only 4 out of 10 girls who enrol complete eight years of schooling.

In addition to this, the burdens of infectious (John *et al.*, 2011) and chronic diseases (e.g., cancer, cardiovascular diseases, diabetes and mental health disorders) and injuries are high in India(Patel$_b$ *et al.*, 2011). Coverage for chronic diseases are generally low, especially among the poor and rural population and much of the care for chronic diseases and injuries is provided in the private sector, which remain exorbitantly expensive (Patel$_b$ *et al.*, 2011). Hence, imbalances in resource allocation, inadequate physical access to high-quality health services, scarce human resources and high out-of-pocket health expenditures are key challenges that India faces to achieve equity in healthcare and financially protecting the vulnerable (Balarajan *et al.,* 2011).

Millennium Development Goals (MDG)[1]requires India to reduce 'Under 5 Mortality' - U5MR (MDG-4) by two-thirds which is expected to decline to 70 per 1,000 live births in 2015, stillshort of the target of 42 in the said year. The Infant Mortality Rate (IMR) has declined from 58 per 1,000 live births in 2005 to 47 in 2009, but still a long way to achieving the target of 30 by 2015.[2] Key to significant progress in reducing U5MR and IMR rests with reducing neonatal deaths (infant deaths occurring within a year of birth) at a fast pace. From a Maternal Mortality Rate (MMR) of 437 per 100,000 live births in 1990-91, India is required to reduce MMR to 109 per 100,000 live births by 2015 (MDG-5), whichis expected to fall short of the 2015 target by 26 points.

Safe motherhood depends on the delivery by trained personnel, particularly through institutional facilities. Similarly, under MDG-6 (HIV/AIDS, Malaria and other diseases),adult HIV prevalence has come down to 0.34per cent in 2007 from 0.45per cent in 2002 attributed to greater awareness and increasing condom use. Malaria diagnosis has declined from 1.74per cent in 2005 to 1.52per cent in 2009 with malaria prone states such as the North Easternstates recording fewer malaria deaths since 2006. Prevalence of Tuberculosis (TB) has steadily declined (India accounts for one-fifth of the global incidence) and treatment success rates have remained steady at 86-87per cent.World Bank statistics showthat in 2013, only 74 per centof children (12-23 months) received full immunisation (measles).[3]

6. Human Resource

Unarguably, the health sector in India suffers from a serious human resource deficit. Specialists are even harder to find; there was a 65per cent shortfall in the required number of specialists at Community Health Centres in March 2010.Moreover, the workforce is concentrated in urban areas. Medical education system has failed to keep pace with the demand in terms of quantity, quality (and required competencies) and appropriate proportion of the different categories of healthcare professionals produced (Rao *et al.,* 2011).

[PANEL-1] State of Public Health[1]

1. Public health expenditure in India has declined from 1.3per cent of GDP in 1990 to 0.9per cent of GDP in 1999. This expenditure however increased to 3.7 per cent in 2010 and further increased to 4 per cent of GDP in 2012. However, 2013-2014, the public expenditure on health accounted for only 1.4 per cent of its GDP.
2. "Vertical Health and Family Welfare Programmes have limited synergy at operational levels" (Mathew, 2010: 92).
3. "Lack of community ownership of public health programmes impacts efficiency, accountability and effectiveness" (Mathew, 2010: 92).
4. "Lack of integration of sanitation, hygiene, nutrition and drinking water" (Mathew, 2010: 92).
5. "There are striking regional inequalities" (Mathew, 2010: 92).
6. "Population stabilization is still a challenge, especially in States with weak demographic indicators" (Mathew, 2010: 92).
7. "Curative services favour the rich: for every Re.1 spent on the poorest 20per cent population, Rs.3 is spent on the richest quintile" (Mathew, 2010: 92).
8. "Only 10per cent Indians have some form of health insurance, mostly inadequate: hospitalized Indians spend on an average 58per cent of their total annual expenditure" (Mathew, 2010: 93).

a. "Over 40per cent of hospitalized Indians borrow heavily or sell assets to cover expenses" (Mathew, 2010: 93).
b. "Over 25per cent of hospitalized Indians fall below poverty line because of hospital expenses" (Mathew, 2010: 93).

7. National Rural Health Mission (2005-12)

The GOI's launch of the NRHM[16] programme in 2005is the largest public health programme in the worldto address the issue of universal health in rural areas. As stated above, renamed as NHM,[1]it has been extended to cover the urban areas too. It is an umbrella programme that embraced many existing schemes: the Reproductive and Child Health Project (RCH II), National Disease Control Programme (NDCP), and Integrated Disease Surveillance Project (IDSP), which brought with it an influx of government funds. As of 2012, the NHM funds operates in the ratio of 75: 25, that is, while 75 per cent is released by the Central Government and the rest 25 per cent managed by respective states. However, state Project Implementation Plans (PIP) allocates the funds.[2]

Suffice to state that the NHM bear several unique strategies—it is centrally financed but implemented in the districts;designates explicit standards to be accomplished and mandates people's participation central to ensure accountability and transparency. Besides, it aims to strengthen the quality of health infrastructure at par with the Indian Public Health Standards (IPHS)and link the vertical health and family welfare programmes to provide an integrated healthcare,which remain free at the point of care. The health planningis decentralised involving Panchayati Raj Institutions (PRIs) to own, control and manage health services and ensure accountability and transparency by community ownership through the local Hospital Management Society *(Rogi Kalyan Samiti)*, which are key strategic planks. By mainstreaming doctors and practitioners who practice traditional Indian medicine, Ayurveda, Yoga, Unani, Siddha, and Homoeopathy (AYUSH), it seeks to alleviate the impact of scarce human resources in the healthcare in rural areas. Employment of female Accredited Social Health Activists (ASHA) in every village is one of its innovative ways to bring healthcare to the rural mass.It covers the entire country with special focus on 18 states including all the seven north easternstates.

An external mid-term assessment in 2009 has suggested substantial achievements, at the same time urges thatmany major issues still need to be addressed (Bajpai *et al.*, 2009). Please refer to Panel 2 that states the key outcomes of the programme since its inception.

[PANEL-2] The Main Goals and Outcomes of NRHM

- IMR reduced to 30/1000 live births by 2012—the IMR for the country stands at 42/1000 live births as per SRS 2012
- Maternal Mortality Ratio (MMR) reduced to 100/100,000 live births by 2012—As per SRS 2010-2012, MMR stands at 178/100000 live births.
- TFR reduced to 2.1 by 2012—As per SRS 2012, TFR stands 2.4
- Malaria Mortality Reduction Rate – 50per cent up to 2010, additional 10per cent by 2012—The rate of achievement is 46%
- Kala Azar Mortality Reduction Rate – 100per cent by 2010 and sustaining elimination until 2012.
- Filaria/Microfilaria Reduction Rate – 70per cent by 2010, 80per cent by 2012 and elimination by 2015.
- Dengue Mortality Reduction Rate – 50per cent by 2010 and sustaining at that level until 2012.
- Cataract operations-increasing to 46 lakhs until 2012.
- Leprosy Prevalence Rate –reduce from 1.8 per 10,000 in 2005 to less than 1 per 10,000 thereafter.
- Tuberculosis DOTS series - maintain 85per cent cure rate through entire Mission Period and sustain planned case detection rate—the treatment success rate (sum of Cured and Treatment) completed is 88%.

Sources : Press Information Bureau, Government of India, Ministry of Health and Family Welfare, Retrieved from: http://pib.nic.in/newsite/PrintRelease.aspx?relid=112335 and Mishra (2008).

8. The Indian Public Health Standards (IPHS)

The IPHS are "a set of uniform standards envisaged to improve the quality of health care delivery in the country."[1]In 2007, for smooth operation for infrastructure planning and upgradation, IPHS guidelines were published for Sub-centres, Primary Health Centres (PHCs), Community Health Centres (CHCs), Sub-District and District Hospitals. These standards are however, flexible to suit the diverse needs of the states and its regions. Nevertheless, these guidelines are framed to act as the key ingredient required for continuous improvement in quality and envisioned to perform as the yardstick through which to assess theoperational and delivery qualities of the health facilities.

9. Rogi Kalyan Samiti

'*Rogi Kalyan Samiti*' (RKS) is a registered societythat acts as a group of trustees entrustedfor proper functioning and management of the CHCs/ hospitals. Comprising of members from local *Panchayati Raj* Institutions (PRI), NGOs, local elected representatives and government officials, allare responsible for smooth functioning of all the affairs of the CHCs/hospitals. The RKS is free to generate revenue and use the funds as per its best judgment and expected to play a crucial role in its effort to upgrade the community health institutions (see below) to IPHS.

10. Accredited Social Health Activist (ASHA)

As stated elsewhere, one of the key components of the NHM is to provide every village in the country with a trained female ASHA. Selected from the village itself, ASHA is trained to perform the role of a health worker— akey mediator between the community and the public health system. Currently, the ASHA programme has trained 894525[2]health workers across the country to care forthe pre- and post- pregnant mothers, new-borns and children. Their services have shifted from promoting institutional delivery and immunisation to providing home based care and counselling for pregnant women, new-borns and children. The other portfolio of ASHA services includes promotion of health products such as sanitary napkins and contraceptives not as commercial commodities but as behaviour change delivery vehicles.[3]

11. Rural Healthcare System in India

The healthcare infrastructure in rural India has been developed as a three-tier system (Figure: 1) based on the following population norms (Panel 3)

[PANEL-3] Population Norms		
Centre	**Plain Area**	**Hilly/Tribal/Difficult Area**
Sub-Centre	5000	3000
Primary Health Centre	30,000	20,000
Community Health Centre	1,20,000	80,000

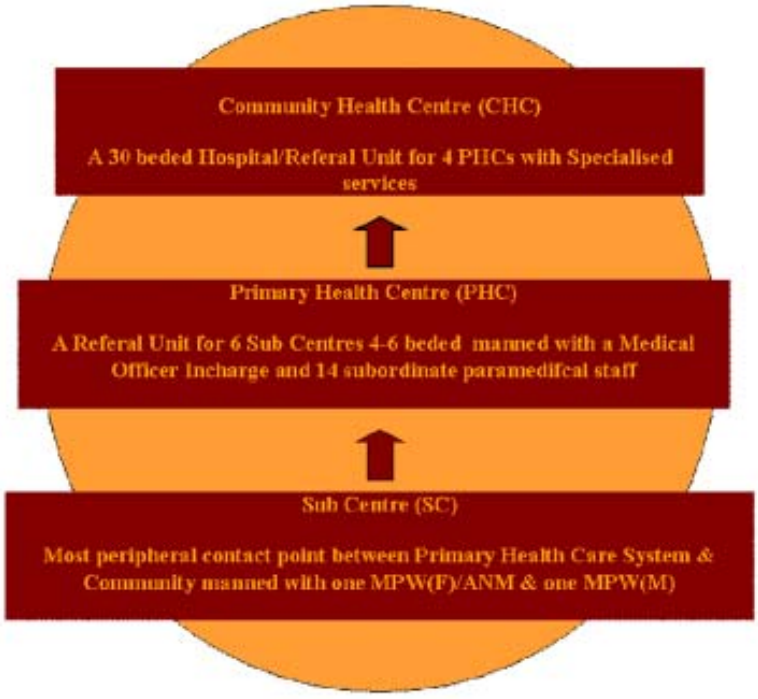

Fig. 1 : Three tier Rural Health Care System in India (Source: Rural Health Care System in India, available at: http://www.gujhealth.gov.in/pdf/5_Ruralper cent20Healthcareper cent20Systemper cent20inper cent20India.pdf (accessed October 25, 2012)

12. Background of North-eastern States

India's Northeast is a home to numerous and diverse ethnic communities, each with its own unique socio-cultural characteristics and over 80 per cent of the population live in the rural areas. Many areas within the region are difficult to access. In addition, the region shares long international borders. Economic development has been slow but there has been growth in recent times and many societies are going through a transitional phase. Natural disaster such as floods are of regular occurrences in many areas, which wipes out many developmental gains made previously. Given these complexities, health problems of the masses acquire extra dimensions different to the rest of the country. The demographic, socio-economic and health profile of the states of region are illustrated in Table 2. Following this, it provides a brief sketch of each state. It then goes on to discuss the healthcare infrastructure of North East India.

Table 2 : Demographic, Socio-economic and Health profile as compared to India figures

		Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura	India
Rural population (lakhs)	(Census 2011)	10.69	267.81	19.00	23.69	5.29	14.07	27.10	8330.88
Annual Exponential Growth Rate (per cent)		2.33	1.58	1.72	2.49	2.07	(-) 0.05	1.39	1.64
Sex Ratio		960	957	934	970	971	944	953	914
Female Literacy Rate (per cent)		66.95	73.18	79.85	75.48	91.85	80.11	87.75	74.04
Crude Birth Rate	SRS-2010[20]	20.5	23.2	14.9	24.5	17.1	16.8	14.9	22.1
Crude Death Rate		5.9	8.2	4.2	7.9	4.5	3.6	5	7.2
Infant Mortality Rate		31	58	14	55	37	23	27	47
Neo-Natal Mortality Rate		NA	33	NA	NA	NA	NA	NA	33
Under 5 Mortality Rate		NA	83	NA	NA	NA	NA	NA	59
Total Fertility Rate		NA	2.5	NA	NA	NA	NA	NA	2.5
MMR (SRS 2000-09)		NA	390	NA	NA	NA	NA	NA	212
Contraceptive Prevalence Rate (DLHS-3 2007-08)[2]		NA	49.7	NA	22.9	53.9	NA	68.5	54.1
Unmet Need for Family Planning (per cent) (NFHS-III 2005-06)[3]		18.8	10.5	12.4	35	17.3	26.1	10.3	12.8
Life Expectancy Rate		NA	M: 58.6 F: 59.3	NA	NA	NA	NA	NA	M: 62.6 F: 64.2

Arunachal Pradesh (AP)

According to the 2011 Census of India, the population of the state is 1382611 (79.2per cent, rural) and are scattered over 16 districts and 5589 villages. The state has the lowest density of 17 persons per sq. km. As against decadal growth rate of 17.64 per cent at the national level, the population of the state has grown by 25.92 per cent over the period 2001-2011. The sex ratio of the state stands at 960 females to 1000 males, which is higher than the national average of

914. Total female literacy is 66.95 per cent, while the crude birth, crude death and infant mortality rates are 20.5, 5.9 and 31 (national rates, being 22.1, 7.2 and 47), respectively (SRS, 2010).

Assam

Scattered over 27 districts and 26395 villages, Assam embraces a population of 31169272 (87.1per cent, rural).The state has the highest population density among North Easternstates of 397 persons per sq. km. As against decadal growth rate of 17.64per cent at the national level, the population of the state has grown by 16.93per cent over the period 2001-2011. The sex ratio is 957 females to 1000 males are higher than the national average of 914. Female literacy of the state rose to 73.18per cent from 56.03per cent in 2001. TFR is 2.5, rural 2.7 and urban 1.6 (SRS-2010) against the crucial replacement level fertility of 2.1. Crude birth, crude death and infant mortality rates are 23.2, 8.2 and 58 (national rates, 22.1, 7.2 and 47), respectively (SRS 2010). The average life expectancy for male is 58.6 years and for female, it is 59.3.

Manipur

The state of Manipur has a population of 2721756 (73.4per cent, rural) with 9 districts and 2588 villages bearing population density of 122 per sq. km. The decadal growth rate of the state is 18.65per cent over the period 2001-2011 against the national rate of 17.64per cent. The sex ratio of Manipur is 934 females to 1000 males. Female literacy of the state is 79.85per cent. Crude birth, crude death and infant mortality rates are 14.9, 4.2 and 14 (national rates, 22.1, 7.2 and 47), respectively (SRS, 2010).

Meghalaya

Meghalaya is an abode to 2964007 persons (80.4 per cent, rural) according to 2011 Census distributed over 7 districts, 39 blocks and 6839 villages. The state has the density of 132 persons per sq. km. As against decadal growth rate of 17.64per cent at the national level, the population of the state has grown by 27.82per cent over the period 2001-2011. The sex ratio of Meghalaya at 970 females to 1000 males is higher than the national average. Female literacy of the state rose to 75.48 from 60.41 per cent in 2001. Crude birth, Crude death and infant mortality rates are 24.5, 7.9 and 55 (national rates, 22.1, 7.2 and 47), respectively (SRS, 2010).

Mizoram

The 2011 Census of India shows that Mizoram is a home to 1091014 (50.4 per cent, rural) dispersed over 8 districts and 830 villages. The total area of the state is 21,081sq. km and has a density of 52 persons per sq. km. As against the decadal growth rate of 17.64 per cent at the national level, the population of the state has grown by 22.78per cent over the period 2001-2011. The sex ratio of Mizoram at 971 females to 1000 males is higher than the national average of 914. Female literacy of the state rose to 91.85 per cent from 86.13per cent in 2001. Crude birth, crude death and infant mortality rates are 17.1, 4.5 and 37 (national rates, 22.1, 7.2 and 47), respectively (SRS, 2010).

Nagaland

Nagaland, with 11 districts and 1428 villages has a population of 1980602(82.8 per cent, rural). The total area of the state is 16,579 sq. km and has the density of 119 persons per sq. km. As against decadal growth rate of 17.64 per cent at the national level, the population of the state has contracted by -0.47per cent over the period 2001-2011. The sex ratio stands at 944females to 1000 males is higher than the national average. Female literacy rose to 80.11 per centin 2011 from 61.92 per cent in 2001. Crude birth, crude death and infant mortality rates are 16.8, 3.6 and 23 (national rates, 22.1, 7.2 and 47), respectively (SRS, 2010).

Tripura

The population of Tripura, according to 2011 Census is 3671032(82.9, rural) are scattered over 4 districts and 875 villages. The total area of the state is 10,486 sq. km and has the density of 350 persons per sq. km. As against decadal growth rate of 17.64 per cent at the national level, the population of the state has grown by 14.75 per cent over the period 2001-2011. The sex ratio at 953 females to 1000 males is higher than the national average of 914. Female literacy of the state rose to 87.75 per cent in 2011 from 65.41per cent in 2001. Crude birth, crude death and infant mortality rates are 14.9, 5 and 27 (national rates, 22.1, 7.2 and 47), respectively (SRS, 2010).

13. The Healthcare Infrastructure in the Northeast

Sub-Centres

The Sub-Centre serves as the 'first contact point' between the community and primary care. It operates with one Auxiliary Nurse Midwife (ANM) and one Male Health Worker MPW. In addition, one Lady Health Worker (LHV) is employed to supervise six Sub-Centres. Panel 4 refers to the recommended labour at the sub-centres by IPHS. These centres are delegated with tasks relating to transform 'behavioural change' while providingbasic services in connection to maternal and child health, family welfare, nutrition, immunisation, diarrhoeal control and control of communicable diseases. The centres

provide basic services like 'drugs for minor ailments'— headaches, colds, coughs, insect bites and stings, earache and even diarrhoea. There are 148124 sub centres operating as on March 2011 in the country as compared to 145272 in 2007. Figure 2 demonstrates the number of Sub-Centres built in the states of North East India since 1981-85 until 2007-2012.

[PANEL-4] Recommended Manpower at Sub-Centres (IPHS 2012)		
Personnel	**Existing**	**Recommended**
Health Worker (Female)	1	1 or 2 (Optional)
Health Worker (Male)	1	1 or 0 (optional; may be replaced by female health worker)
Voluntary worker to keep the Sub Centre clean and assisting ANM. She is paid by the ANM from her contingency fund @ Rs. 100 per month	1 (optional)	1 (optional)

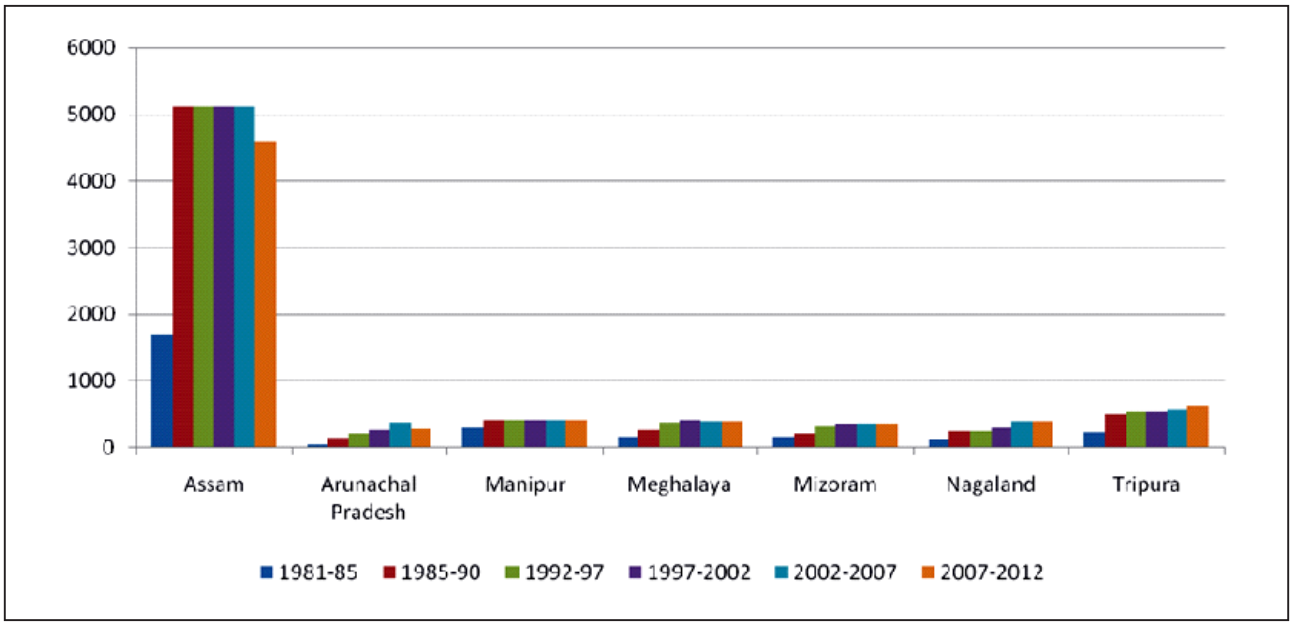

Fig. 2: Sub centres built in the northeast since 1981-85

Note: reduction in number of Sub Centres is due to correction of actual status of functioning.

14. Primary Health Centres (PHCs)

PHCsserve as a referral unit between the Medical Officer (MO) and village community; established and maintained by the state governments under the Minimum Needs Programme (MNP)/ Basic Minimum Services Programme (BMS). Comprising of 4-6 beds, for every six Sub-Centres, there is one PHC. The primacy of the PHCs are to serve the rural population with desegregated services especially on curative and preventive health care that emphasises on promotion of better health via rendering prevention of diseases. Currently, one MO is in charge of a PHC, who is further supported by 14 paramedical and other staffs. As of March 2011, there are 23887 PHCs functioning in the country as compared to 22370 in 2007.Panel 5 refers to the recommended labour at the PHCs by IPHS. Figure 3 illustrates the number of PHCs built in the state of North East India since 1981-85until 2012.

PANEL-5] Recommended Manpower at PHCs (Indian Public Health Standards 2012)		
Personnel	**Existing pattern**	**Recommended**
Medical Officer	1	2 (one may be from AYUSH and one other Medical Officer preferably a Lady Doctor)
Pharmacist	1	1
Nurse - Midwife (Staff Nurse)	1	3 (for 24 hour PHCs; 2 may be contractual)
Health Worker (Female)	1	1
Health Educator	1	1
Health Assistant (One male and One female	2	2
Clerks	2	2
Laboratory Technician	1	1
Driver	1	Optional; vehicles may be out-sourced
Helpers	4	4

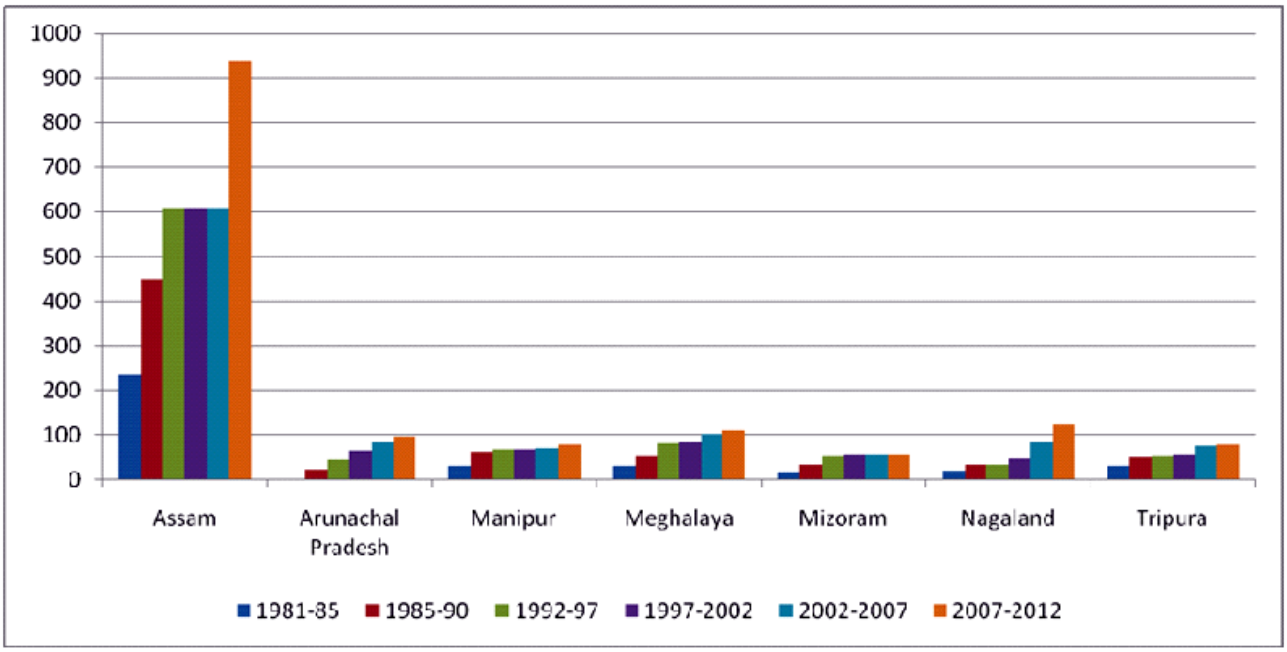

Fig. 3 : PHCs built in the northeast since 1981-85

15. Community Health Centres (CHCs)

Established and maintained under the same MNP/BMS programme of the state governments, CHCs serve as a referral centre for four PHCs, render facilities for obstetric care and specialist consultations. Manned by four medical specialists, that is surgeon, physician, gynaecologist and paediatrician and supported further by 21 paramedical and other staffs; CHCs provide room for 30 in-door beds with one operation theatre, X-ray, labour room and laboratory facilities. Panel 6 refers to the recommended labour at the CHCs as per IPHS.As on March 2011, there are 4809 CHCs functioning in the country as compared to 4045 in 2007. Figure 4 shows the number of CHCs built in the region since 1981-85, which are in operation. Taken all the Primary Health Care Institutions together, Table 3 presents a snapshot of the average rural area and average radial distance covered by these institutions in the states of North East.

[PANEL-6] Recommended Manpower at CHCs (Indian Public Health Standards 2012)		
Personnel	**IPHS Norm**	
Clinical Manpower		
General Surgeon	1	
Physician	1	
Obstetrician / Gynaecologist	1	
Paediatrics	1	
Anaesthetist	1, on contractual appointment or hiring of services from private sectors on case to case basis	
Public Health Programme Manager	1, On contractual appointment	
Eye Surgeon	1, for every 5 lakhs population as per vision 2020 approved Plan of Action	
Other specialists (if any)		
General duty officers (Medical Officer)	Recommended to undergo training in Sterilization, IUD Insertions, Emergency contraception, RTI / STI, HIV/ AIDS, Newborn care, Emergency obstetric care and any other relevant subjects.	
Support Manpower		
Personnel		
Nursing Staff	7+2, 1 ANM and 1 Public Health Nurse for family welfare will be appointed under the ASHA scheme	
Public Health Nurse	1	
ANM	1	
Staff Nurse	7	
Nurse/Midwife		
Dresser	1	
Pharmacist	1	
Lab. Technician	1	
Radiographer	1	
Ophthalmic Assistant	1, Ophthalmic Assistant may be placed wherever it does not exist through redeployment or contract basis	
Ward boys / nursing orderly	2	
Sweepers	3	
Chowkidar	1	Flexibility may rest with the State for recruitment of personnel as per needs
OPD Attendant	1	
Statistical Assistant / Data entry operator	1	
OT Attendant	1	
Registration Clerk	1	

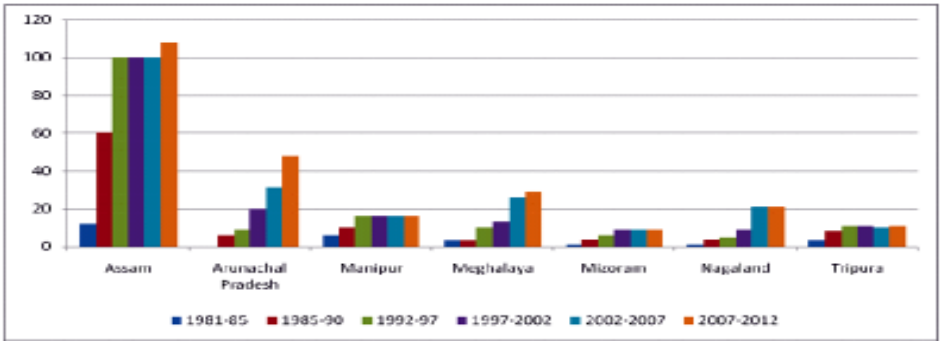

Fig. 4: CHCs built in the northeast since 1981-85

Average rural area and radial distance covered by Primary Health Care institutions

Table 3: Average rural area and average radial distance covered by Primary Health Care institutions

	Average Rural Area [Sq. Km.] covered by a			Average Radial Distance [Km.] covered by a		
	Sub Centre	**PHC**	**CHC**	**Sub Centre**	**PHC**	**CHC**
AP	NA	NA	NA	NA	NA	NA
Assam	16.83	82.60	717.37	2.31	5.13	15.11
Manipur	52.82	277.29	1386.44	4.10	9.39	21.00
Meghalaya	54.81	203.66	765.49	4.18	8.05	15.61
Mizoram	55.39	359.55	2277.12	4.20	10.70	26.92
Nagaland	41.49	130.41	782.46	3.63	6.44	15.78
Tripura	16.37	130.97	940.60	2.28	6.46	17.30
All India	**21.05**	**130.54**	**648.43**	**2.59**	**6.44**	**14.36**

16. Shortfall in health infrastructure in the North East

With the launch of NRHM, all the North Eastern states have made considerable progress in terms of increasing the numbers of rural health infrastructure (please refer to Figures 2, 3, and 4): gap between the required and in position Sub-Centres, PHCs and CHCs are reducing; in fact, there are surplus facilities in few states (Table 4). However, considerable progress needs to be made in terms of ANM staff quarters, water, electricity and motorable roads (please see, Tables 5 and 6). The number of PHCs functioning with labour room, operation theatre (Table 7); water, electricity, motorable roads, telephone and computers (Table 8); referral transport, RKS and as per IPHS (Table 9), however, still a long way to go but RKS are in place in nearly 100per cent of the PHCs. The CHCs with 4 specialists, laboratory, labour room and operation theatre (Table 10), and with X-ray, doctor's quarters, transport, RKS and as per IPHS (Table 11); all these demonstrate that RKS are in place in nearly 100per cent of the CHCs but challenges remain —a long journey awaits in terms of therest of the required facilities to be fulfilled.

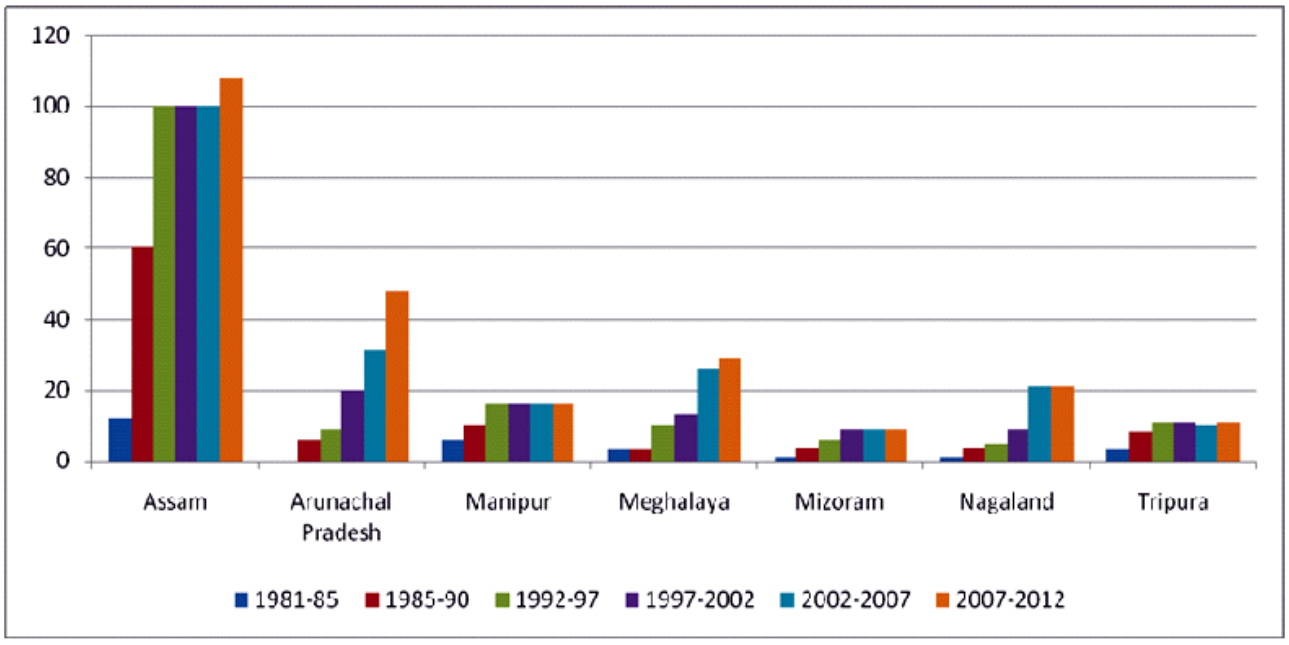

Table 4 : Shortfall in health infrastructure as per 2011 population (March 2011)

	Total Population in Rural Areas (Tribal Population)	Sub Centres			PHCs			CHCs		
		Required	In Position	Shortfall	Required	In Position	Shortfall	Required	In Position	Shortfall
AP	10,69,165 (7,44,996)	313	286	27	48	97	*	12	48	*
Assam	2,67,80,516 (36,38,841)	5841	4604	1237	953	938	15	238	108	130
Manipur	18,99,624 (8,42,941)	492	420	72	77	80	*	19	16	3
Meghalaya	23,68,971 (21,37,702)	758	405	353	114	109	5	28	29	*
Mizoram	5,29,037 (5,09,316)	173	370	*	26	57	*	6	9	*
Nagaland	14,06,861 (13,18,698)	457	396	61	68	126	*	17	21	*
Tripura	27,10,051 (9,88,644)	673	632	41	106	79	27	26	11	15
India	**83,30,87,662 (8,75,00,780)**	**178267**	**148124**	**35762**	**29213**	**23887**	**7048**	**7294**	**4809**	**2766**

Notes : The requirement is calculated using the prescribed norms based on provisional rural population from Census; 2011and estimated rural tribal population in 2011 using per cent of tribal population out of rural population in 2001.

Table 5 : Sub-Centres functioning with ANM quarters (March 2011)

	Sub Centres Functioning	Sub Centres with ANM Quarter		Sub Centres with ANM living in Sub Centre Quarter*	
		Number	per cent	Number	per cent
Arunachal Pradesh	286	114	39.9	114	100.0
Assam	4604	2542	55.2	507	19.9
Manipur	420	0	0.0	0	0.0
Meghalaya	405	401	99.0	171	42.6
Mizoram	370	350	94.6	350	100.0
Nagaland	396	68	17.2	66	97.1
Tripura	632	49	7.8	16	32.7
All India	**148124**	**81422**	**55.0**	**49470**	**60.8**

Table 6: Sub-Centres functioning with Water, Electricity and Motorable Roads (March 2011)

	Sub Centres Functioning	Without Regular Water Supply		Without Electric Supply		Without All-Weather Motorable Approach Road	
		Number	per cent	Number	per cent	Number	per cent
Arunachal Pradesh	286	12	4.2	63	22.0	95	33.2
Assam	4604	439	9.5	3111	67.6	689	15.0
Manipur	420	371	88.3	268	63.8	115	27.4
Meghalaya	405	294	72.6	265	65.4	73	18.0
Mizoram	370	296	80.0	0	0.0	69	18.6
Nagaland	396	210	53.0	195	49.2	132	33.3
Tripura	632	334	52.8	304	48.1	198	31.3
INDIA	**148124**	**36663**	**24.8**	**36250**	**24.5**	**10217**	**6.9**

Table 7 : PHCs functioning with Labour Room and Operation Theatre (March 2011)

	PHCs Functioning	With Labour Room		With Operation Theatre		With at least 4 beds	
		Number	per cent	Number	per cent	Number	per cent
Arunachal Pradesh	97	67	69.1	11	11.3	59	60.8
Assam	938	686	73.1	33	3.5	511	54.5
Manipur	80	38	47.5	0	0.0	19	23.8
Meghalaya	109	109	100.0	0	0.0	109	100.0
Mizoram	57	57	100.0	57	100.0	57	100.0
Nagaland	126	88	69.8	39	31.0	123	97.6
Tripura	79	60	75.9	4	5.1	46	58.2
INDIA	**23780**	**15629**	**65.7**	**9131**	**38.4**	**14830**	**62.4**

Table 8: PHCs functioning with Water, Electricity, Motorable Roads, Telephone and Computers

	PHCs Functioning	Without Electric Supply		Without Regular Water Supply		Without All Weather Motorable Approach Road		With Telephone		With Computer	
		Number	per cent	Number	per cent	Number	per cent	Number	per cent	Number	per cent
AP	97	31	32.0	29	29.9	11	11.3	13	13.4	0	0.0
Assam	938	83	8.8	392	41.8	29	3.1	447	47.7	562	59.9
Manipur	80	15	18.8	55	68.8	12	15.0	6	7.5	73	91.3
Meghalaya	109	4	3.7	13	11.9	59	54.1	18	16.5	85	78.0
Mizoram	57	0	0.0	57	100.0	57	100.0	57	100.0	45	78.9
Nagaland##	126	25	19.8	20	15.9	16	12.7	118	93.7	24	19.0
Tripura	79	5	6.3	12	15.2	50	63.3	29	36.7	57	72.2
INDIA	**23780**	**1920**	**8.1**	**2969**	**12.5**	**1572**	**6.6**	**12402**	52.2	**11034**	**46.4**

Table 9 : PHCs functioning with referral transport, RKS and as per IPHS

	PHCs Functioning	Referral Transport	Registered RKS	PHCs Functioning as per IPHS
AP	97	45	85	0
Assam	938	502	938	NA
Manipur	80	0	73	0
Meghalaya	109	55	109	3
Mizoram	57	57	55	0
Nagaland	126	33	126	21
Tripura	79	73	79	22
INDIA	**23780**	**9657**	**18702**	**3594**

Table10: CHCs with 4 Specialists, Laboratory, Labour Room and Operation Theatre

	CHCs Functioning	With all 4 specialists	With computer/ Statistical Asst. for MIS/ Accountant	With functional Laboratory	With functional O.T.	With functional Labour Room	With functioning Stabilization Units for New Born	With New Born Care Corner	With at least 30 beds
AP	48	0	0	38	37	46	0	8	0
Assam	108	28	108	108	101	108	84	108	101
Manipur	16	0	16	14	7	16	NA	12	7
Meghalaya	29	0	29	29	6	29	3	12	29
Mizoram	9	0	9	9	9	9	2	9	9
Nagaland	21	0	10	21	21	21	0	21	21
Tripura	11	0	11	11	3	11	0	5	11
INDIA	**4809**	**641**	**4158**	**4545**	**4190**	**4557**	**938**	**2884**	**3354**

Table 11 : CHCs with X-ray, Doctor's Quarters, Transport, RKS and as per IPHS

	CHCs Functioning	With functional X-Ray	With quarters for Specialist	With Specialist living in quarters	With referral transport	With registered RKS	Functioning as per IPHS norms	Allopathic drugs for common ailments	AYUSH drugs for common ailments
AP	48	13	3	3	40	31	0	48	NA
Assam	108	60	NA	NA	108	108	NA	108	108
Manipur	16	12	16	0	16	16	0	16	16
Meghalaya	29	18	4	4	29	29	1	29	19
Mizoram	9	9	1	1	9	9	0	9	2
Nagaland	21	3	19	19	21	21	0	21	21
Tripura	11	8	3	0	11	11	1	11	11
All India	**4809**	**2811**	**2707**	**2008**	**4270**	**4752**	**884**	**4728**	**2692**

17. Shortfall of Human Resources for Health

In terms of doctors posted at the PHCs, the short fall is minimal and, interestingly, in Assam, Manipur and Tripura there remain an excess of doctors (The states have done well with the recruitment of ASHA (Table Training up to Module 5 is completed for 100 per cent in all states. Except Assam, all states have completed two rounds of Module 6 and 7 training or are underway as of June 2012. The overall pattern of expenditure in North Eastern states reflects well-grounded programme, and Arunachal Pradesh, Assam, Mizoram, Nagaland and Sikkim have spent above Rs. 20,000 per ASHA over the period of 2005-12.[19] The two key challenges that states face today are in enabling ASHA to reach the most marginalised and to establish performance monitoring systems. Drug kits are distributed on annual basis, given to over 100 per cent of ASHA in 2011-12. Replenishment system from PHC on quarterly basis as per requirement is in place in Assam and Tripura. (Table 2). In terms of specialists in the CHCs, not surprisingly there is considerable shortfall but in Assam, this shortfall is in relation to Obstetricians & Gynaecologists, which is minimal and stands at 7per cent (Table 14). However, there are surplus in cases of Health worker (Female) /ANM at sub centre and PHCs (Table 15). Assam requires 1322 (out of 1657 required in the seven states), staff nurses (SN) at CHCs but data available on 30 June 2012 indicates SN are yet to be recruited. Except for Mizoram (30/30), other states have shortfall in regards to SN (Meghalaya 32/116; Nagaland 54/189).

Table 1 : ASHA in Position[19]

	Proposed No. of ASHA	No. of ASHA Selected	per cent of ASHA Selected
AP	3862	3757	97.28
Assam	29693	29172	98.4
Manipur	3878	3878	100.00
Meghalaya	6258	6258	100.00
Mizoram	987	987	100.00
Nagaland	1700	1700	100.00
Tripura	7367	7367	100.00

The states have done well with the recruitment of ASHA (Table 1 : ASHA in Position[19]). Training up to Module 5 is complete for 100per cent in all states. Except Assam, all states have completed two rounds of Module 6 and 7 training or are underway as of June 2012. The overall pattern of expenditure in North Eastern states reflects well-grounded programme, and Arunachal Pradesh, Assam, Mizoram, Nagaland and Sikkim have spent above Rs. 20,000 per ASHA over the period of 2005-12.[19] The two key challenges that states face today are in enabling ASHA to reach the most marginalised and to establish performance monitoring systems. Drug kits are distributed on annual basis, given to over 100per cent of ASHA in 2011-12. Replenishment system from PHC on quarterly basis as per requirement is in place in Assam and Tripura.

Table 2: Doctors at Primary Health Centres

		Required	Sanctioned	In Position	Vacant	Shortfall
Allopathic Doctors	Arunachal Pradesh	97	NA	92	NA	5
	Assam	938	NA	1557	NA	*
	Manipur	80	240	192	48	*
	Meghalaya	109	127	104	23	5
	Mizoram	57	57	37	20	20
	Nagaland	126	NA	101	NA	25
	Tripura	79	NA	119	NA	*
	INDIA	**23887**	**30051**	**26329**	**7246**	**2866**

Table 14 : Specialists in Community Health Centres

		Required	Sanctioned	In Position	Vacant	Shortfall
Surgeons	Arunachal Pradesh	48	NA	0	NA	48
	Assam	108	NA	42	NA	66
	Manipur	16	16	0	16	16
	Meghalaya	29	2	1	1	28
	Mizoram	9	NA	1	NA	8
	Nagaland	21	NA	12	NA	9
	Tripura	11	NA	0	NA	11
	INDIA	**4809**	**2182**	**1018**	**1220**	**3052**

Obstetricians & Gynaecologists	Arunachal Pradesh	48	NA	0	NA	48
	Assam	108	NA	101	NA	7
	Manipur	16	16	1	15	15
	Meghalaya	29	2	5	*	24
	Mizoram	9	NA	1	NA	8
	Nagaland	21	NA	11	NA	10
	Tripura	11	NA	0	NA	11
	INDIA	**4809**	**1958**	**1389**	**915**	**2682**
Physicians	Arunachal Pradesh	48	NA	0	NA	48
	Assam	108	NA	27	NA	81
	Manipur	16	16	1	15	15
	Meghalaya	29	2	2	0	27
	Mizoram	9	NA	0	NA	9
	Nagaland	21	NA	6	NA	15
	Tripura	11	NA	NA	NA	NA
	INDIA	**4809**	**1437**	**819**	**847**	**3252**
Paediatricians	Arunachal Pradesh	48	NA	1	NA	47
	Assam	108	NA	46	NA	62
	Manipur	16	16	2	14	14
	Meghalaya	29	2	1	1	28
	Mizoram	9	NA	0	NA	9
	Nagaland	21	NA	5	NA	16
	Tripura	11	NA	0	NA	11
	INDIA	**4809**	**1731**	**1041**	**849**	**3029**

NA: Not Available; * Surplus

Table 15 : Health worker (Female) /ANM at sub centre and PHCs (as on March 2011)

	Required	Sanctioned	In Position	Vacant	Shortfall
Arunachal Pradesh	383	NA	395	NA	*
Assam	5542	NA	8723	NA	*
Manipur	500	984	661	323	*
Meghalaya	514	667	787	*	*
Mizoram	427	388	619	*	*
Nagaland	522	NA	907	NA	*
Tripura	711	NA	440	NA	271
INDIA [2]	**172011**	**177103**	**207868**	**8835**	**6555**

[1] Requirement based on norm of one ANM per each existing Sub Centre & PHC; *: Surplus

18. Training Capacity

Tables16 and 17 show the number of Health & Family Welfare Training Centres and Multi-Purpose Worker (M) Training Centre and ratio of Healthcare Worker [F]/ANM schools to LHV/Health Assistant [F] Training schools and average population covered as on March 2011. In Assam, an innovative idea was launched through introduction of Rural Health Practitioners with 3 years training for students completing higher secondary has facilitated improvement in the quality of health services in the rural areas.[23] The largest state, Assam, after the establishment of Assam Medical College, Dibrugarh (1947), Gauhati Medical College (1960) and Silchar Medical College (1968)prior to 1970have failed to establish any new college, whichseverely constrained the number of doctors and specialists. To address this issue,Assam embarked on a rapid expansion programme with one new medical college functioning at Jorhat (2009) and three more are expected two start fully functioning: Barpeta in 2012, Tezpur in 2014 and Diphu in 2015.[24] Further, three more are planned to be established at Lakhimpur, Dhubri and Kokrajhar.[25] In addition, Assam has one Ayurvedic and three Homeopathy colleges. Tripura, Manipur and Meghalaya have one government medical college each[26] and Mizoram announced to set one up soon[27].

Table 5 : Health & Family Welfare Training Centres and MPW (M) Training Centre (March 2011)

	H&FW Training Centres	MPW (M) Training Centre
Arunachal Pradesh	0	0
Assam	1	0
Manipur	1	1
Meghalaya	1	0
Mizoram	0	1
Nagaland	0	0
Tripura	0	1
INDIA	**49**	**49**

Source: Training Division of Ministry of Health & Family Welfare, Govt. of India

Table 6 : Ratio of H.W. [F]/ANM schools to LHV/Health Assistant [F] Training Schools and Average Population Covered as on March 2011

	No. of Training Schools		Ratio of ANM per LHV School	Rural Population** - 2011 [lakhs] covered by a	
	ANM/HW (F)	LHV/HA (F)		**ANM School**	**LHV School**
Arunachal Pradesh	1	0	-	10.69	*
Assam	18	1	18	14.88	267.81
Manipur	3	1	3	6.33	19.00
Meghalaya	2	0	-	11.84	*
Mizoram	1	0	-	5.29	*
Nagaland	2	0	-	7.03	*
Tripura	2	1	2	13.55	27.10
INDIA	**319**	**34**	**9**	**26.12**	**245.03**

Source: Training Division of Ministry of Health & Family Welfare, Govt. of India

19. Expenditure Performance

In order to ensure conformity with the IPHS, the state governments use central funds to plug the loopholes identified by them in the infrastructure, human resources, equipment, and service deliveries. Besides, for smooth functioning and maintenance of the budget, the NRHM also directly releases flexible funds. In 2005-06, only 73 per cent funds were spent which dropped to 55per cent in 2007-08. 2008-09 saw a significant improvement when nearly 90 per cent funds were spent and no under spending, was reported in 2010-11. The funds are routed directly to RKS. Figure 5 shows the steadily increased spending capacity of all the seven states and Assam in particular considerably overspent making up for under spent amount in the previous years (Figure 6).

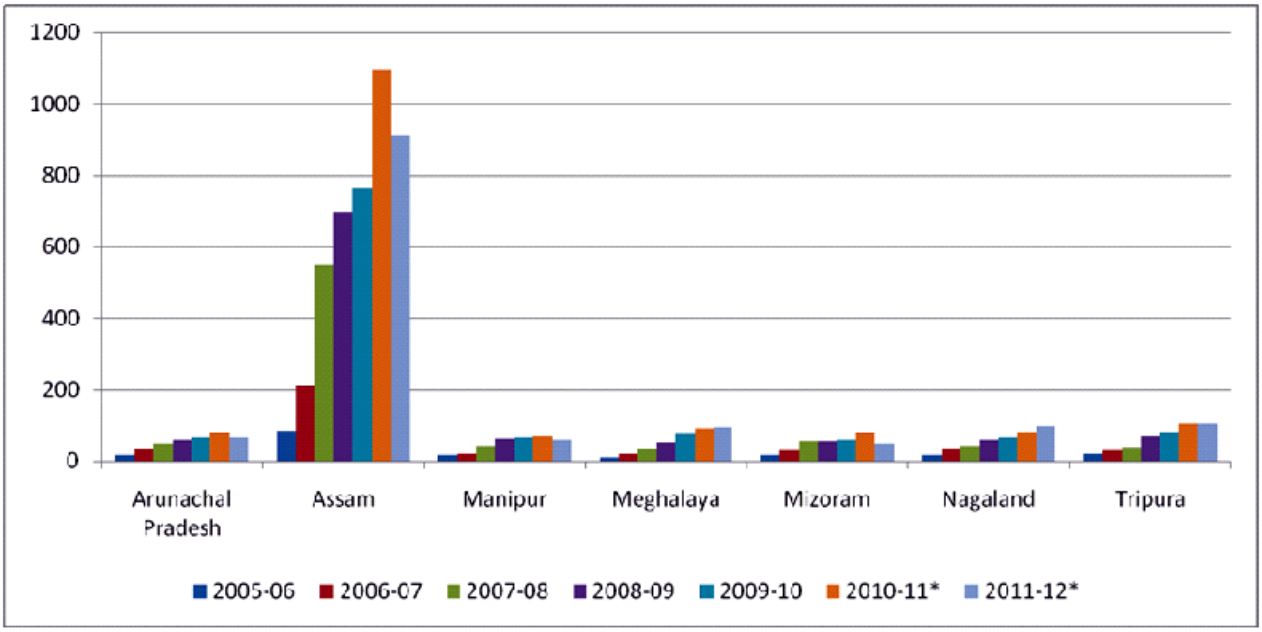

Fig. 5 : Amount of expenditure by States under items subsumed within NRHM (Rs. in Crore)

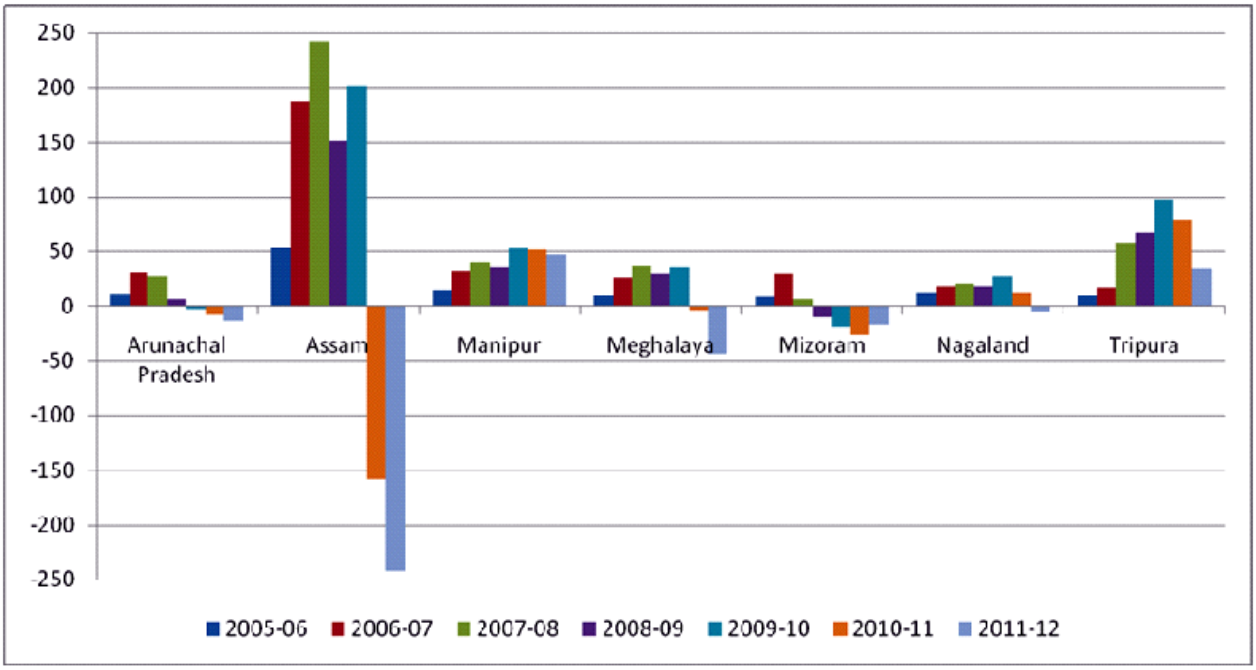

Fig. 6: Un-spent amount available with state out of fund released by GOI under items subsumed within NRHM (Rs. in Crore)

20. Janani Suraksha Yojana (JSY)

JSY is a conditional cash assistance (incentive) programme aimed to encourage pregnant mothers to deliver their babies in government health facilities or accredited private facilities.[1]Nationally, institutional delivery has increased since the launch of JSY— it increased from 57per cent in 2006-07 to 79per cent in 2010-11.Estimated to be 9·5 million women giving birth in 2010, JSY has the largest number of beneficiaries for any such programme in the world.In Assam, the number of JSY beneficiaries has been increasing and doubled to over 400,000 in 2011-12 from under 200,000 in 2006-07 (Figure 7). Institutional delivery has increased by 212per cent in 2011-12 (464,985) as compared to 2005-06 (149,003).

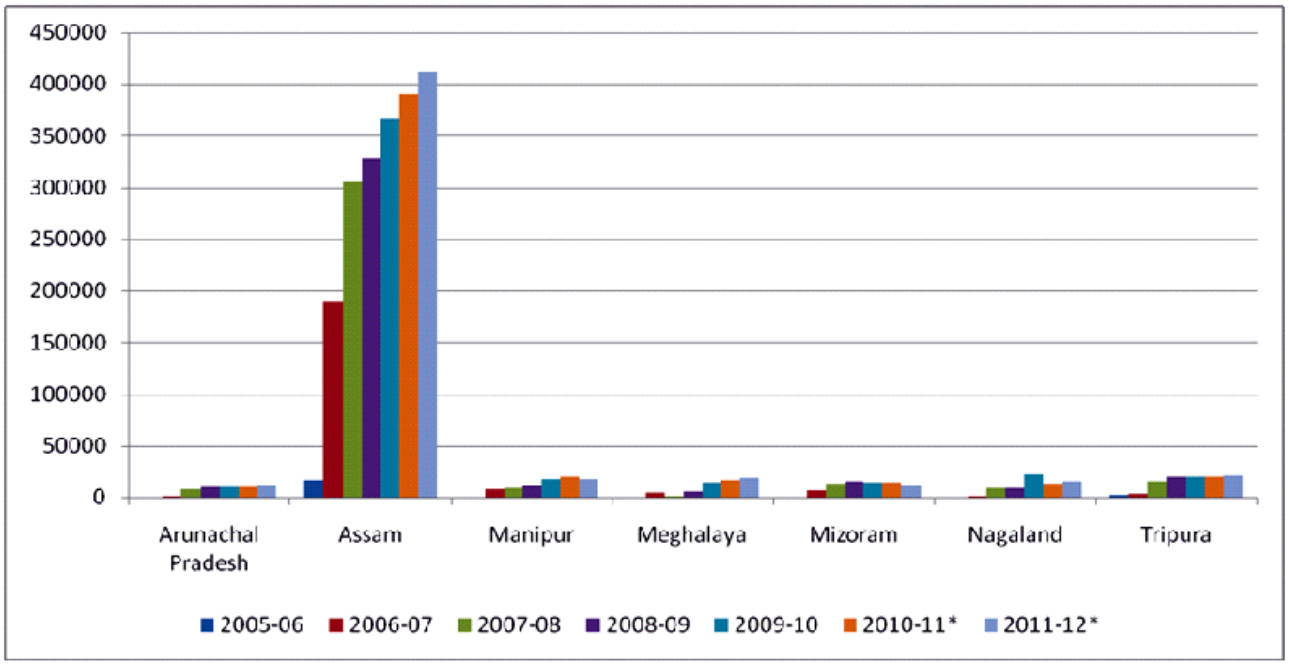

Fig. 7 : Number of beneficiaries of JSY

21. Burden of Cancer

This review revolves mainly around the NRHM, which is very much focused on pressing outcome measures such as IMR and specific infectious diseases. However, among the chronic diseases, the burden of cancer in the Northeast isamong the highest in the country and warrants specific mention (Figures8, 9). A very high incidence of cancers of all types in general and tobacco and pesticide related cancers in particular has been reported in the region. There is extensive use of pesticides in tea gardens, which can lead to widespread occupational and environmental exposures. The available data on tobacco usage and pesticide exposure alone is not sufficient to explain the high rate of incidence as the region has different customs, food habits, life-style, diverse ethnic groups, and type and the pattern of tobacco use as compared to the rest of the country.[1] Assam has the highest number of patients with cancer of the oesophagus, pharynx (or throat), larynx and gallbladder in the country with betel nut and tobacco chewing being the major contributors. The data available from population-based cancer registries (2006-2008) (Rahman, 2011),the Kamrup (metro) has the highest number of patients suffering from cancer of the oesophagus, pharynx and gall bladder, while Cachar tops the nationwide list for laryngeal cancer. In the case of male patients suffering from cancer of the oesophagus, Kamrup (metro) is second on the list in the country while Aizawl in Mizoram tops this list. Dibrugarh and Cachar are the third and fourth highest, respectively in case of pharynx or throat cancer while Aizawl ranks second in the country.Kamrup (metro) was also found to have the highest cases of gall bladder cancer in the country.

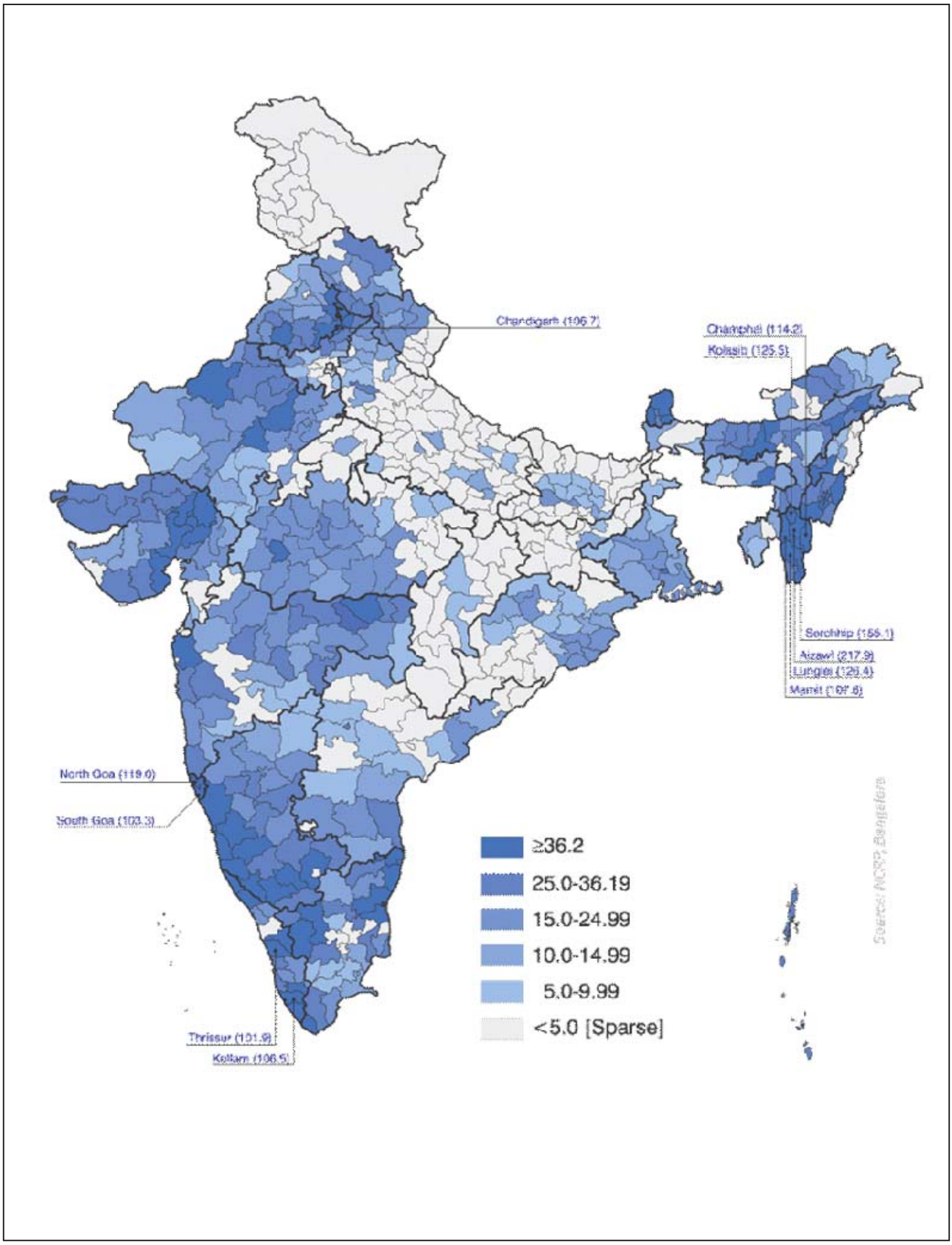

Fig. 8 : District-wise Distribution The average annual minimum age adjusted incidence rate (MAAR), Male[30]

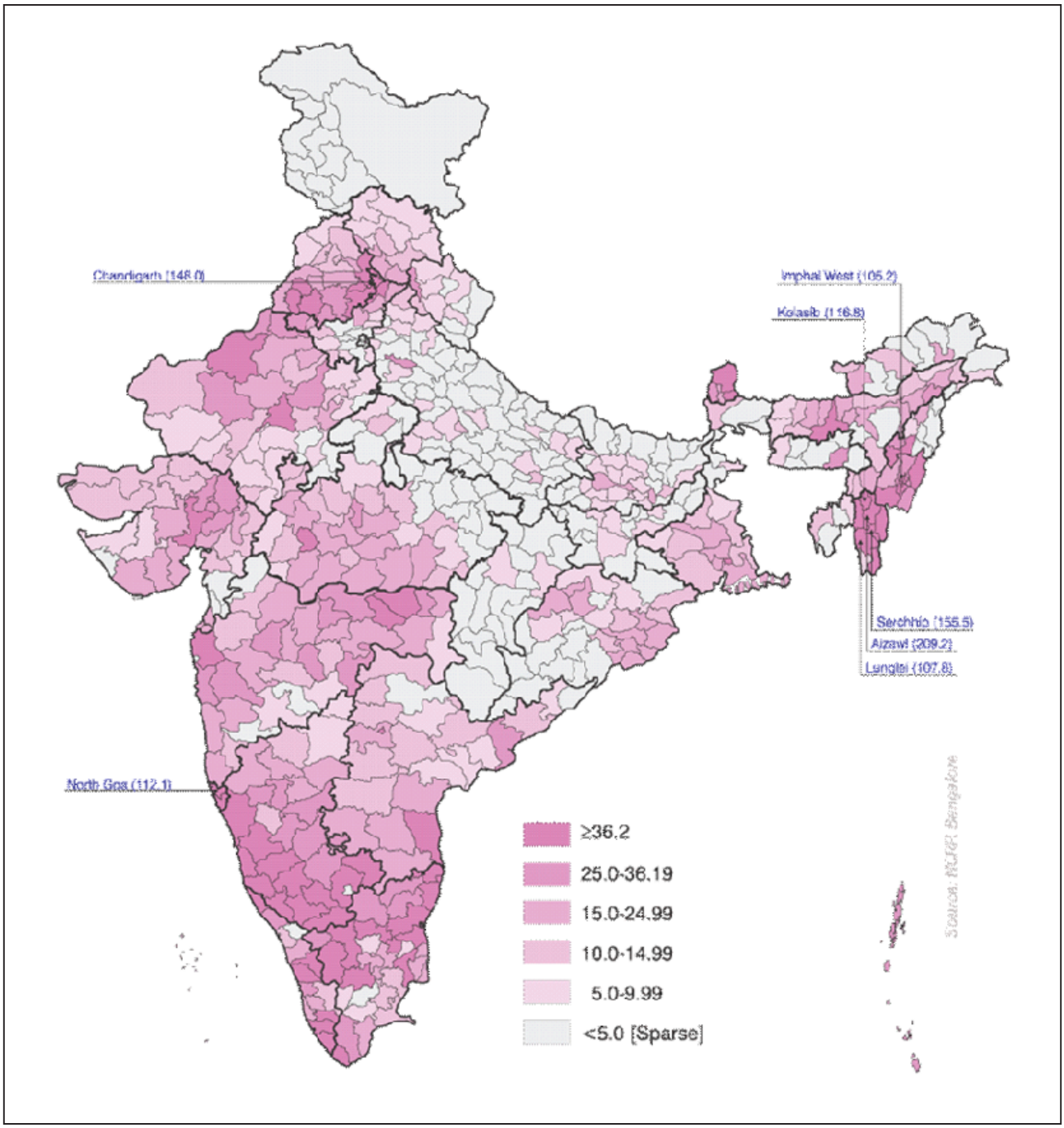

Fig. 9 : District-wise Distribution The average annual minimum age adjusted incidence rate (MAAR), Female[30]

22. Treatment outside the region

A large number of patients from north east travel to metropolis in search for advanced treatment. At a conservative estimate, 75,000 to 100,000 patients from Assam alone every year go to Chennai (and Vellore), a distance of over 2718 km from Guwahati,in search of better medical treatment.[1]There is a commonperception rightly or wrongly thatthe good secondary and tertiary medical care is not available within the region.[2]According to a study conducted by Barman et al. (2012), approximately 26per cent of the cancer patients preferred to go to big metropolis of India such as Delhi, Mumbai, and Chennai for advanced treatment after their diagnosis of the disease. The study found that the patients treated outside the state have better survival chances than that of the patients treated locally. However, this is confounded by socioeconomic status, because poor patients cannot

afford treatment cost outside the home state.

23. Outcome Measures: Key Health Indices Infant Mortality, U5MR, MMR and Immunisation Coverage

One of the key outcome measures of the NRHM is thatby 2012 IMR must be reduced to 30/1000 live births. Latest figure available (Figure 10) indicates IMR for Assam stands at 55 (against the national rate of 43) in 2011. The IMR in Assam is steadily declining since 2006 from a base level considerably higher than that of the national. In other North Eastern states, IMR is considerably lower than the national rate and close to the target except for Meghalaya and Mizoram (Figure 11). The U5MR[3] for Assam was 83 (national 59) and Neo Natal Mortality is 33, same as the national rate (SRS, 2010).[4]

MMR for Assam was 390 against the national rate of 212 (2007-09). To tackle MMR, First Referral Units (FRUs) are being set up by upgrading the existing community health centres and sub-district hospitals for providing emergency obstetric care to pregnant women with complications as close to the community as possible. In June 2012, Assam has 60 FRUs (109 in total in North East), increasing from 46 in 2005.

NFHS-3 (2005-06) the immunisation coverage in the seven north-eastern states was poor ranging from 28per cent to 50per cent. Table 17 summarises selected key reproductive and child health indicators including immunisationfrom more recent Coverage Evaluation Survey, 2009 conducted by the UNICEF.

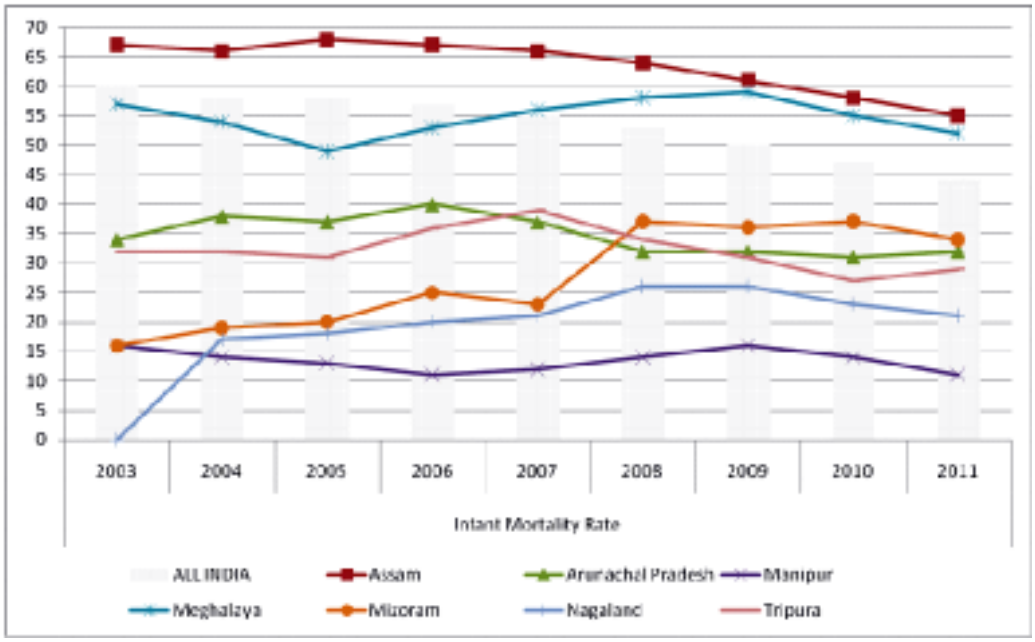

Fig. 10: Infant Mortality Rate (Time Series 2003 - 2011)

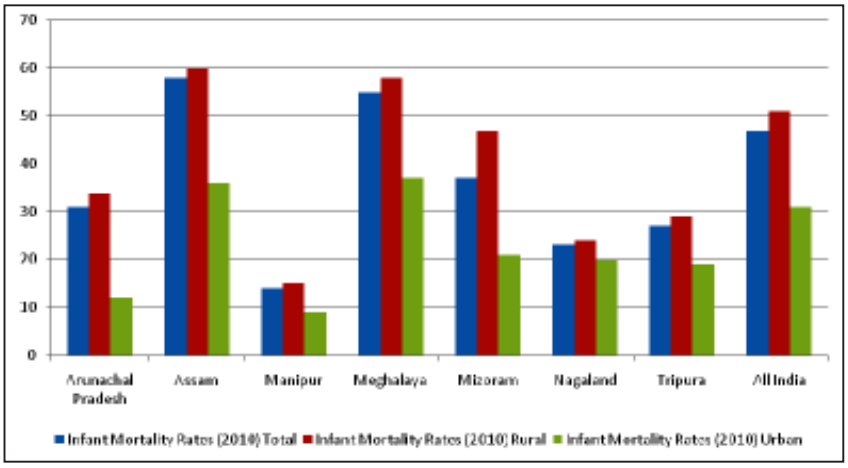

Fig. 11: Infant Mortality Rates (Rural and Urban), 2010

Source: SRS Bulletin December, 2011 Sample Registration System, Office of Registrar General, India.

Table 17: Selected Key Indicators (Coverage Evaluation Survey 2009 - UNICEF)

	At least 1 ANC	Σ 3 ANC	Full ANC (Women who received 3 ANC check-ups, one TT injection and consumed 100 + IFA tablets)	Institutional Delivery	Skilled Birth Attendance (Delivery by Doctor, ANM/ Nurse/LHV)	DPT3 Vaccine	Measles Vaccine	Full Immunization (Children (12-23 months) receiving 1 dose BCG, 3 doses of DPT/OPV each and 1	DPT Booster Dose (Children aged 18-23 months who received DPT booster dose)	Vitamin A 1st Dose	Early Initiation of Breast Feeding (<1hr)	ORT or Increased Fluids for Diarrhoea(Among children <2 year of agewho had diarrhoea in preceding2 weeks)	Care Seeking for ARI in any health Facility (Among children <2 year of age whohad ARI in preceding 2 weeks)
AP	69.8	50.4	16.3	69.9	71.9	45.0	48.2	24.8	35.9	40.0	55.6	84.6	64.5
Assam	89.6	66.4	21.3	64.4	65.5	67.5	80.1	59.1	27.7	69.3	46.1	60.0	79.2
Manipur	93.7	85.0	28.4	80.0	82.7	62.7	60.3	51.9	39.9	47.9	75.1	82.9	77.8
Meghalaya	95.1	71.0	28.1	63.7	65.2	69.3	74.1	60.8	16.4	58.1	67.7	88.4	94.3
Mizoram	91.9	79.0	21.7	83.0	85.1	77.8	81.1	73.7	67.1	74.4	56.5	60.8	87.6
Nagaland	53.7	29.4	3.5	30.4	43.8	45.9	52.2	27.8	13.6	28.2	49.4	57.5	50.6
Tripura	90.9	83.1	21.5	82.6	83.1	70.6	68.8	66.0	50.7	68.0	7.1	76.4	95.5
INDIA	89.6	68.7	26.5	72.9	76.2	71.5	74.1	61.0	41.4	64.0	33.5	53.6	82.6

Note: Conducted during November 2009 to January 2010. All figures in per cent [available at http://www.unicef.org/india/health_6679.htm]

24. Innovations

The NRHM champions the states to assess the need for innovation through decentralised planning.[1]It provides funds for local innovative approaches that emerge as priorities during the bottom up planning process. In order to achieve Reproductive and Child Health, Phase II (RCH II), each state has taken considerable steps to reduce IMR, while retaining quality but rendering appropriate service coverage for the un-served and underserved population. Panel 7 sketches the facts of RCH II.

[PANEL-7] The innovations themes following the National Programme Implementation Plan of RCH II and the Implementation Framework of the NRHM

1. Safe Motherhood/Maternal Mortality Reduction
   a. Innovations to promote safe motherhood and institutional delivery
   b. Ambulance services and help lines for transport of obstetric emergencies
   c. Strengthening skills and capacity of providers
2. Immunisation and Infant and Young Child Feeding
3. Adolescent Reproductive and Sexual Health (ARSH)
4. Behaviour Change Communication (BCC)
5. Gender Mainstreaming
6. Service Delivery for RCH
   a. Mobile health units
   b. Social franchising networks
   c. Health financing
   d. Contracting out management of public health services
7. Programme Management
   a. Incentives to improve mobility, availability and attendance of staff
   b. Incentives to improve performance and range of services
   c. Alternatives to In service training for improved performance
   d. Community and Panchayat involvement in planning, monitoring and management of health services and facilities
   e. Programme monitoring and management information systems
   f. Improving procurement and finance systems
8. School Health
9. Urban Health

Sources : Directory of Innovations implemented under RCH II/NRHM, Final Draft, September, 2008. Retrieved from capacity4dev.ec.europa.eu/.../final_draft_innovations_review_report.doc and Directory of Innovations: Implemented in the Health Sector(2008, December), Supported by Department for International Development. Retrieved from http://planningcommission.nic.in/reports/genrep/health/Directory_of_innovations_march.pdf(accessed December 31, 2012)

25. **Innovations by the north eastern states**

There are a number of innovations carried out by the north eastern states. Following is abrief outline of selected initiatives, whichprovide a window to the unique nature of the problems faced by the respective states and the innovation piloted to overcome the constraint.

Management of PHCs by NGOs (Arunachal Pradesh): A Public Private Partnership (PPP), management of 16 PHCs in 16 districts was handed over to the NGOs.As per the Memorandum of Understanding (MoU) signed with the NGOs by the government, the NGOs provide labour, equipment and administrative support and the range of outreach services. Sub-centres under the respective PHCs are also managed by the NGOs who provide outreach services in the villages covered by the PHCs. The government provides 90per cent of the funds with a 10per cent contribution from the NGOs.

Chiranjeevi Yojana, (Assam): A PPP initiative to increase access to emergency obstetric care and institutional delivery for the un-served population. The scheme contracts out services to the private doctors/ hospitals, provides insurance coverage to all Below Poverty Line (BPL) pregnant women, neonates, and generates awareness about the scheme. Cash reimbursementsare provided for transport and for the patient's attendant wage loss.

*Insecticide-treated Bed Nets for Pregnant Women (**Assam**)*: Insecticide-treated bed nets are provided to all the pregnant women accessing institutions for delivery combined with theJSY incentive. This has been initiated in Sivasagar, Goalpara, Golaghat and Morigaon on pilot basis.

*Emergency Management and Referral Institute (**Assam**)*: A toll-free number has been set up in Guwahati, which include emergency ambulance services in partnership with a non-profit organisation. The ambulances are placed strategically in the districts and functions 24/7 to cater to any kind of emergency with three teams: Information team (call taking, call processing and call dispatch), Response team (ambulance) and Care team (pre-hospital medical care). A state-wide toll-free emergency number connects informants to the Emergency Response Centre in Guwahati.

*Mother and Child Health (MCH) Month (**Assam**)*: Specific months in a year are focussed (September and March) in all the districts for promoting awareness on child health and improving service delivery. During the MCH month, the emphasis is placed on the provision of the following services, which are provided at the sub-centres, *Anganwadi* centres, and out-patient departments of all health institutions: Vitamin A prophylaxis up to children of three years, de-worming of children between one to five years, treatment of anaemia in children between one to five years, treatment of Acute respiratory infections (ARI) cases and cases of dehydration with Oral Rehydration Solution (ORS) and zinc tablets.

*ASHA Radio (**Assam**)*: From 08 October 2007, the radio programme for ASHA started in All India Radio—two days a week. For this, the radio sets were distributed to all the selected ASHA. Produced in three languages, each programme is broadcast for half-an-hour all over the state,it provides health education and information to the ASHA (for details, please visit: ASHA Radio Programme under NRHM, Assam at http://www.nrhmassam.in/asharadio.php). Pre-paid postcards were distributed to the ASHA for giving feedback and according to the feedbacks, special topics are organised each week.

*PPP with Private Hospitals/Tea Garden Hospitals (**Assam**)*: In order to deliver quality RCH services in both urban and remote areas including the tea gardens,partnership was formed with private sector/ trust hospitals/ tea garden hospitals, refinery hospitals, army hospitals and other non-profit earning hospitals. The private hospitals renders a range of services for promoting JSY such as comprehensive *Emergency Obstetric Care* (EmOC), safe abortion facilities, new-born care services, sterilisation programmes and counselling on adolescent health. Those hospitals that provide RCH services under PPP are given an annual grant of Rs. 15 lakhs each and are supported in terms of honorarium for labour, drugs, mobility support, in addition to JSY funds and social mobilisation and orientation. The state has already established partnership with seven trust hospitals and 22 tea garden hospitals.

*Mobile Boat Clinics in Riverine Areas (**Assam**)*: Started in 2005, this service has embraced 13 districts of the state. In the phase 1, it was launched in five districts: Dibrugarh, Tinsukia, Dhemaji, Morigaon and Dhubri. In 2009, five more districts were added and they are Lakhimpur, Jorhat, Sonitpur, Nalbari and Barpeta and in August 2010,in its third phase added the districts of Kamrup, Goalpara and Bongaigaon (Satia et al., 2014).The boat clinic has provisions for providing routine primary health care services as well as emergency services. Health camps are held every month for providing antenatal care. During

emergencies, that is, floods and other calamities, the boat clinic increases the frequency of visits (Satia et al., 2014).

*Outsourcing of CHCs to NGOs (**Assam**)*: For smooth functioning and better management of service delivery in the CHCs, the districts of Jonai, Majuli, Sadiya and Mancachar has outsourced the same to private agencies such ascharitable or army hospitals. That is, while the privatepartners provide labour, they will use the existing government infrastructure including the equipment, and the state will provide drugs and consumables to the partner and will be responsible for monitoring.

*Performance Incentives for Government Facilities to Improve Institutional Delivery (**Assam**)*: This innovation aims to award incentives for both normal and caesarean deliveries. It also aims to pay cash incentives to the institution—both RKS and the team conducting the deliveries are expected to pay, each with 50 per cent of the incentives.

*Cash Incentives for Staff in Difficult Areas (**Assam**)*: This incentive is meant to encourage Medical Officers (MOs) and specialist doctors to work in difficult areas. The scheme aims to pay allowances to 40 specialists and 60 MOs posted therein. The promising incentives suggest that the salaries for the doctors and the specialists will respectively be at par with the Associate Professors and Professors of the medical colleges. Rs. 5,000 is paid to the Specialist serving in a rural area as human resources and difficult area allowance for all doctors serving in KarbiAnglong, NC Hills and five subdivisions: Jonai, Majuli, Sadiya, Dhakuakhana and South Salmara.

Maternal and Perinatal Death Autopsy (MAPDA) *(**Assam**)*: Central to MAPDA is to record properly the perinatal and maternal deaths via verbal autopsies taken by either an ANM or an ASHA worker of the respective blocks/districts and reported directly to the DPM. This followsan in-depth enquiry into the incident within 15 days by an investigation team..

*Ensuring 100per cent Birth Registration (**Manipur**)*: Manipur has launched the programme of paying incentives to the Trained Birth Attendants (TBA) and others for 'making certain' that parents of all the newly born babies register the 'birth of their babies'. This is essential for obtaining 100per cent birth registration.

*Maternity Waiting Centres (**Manipur**)*: This is a pilot initiative started by Manipur for two 20-bed maternity waiting centres managed by NGOs.For the purpose of smooth functioning, each these two centres employ '14 ANM where two ANM remain on service 24/7'. These two centres have been built solely for women living in poverty. In order to use this service, the women requirepaying a nominal admittance and daily fees. However, in cases of emergency and deliveries, the pregnant women are shifted to the referral centres.*Use of Satisfied Couples to Motivate Clients for Family Planning (**Manipur**)*: Launched by Manipur, this programme aims at generate demand from the satisfied beneficiaries.

Incentives to Sub-centre Second ANM (Manipur): Manipur has launched another innovative scheme to pay incentives to any additional ANM based on their performances posted at the sub-centres.

*Incentives for Provision of Emergency Obstetric Care (**Manipur**)*: Another performance-based incentives (of Rs.1000 per case)launched by Manipur is for MBBS doctors, so that they trainthemselves in comprehensive *Emergency Obstetric Care* (EmOC) and life-saving anaesthesia skills.

*JSY Helpline (**Mizoram**)*: With the help of an NGO, Mizoram has launched a JSY helpline.

*Verbal Autopsy for New-born Deaths (**Manipur**)*: Manipur has started tracking verbal autopsy for new-born deaths.

*Health Insurance for Poor (**Mizoram**)*: Mizoram has launched a subsidised family health insurance for those people living in poverty. The scheme has been launched in collaboration with a private insurance company and private sector hospitals. The nodal agency or the state government installing the network among the private hospitals will assist the insurance company. At the same time, the state government will help the insurance in finalising treatment protocols and costs including treatment authorisation and claims scrutiny. Those private hospitals that qualify the minimum criteria for standards are chosen for collaboration. The insurance scheme looks appealing as it aims to cover pre-existing diseases as well as actual travel expenses and wage loss of the families.

*Enabling Round the- clock Services for Institutional Delivery (**Mizoram**)*: Under NHM, Mizoram has launched another cash incentive scheme for those MOs, staff nurses and Grade IV staff who conduct deliveries at night in PHCs.

*PHC run Faith-based Organisations (**Mizoram**)*: Another innovation of Mizoram is the launching of scheme that church-based-organisation should be responsible for managing PHCs. Such PHCs are located at inaccessible areas of the districts that embracetwo Sub-Centres and six villages. ThesePHCs

managed by the Mission Hospitals that are funded by the State Health Society (SHS).The funding from SHS is used for the staff salaries, maintenance of infrastructures, and equipments.The PHCs operate according to the norms of the SHS while the Mission Hospitals are responsible for service delivery and staff recruitment.

*Incentives to Increase Mobility of Health Workers (**Mizoram**)*: Mizoram has launched another scheme of providing vehicle loan to all its health workers, health supervisors and community health worker aimed at increasing their mobility

*Gender Budgeting (**Nagaland**)*: Nagaland has introduced 'gender budgeting'. This aims to integrate a 'gender perspective' and make certain that the budgets conform to gender equality and are made to fulfil the requirements of women.

*Communitarian Private Public Partnership for the Management of Health Centres (**Nagaland***): For better management of health centre services especially from sub-centres upwards, this on-going initiative aims to engage community participation. The key aim of this whole initiative is to encourage ownership.

*Cash Incentives for ANM (**Nagaland**)*: Nagaland has also introduced the scheme to provide cash incentives for those ANM posted in the sub-centres of its remote districts.

*Doli Initiative (**Tripura**)*: The Government of Tripura has launched a pilot initiative in the form of a palanquin or a*doli*transport aimed at reaching services for those people residing in the remote areas of the state. This is basically a transport service used by the villagers/porters in order to transport the sick women and children from the villages to the health care centres. The government anticipates providing500 porter services in a year.

*Mobile Helicopter Services (**Tripura**)*: Another innovative service launched by Tripura is its mobile helicopter services to reach its most remote places. For this, the government has started 12 special services.

*Increasing Mobility to Enable the Monitoring of Sub-centres (**Tripura**)*: Aimed at improving the monitoring and supervision of the sub-centres, the Dhalai district of Tripura has launched a two-wheeler service at each CHC and all the PHCs in a phased manner. The registers maintain the movement of the two wheelers while supervision reports of these two wheelers aresubmitted to the district office.

*Performance Incentives for Medical Officers in PHC, CHC and SDH (**Tripura**)*: Similar to many other states of North East, Tripura too has launched 'cash incentives' for those MOs posted in remote PHCs and CHCs. These MOs are also responsible for monitoring the bed occupancy rate of these PHCs and CHCs.

*Health Village Awards to Autonomous Development Councils (**Tripura**)*: For developing the RCH programme, Tripura has launched this scheme to award the best three villages with cash prizes, to enable the winning villages reuse the prizes for further development of health activities. For this, every year, based on a select list of indicators provided by the state, the implementation of which are monitored by *Gram Pradhans* and health committees, the District Selection Committee selects the top three general practitioners on Autonomous District Councils (ADCs).The three performing 'healthy villages' are conferred respectively Rs 3 lakhs, Rs. 2 lakhs and Rs. 1 lakh.

26. Discussion

At the launch of the NRHM in April 2005, the formerhonourable Prime Minister Mr Manmohan Singh admitted, "[w]hat has been a fatal flaw in our approach is that we have gradually abandoned comprehensive health care and a public-health perspective for focused attention on selective diseases."[1]He also said, "[w]e have grievously erred in the design of many of our health programs. We have created a delivery model that fragments resources and dissipates energies. Most importantly, we have paid inadequate attention to the public-health issues and the possibilities of social and preventive medicine."[36] The NRHM is an attempt to remedy the situation with a clear policy direction and strategic objectives. There has been emphasis on developing adequate rural health infrastructure and meeting priority goals such as reducing IMR to meet the MDG obligation.

The findings suggest that there has been significant improvement in the rural health infrastructure since 2005 and fund utilisation capacity has increased significantly. In many respect, the north eastern states fared better when compared to all-India average. The glass seems to be half-filled. The NRHM has a strong and robust information capture and monitoring system via online Health Management Information System of all the programme components. The performance of north eastern states in vital programme components such as number of districts, which prepared annual district health action plan, beneficiaries of IUCD insertions and male and female sterilisations, antenatal care, delivery care, postnatal care, deliveries, children vaccinated, AYUSH

components and number of Health *Melas* held, operational mobile medical unit and so on reveals variable performances but steady progress.[30]The gulf between the required and in-position interms of the physical infrastructure comprising of Sub-Centres, PHC and CHS has reduced dramatically when compared to 2005. However, main challenge is in meeting the human resources requirement, staffing being a serious concern particularly of specialist doctors and staff nurses at the CHC. However, Assam managed in recent time to fully meet the requirement of doctors and, in fact, has (with Manipur) surplus doctors in the PHCs.Significant challenges remain in meeting the IPHS for the Sub-Centres, PHCs and CHCsin terms of staffing and amenities such as regular water and electricity, telephone, staff-quarter, all-weather motorable road, and, labour room and operating theatre, etc. However, states have done extremely well in formingregistered RKS at PHC and CHC (100per centin Assam), together with clearexplicit goal and roadmap,and performance continuously monitored, progress is likely to continuetowards meeting IPHS. Unlike in few other states,[2] there was no big fraud reportedin north eastern states so far, while this is no guarantee against the leakage of funds and misappropriation. The RKS and PRI hold the keys andcould ensure much better utilisation of funds. The states have attained the target in appointing ASHA, all the preliminary training modules completed, and advanced training is underway in many states.

IMR is steadily declining from a very high base level compared to national rate; Assam still faces a significant challenge. The target of 30/1000 live births by 2012 probably will not be met as IMR stands at 55 against the national rate of 43 in 2011. How sooner the significant progress made in strengthening physical health infrastructure, full complement of ASHA, good performance in JYS and other components of reproductive and child health translate to achieving the IMR target is of great interest and has important implications. Similarly, MMR for Assam was 390 against the national rate of 212 (2007-09).In June 2012, Assam has 60 FRUs, an increase from 46 in 2005 to extend the reach of good obstetrics care.Whether MMR has reduced is yet to be reported.In Meghalaya and Mizoram tooIMR remainsa concern.

The innovations by the states provide a glimpse to the unique problems faced by the states,such as remoteness and difficult access, lack of trained workforce and government capacity to deliver services, overriding necessity to provide reproductive and child health services. The successful innovations need to be replicated and the learning be shared among all the stakeholders.ASHA radio is an interesting innovation; newer ICT technology shouldalso provide great advantage to remotely deliver continuous professional learning andfacilitate effective communication with the workforce. Similarly, incentive to MBBS doctors to upgrade skills, such as in comprehensiveemergency obstetric care to fill the specialist gap, is noteworthy. Continuous and relevant training is one of the most important activities of any service delivery enterprise. Access to such specialist training not only for doctors but also for other staff could be made easily deliverable by investing in simulation technology and creating interactive reusable digital learning material delivered in the form of webcast/podcast as internet penetration deepens. Boat clinic to make services available to remote, otherwise, inaccessible areas and during natural disasters is another noteworthy innovation. Partnership with private enterprise to deliver services is a standard policy but north eastern states engaging in partnership with faith based organisations and other not-for-profit organisations like military and tea garden hospitals are interesting experiment and worth closure look in terms of performance and outcome. In this regard, encouraging and empowering co-operativeformed by patients to run services for its members could be quite effective. Introduction of competition with substantial cash reward to high performing institutions or units as in tried in some states is interesting. Innovations and replicating the successful ones are the way forward. Higher learning institutions such as universities need to be encouraged to do research on innovative practices, pilot ideas and generateotherwise much needed evidenceto inform health policy formulation and future direction.

In the front of human resources, recruiting and training the healthcare professionals, from ASHA with basic curative and preventive competencies to doctors and nurses capable of specialist functions, curriculum update and meticulous workforce planning to fill the gap for the next 25 years with expansion of training capacity are required. Assam has embarked on to establish numbers of new medical colleges, which will fill the gap of doctors with first batch from the first new college qualifying in 2015. It is not sufficient to produce doctors (and nurses and other health professionals) but with right mix of skills,

competencies and attitudeand in right proportion. In developed nations, the trend is fordelegating more and more specialist tasks to trained nurses and non-doctor health professionals.In this context, the introduction of Rural Health Practitioners with 3 years training after 10+2 is a pioneering experiment in Assam. The current focus on infectious diseases, and reproductive and children health is understandable, but soon has to be matchedwith equally urgent measures to combat the chronic disease epidemic, which equally affects the poor and rural population. A wide range of cost-effective primary and secondary prevention strategies are available for chronic diseases, which can be delivered by non-doctor healthcare professionals. As such, getting it right in terms of right mix of trained work forceis a strategic priority for the north eastern states lest it turns to be its Achilles' heel.The first and the only health university in the region established in Assam in 2009 could play an instrumental role in producing healthcare professionals in right numbers with right skills and competencies to serve the region.

The cancer care facilities in the region are comparatively poor relative to the burden of the disease.The states should pool their scarce resources and capability together, and create strategically located 'state of the art'regional tertiary care centres instead of duplicating efforts and wasting resources.People travelling hundreds of kilometre from the region to metropolis in search of medical care must stop, not only from the equity point of view but alsofrom economic point of view. It is an economic imperative for the region as a whole to prevent drainage of money from the region.

Overall, with much strengthened physical infrastructure in place in most states and progress towards IPHS, what is waiting to emerge is a strong professional leadership and replicable groundbreaking innovations enabling the north eastern states to make a leap towards universal health coverage in this strategic corner of the country.

Foot Note

1. World Health Organization (WHO). The World Health Report (2000). Health Systems: Improving Performance. Geneva: WHO, retrieved from http://www.who.int/whr/2000/en/whr00_en.pdf (accessed December 10, 2012)
2. Resolution WHA58.33 (2005, May 16-25). Sustainable Health Financing, Universal Coverage and Social Health Insurance. In *Fifty-eighth World Health Assembly,* Geneva: WHO, retrieved from http://apps.who.int/gb/ebwha/pdf_files/WHA58/WHA58_33-en.pdf (accessed June 23, 2010).
3. World Health Organization (WHO). The World Health Report(2010). Health Systems Financing: the Path to Universal Coverage. Geneva: WHO, retrieved from http://www.who.int/whr/2010/whr10_en.pdf(accessed Dec 1, 2010).
4. World Health Organization (WHO). World Health Statistics (2008). Geneva: WHO, retrieved from http://www.who.int/whosis/whostat/EN_WHS08_Full.pdf (accessed January 05, 2013)
5. India, World Health Organization, retrieved from http://www.who.int/countries/ind/en/ (accessed December 02 2014).
6. Health expenditure, total (% of GDP), The World Bank, Retrieved from http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS/countries/IN?display=graph (December 02 2014).
7. Countries, World Health Organization, retrieved from http://www.who.int/countries/en/
8. PWC. Addressing the unfinished agenda Universal healthcare. http://www.pwc.in/assets/pdfs/healthcare/background-paper.pdf
9. Indians' medicine bills concern WHO. http://articles.timesofindia.indiatimes.com/2011-11-02/india/30349668_1_drug-procurement-therapeutics-committee-medicines
10. Millennium Development Goals (MDGs), India, retrieved from http://www.unicef.org/india/overview_3696.htm (accessed January 02, 2013)

11. United Nations Development Programme (UNDP), About India. Retrieved from http://www.in.undp.org/content/india/en/home/countryinfo/ (accessed January 01, 2013)

12. Millennium Development Goals Indicators-The Official United nations Site for the MDG Indicators, Infant Mortality rate (0-1) per 1,000 live births. Retrieved from http://unstats.un.org/unsd/mdg/SeriesDetail.aspx?srid=562 (accessed January 01, 2013)

13. Adolescent fertility rate (births per 1,000 women ages 15-19) http://data.worldbank.org/indicator/SH.IMM.MEAS/countries

14. National Rural Health Mission (NRHM). Mission Document (2005-2012). Retrieved from http://www.mohfw.nic.in/NRHM/Documents/Mission_Document.pdf (accessed January 01, 2013)

15. National Rural Health Mission: Framework for Implementation(2010). MHFW, Government of India. Retrieved from http://mohfw.nic.in/NRHM/ Documents/Urban_Health/UH_Framework_Final.pdf (accessed January 02, 2013)

16. NRHM Implementation Plans, 2012-13. Retrieved from http://pipnrhm-mohfw.nic.in/PIP2012-13_files/State_PIP.htm (accessed December 24, 2012)

17. Indian Public Health Standard (IPHS).National Rural Health Mission. Retrieved from http://mohfw.nic.in/NRHM/iphs.htm (accessed January 01, 2013)

18. ASHA Status of Selection and Training , http://nrhm.gov.in/communitisation/asha/asha-data.html

19. Update on the ASHA Programme (2012, July). National Rural Health Mission. Retrieved from http://nhsrcindia.org/pdf_files/resources_thematic/Community_Participation/NHSRC_Contribution/Asha_Update_July_2012.pdf (accessed December 09, 2012)

20. Sample Registration System (SRS) Bulletin (December 2011). Office of Registrar General, India

21. District Level Household and FacilitySurvey (DLHS). Retrieved from http://www.rchiips.org (accessed January 10, 2013)

22. National Family Health Survey (NFHS), India. Retrieved from http://www.rchiips.org/NFHS/index.shtml (accessed January 10, 2013)

23. Evaluation Study of National Rural Health Mission (NRHM) in 7 States (2011). Programme Evaluation Organisation Planning Commission, Government of India. Retrieved from http://planningcommission.nic.in/reports/peoreport/peoevalu/peo_2807.pdf (accessed December 12, 2012)

24. Medical Education in Assam. Retrieved from http://www.jmch.org.in/showsubpage.asp?subid = 54 & id = 120 (accessed January06, 2013)

25. Kokrajhar Medical College foundation laid (2011, February 12), *Assam Tribune*. Retrieved from http://www.assamtribune.com/scripts/detailsnew.asp?id=feb1211/state05 (accessed January06, 2013); Dhubri to get medical college (2011, January 28)*The Telegraph*, Calcutta India.Retrieved from http://www.telegraphindia.com/1110128/jsp/northeast/story_13500498.jsp (accessed January06, 2013) ; Foundation of Lakhimpur Medical College laid (2011, February 21).*The Assam Tribune*. Retrieved from . http://www.assamtribune.com/scripts/detailsnew.asp?id=feb2111/at09(accessed January06, 2013)

26. List of Colleges Teaching MBBS.*Medical Council of India*. Retrieved from http://www.mciindia.org/InformationDesk/MedicalCollegeHospitals/ListofCollegesTeachingMBBS.aspx (accessed January06, 2013)

27. Mizoram to get medical college. *The Hindu-Business line*. Retrieved from http://www. the hindubusinessline.com/industry-and-economy/economy/article1523380.ece(accessed January06, 2013)

28. Janani Suraksha Yojana, Guidelines for Implementation (2005). MHFW. Government of India. Retrieved from http://www.ilo.org/dyn/travail/docs/683/Janani%20 Suraksha%20 Yojana% 20% 20 Guidelines%

20 for %20 implementation %20-%20 Ministry %20 of %20 Health %20 and% 20 Family %20 Welfare.pdf (accessed January 11, 2013)

29. Cancer in North-East Regions of India. Retrieved from http://icmr.nic.in/annual/2004-05/icpo/cancer_neregion.pdf (accessed January 10, 2013)
30. First All India Report 2001-2002: Atlas of cancer in India. Retrieved from www.ncrpindia.org/Cancer_Atlas_India/map.aspx (accessed January 10, 2013)
31. Chennai Assam Bhawan likely to be a reality (2008, February 07).*The Assam Tribune*. Retrieved from http://www.assamtribune.com/scripts/details.asp?id=feb0708/State9 (accessed January 10, 2013)
32. Healthcare improves but people still eye big cities (2012, April 26). *The Times of India*. Retrieved from http://articles.timesofindia.indiatimes.com/2012-04-26/guwahati/31409490_1_cleft-surgeries-patients (accessed January 12, 2013)
33. U5MR and MMR figures for smaller States are not available.
34. State Wise Progress as on 30.06.2012, National Rural Health Mission (NRHM). Retrieved from http://www.mohfw.nic.in/NRHM/Documents/MIS/Statewise %20 Progress%20 under%20 NRHM_Status %20 as %20 on % 2030.06.2012. pdf (accessed January 02, 2013)
35. Directory of Innovations: Implemented in the Health Sector(2008, December), Supported by Department for International Development. Retrieved from http://planningcommission.nic.in/reports/genrep/health/Directory_of_innovations_march.pdf(accessed December 31, 2012)
36. India's Medical Emergency (2008, May 01). *Time*. Retrieved from http://www.time.com/time/magazine/article/0,9171,1736516-1,00.html (accessed January 09, 2013)
37. NRHM scam: CBI files Chargesheet against ex-UP Babu, others (2012, April, 03). *The Times of India*. Retrieved from http://articles.timesofindia.indiatimes.com/2012-04-03/india/31280630_1_cbi-files-chargesheet-charge-sheet-nrhm (accessed January 10, 2013)

References

Bajpai, N., Sach, J.D., Dholakia, R. H. 2009. Improving Access, Service Delivery and Efficiency of the Public Health System in Rural India- Mid-term evaluation of the National Rural Health Mission, Working Papers Series, Center on Globalization and Sustainable Development, New York: Columbia University

Balarajan,Y., Selvaraj, S. and Subramanian, S.V. 2011. Health care and equity in India. The Lancet. 377 (9764), 505-511

Barman, M.P., Hazarika, J., Dutta, K. 2012. Survival Status of Oesophageal Cancer Patients in Assam, India: A Bio-Statistical Analysis. International Journal of Statistika and Mathematika. 3(2), 42-49

Bhattacharyya, R. 2014. Good Governance and Development Mandate, *Journal Space and Culture, India*, Vol. 2(1), 1-3

John T.J., Dandona L., Sharma V.P., Kakkar M. 2011. Continuing challenge of infectious diseases in India. The Lancet. 377(9761), 252-69.

Mathew, G.E. 2010. India's Innovation Blueprint: How the World's Largest Democracy is becoming an Innovation Super power. Oxford: Chandos Publishing.

Mishra, D. 2008. Self Assessment and Review: PSM Biostatistics. New Delhi: Jaypee Brothers Medical Publishers

Patel, V., Shiva Kumar, A.K., Paul, V.K., Rao,K.D. and Reddy, K.S. 2011_a.Universal health care in India: the time is right. The Lancet. 377(9764), 448 - 449.

Patel, V., Chatterji S., Chisholm, D, Ebrahim, S., Gopalakrishna, G., Mathers, C., Mohan V., Prabhakaran, D., Ravindran, R.D., Reddy, K.S. 2011_b. Chronic diseases and injuries in India. The Lancet.377(9763), 413-28.

Rahman, D. 2011, April 13. Cancer rages in Assam- Betel nut, tobacco culprits. *The Telegraph*, Calcutta, India. Retrieved from http://www.telegraphindia.com/1110413/jsp/northeast/story_13845916.jsp (accessed January 10, 2013)

Rao, M., Rao, K. D., Shiva Kumar, A.K., Chatterjee, Sundararaman, T. 2011. Human resources for health in India. The Lancet. 377(9765), 587-598.

Shiva Kumar, A. K., Chen, L.C., Choudhury, M., Ganju, S., Mahajan, V., Sinha,A. and Sen. A. 2011. Financing health care for all: challenges and opportunities. The Lancet. 377(9766), 668 – 679.

Satia J., Misra, M., Arora, R. and Neogi, S. 2014. Innovations in Maternal Health: Case Studies from India, New Delhi: Sage Publications