Essential Health Package for India: Approach and Costing

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CONTENTS

ABBREVIATIONS

ANM   Auxiliary Nurse Midwives

AWW   Anganwadi Worker

BCC   Behaviour Change Communication

BPHC   Block Primary Health Centre

BPL   Below Poverty Line

CAG   Comptroller and Auditor General

CD   Communicable diseases

CGHS   Central Government Health Scheme

CHC   Community Health Centre

COPD   Chronic Obstructive Pulmonary Disease

CSO   Central Statistical Organisation

CSRD   Centre for the Study of Regional Development

DH   Dynamic Hyperinflation

DOTS   Directly Observed Treatment, Short Course

EAG   Empowered Action Group

ECHS   Ex-Servicemen Contributory Health Scheme

EHP   Essential or Basic Health Package

EQUITAP   Equity in Asia Pacific Health Systems

ERD   Economics and Research Department

FC   Finance Commission

GDP   Gross Domestic Product

GSDP   Gross State Domestic Product

HDI   Human Development Index

HLEG   High Level Expert Group

HMIS   Health Management Information System

HP	Himachal Pradesh
IMCI	Integrated Management of Childhood Illness
IMR	Infant mortality rate
IPHS	Indian Public Health Standard
IRDA	Insurance Regulatory and Development Authority
IYCF	Infant and Young Child Feeding
J&K	Jammu and Kashmir
LHV	Lady Health Visitor
M&E	Monitoring and Evaluation
MDG	Millennium Development Goals
MIS	Management Information Systems
MMR	Maternal mortality rate
MO	Medical Officer
MoHFW	Ministry of Health and Family Welfare
NAS	National Account Statistics
NCD	Non-communicable diseases
NCMH	National Commission on Macroeconomics and Health
NHSRC	National Health System Resource Centre
NRC	Nutritional Rehabilitation Centres
NRHM	National Rural Health Mission
NSS	National Sample Survey
OGDPI	Open Government Data Platform India
OOP	Out-of-pocket
OOPHE	Out of Pocket Health Expenditure
OOPS	Out-of-pocket spending
PCA	Principal Component Analysis
PHC	Primary Health Centre
PIP	Project Implementation Plans

RBI	Reserve Bank of India
RBSK	Rashtriya Bal Swasthya Karyakram
RH	Rural Hospital
RHS	Rural Health Statistics
RSBY	Rashtriya Swasthya Bima Yojana
SC	Sub-Centre
SHI	Social health insurance
SRS	Sample Registration System
TB	Tuberculosis
TER	Total Expenditure Requirement
TN	Tamil Nadu
UHC	Universal Health Coverage
UP	Uttar Pradesh
VBD	Vector-borne disease
WHO	World Health Organization

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1.   INTRODUCTION

Essential or Basic Health Package (EHP) became a central feature in discussions since the 1993 World Development Report of the World Bank, which posed the following question: how should resource-poor countries spend their money in the health sector (World Bank 1993, Waddington 2013)? To make the best use of scarce resources, it was argued, countries should incorporate low-cost, high-benefit interventions in their health investment.   Since then, discussions on health investment have centred on the notion of the Basic Health Package or Essential Health Package (EHP).   Subsequently, the WHO Commission on Macroeconomics and Health (CMH) recommended that countries should try to find funding for tailored packages of essential services or basic health interventions (WHO 2001). There is an assumption implicit in any EHP: needs are numerous, but resources are limited; therefore, some sort of rationing mechanism must be used.   Explicit prioritization and rationing is the basis of formulating an EHP, which depends on a country's disease burden, economic development, health system set-up and implicit value system. An EHP comprises a limited set of public health and clinical services to be provided at primary, secondary and tertiary care levels.   A very recent comprehensive review of the various definitions and design and implementation issues (Waddington 2013) indicate the four main justifications for an EHP.

1. *Cost effectiveness*: Interventions that add value for money need to be included in a package

2. *Equity*: A minimum set of services to be available to every person with the same need, regardless of their socioeconomic and demographic characteristics

3. *Poverty reduction*: Ill health and poverty are correlated

4. *Political empowerment and accountability*: Since EHP has a well-defined list of services to be provided, accountability is also a clearly visible tool for good governance

Cost-effectiveness would seem to be the most important criterion of an EHP in a resource-constrained setting but, in real life, most developing countries develop an EHP primarily for the equity objective, which is often seen in the context of a poorly functioning health system that fails to deliver care to citizens, especially the most

vulnerable ones. More developed countries have often implemented EHPs with a functional social health insurance system to define terms of contracts with different providers, or to set levels of subsidies or insurance reimbursements (ibid). The global interest in EHP also came with the resolution adopted on Universal Health Coverage (UHC) by the 58th World Health Assembly in 2005, which defined UHC to mean that "everyone in the population has access to appropriate promotive, preventive, curative and rehabilitative health care when they need it and at an affordable cost" (WHO 2005). In the current discourse on health coverage, an EHP is viewed as the core of a UHC programme of a country and an efficient, effective way to achieve the goal of UHC, increase health service delivery and, in particular, improve access to health services in low-income and resource-constrained settings. Designing an EHP is a complex exercise; it requires technical, institutional and operationally practical inputs. While designing an EHP, a country must work out the core health needs of its population and its capacity to implement and deliver the promised package. There are four aspects to an EHP: content, delivery, level and financing. The design phase of an EHP must consider content, delivery and level but financing—an essential part of the implementation and success of any EHP—may take place later.

In India, health is a state subject; because of differentials in resource capacity, effort and commitment, inter-state variations in health spending are huge and, therefore, health outcomes vary widely. Concerns have been escalating over insufficient government finances on the one hand and high out-of-pocket spending (OOPS) on the other. Insufficient government finances affect countries' aspirations to achieve UHC amid high inequity, and high OOPS seriously affect health equity. Some of the earlier Finance Commissions have acknowledged these constraints and disparities and tried to address it through specific-purpose grants (RBI, 2011).

The issues arising from the lack of adequate resources and its concomitant impact on supply-side factors are compounded by the changing health profile of the country, wherein basic public health threats requiring preventive and primary care exist alongside non-communicable diseases (NCD) that usually require expensive medical intervention. Also, depending on the stage of epidemiological transition a state is passing through, the share of communicable diseases (CD) and NCD varies considerably at the sub-national level. Secondly, the serious quality issue of public

health delivery systems has led to a huge explosion of private health care providers, with uneven and at times dubious service quality. This has also led to a mushrooming of "demand" for health services, some of which is supply-induced. Thirdly, rapidly changing technology and growing incomes have also led to a different kind of demand for health care, often blurring the distinction between ailment and aesthetics. In a scenario of such heterogeneous demand for health services, it is a challenge to plan for UHC or a core health package with the maximum number of services that reaches the maximum number of people.

Finally, the state-level variations in all these parameters add the final layer of complexity to the debate around UHC. In India, the imbalance in regional development has many adverse fallouts; one is a corresponding inequity in state epidemiological profiles. Putting health in the state list of the Constitution was an acknowledgement of this imbalance. There was a corresponding hope: sub-national governments could identify their needs and gaps better and formulate policies accordingly.

Therefore, discussions around UHC or EHP at the *national* level miss the point entirely about tailoring needs to meet situations that differ widely across states. Similarly, the availability of a well-functioning health infrastructure is a key to universal coverage, and this varies across states significantly as well. The issue of access to healthcare becomes critical for policy makers not only to achieve universal coverage of healthcare but also to ensure social justice (Rice et al. 2001; Sen 2002). Geographical accessibility is one of the factors that can influence 'timely use'. Studies in developing countries have shown that the absence of good roads and proper communication, particularly in poor, remote areas and in adverse terrain, constrain access to healthcare and result in poor health outcomes of the population (Baker et al 2000; Gupta et al 2003; Peters et al 2008; Rahman et al 2000).

There have been a few attempts to understand and cost EHP in India. The first was by the National Commission on Macroeconomics and Health (NCMH) set up by the Ministry of Health and Family Welfare (MoHFW 2005). The NCMH estimated that the government would require a five-fold increase in the budget at Rs 1,160 per capita per year if it is to be the sole provider of the comprehensive package of services consisting of preventive, promotive and curative services. A more recent estimate of

recurrent and annual costs for providing health services through a mix of public and private providers in Chandigarh estimated the cost of UHC at Rs 1,713 per person per annum in India using generic drugs. The costs using branded drugs were to be 24 per cent higher (Prinja et al 2012). Extrapolation of these costs to entire country indicated that Indian government will need to spend 3.8 per cent (range was between 2.1-6.8 per cent) of the gross domestic product (GDP) for universalizing health care services.

More recently, during the formulation of strategy for the Twelfth Plan, the Planning Commission set up the High Level Expert Group (HLEG) to develop a comprehensive strategy for health for the Twelfth Five Year Plan period (2012-17). The HLEG recommended Health Service Norms and, under it, the development of a National Health Package (NHP). The NHP was to offer every citizen—as an entitlement—a package of essential health services at different levels of the healthcare delivery system. The HLEG also recommended that services be rationalized and that the urban poor's health needs be focussed on so that in urban areas access to health facilities is equitable (Planning Commission 2011). Debate over the merits of these recommendations has been intense (Gaitonde 2012, Rao 2012), with a common comment being on the lack of details in the report, which extends to costing as well. Since the report did not include a detailed costing of the full package if all the recommendations were to be carried out, it is not possible to comment on how much the package would have cost.

Very recently, the MoHFW has drawn up an "Essential Package of Services" comprising 20 services under what it called UHC- Phase I. A few states were selected to pilot this package, but reports are yet to come in.

With this background, the report attempts to analyse the elements and costs of a potential EHP in India. In the process, the report highlights the diversities among states in disease burden, health infrastructure and health financing. It also looks at select international best practices on EHP for lessons. The central focus remains on the states' ability to approach the issue of EHP or UHC and the parameters a state might like to consider in finalizing what an optimum package should include. The report also arrives at possible per capita annual costs of a package of services for India.

The report is divided into 11 sections. Section 2 presents the objectives and research questions. Section 3 discusses the methodology and data sources used in the report. In Section 4, we present international experiences with EHP. Sections 5 and 6 present analyses of health outcomes and infrastructure, and in Section 7 we present a brief overview of the health financing situation in the country. Section 8 presents the implications of the findings for EHP and discusses the various possible models that the country can adopt and their costs. Section 9 discusses how states might want to prioritize and reduce the initial burden of launching such a programme. In Section 10, we discuss some key health sector reforms and policy options that might have to precede the launch of UHC or EHP. Finally, in Section 11, we present the overall summary and conclusions in light of the Finance Commission's mandate regarding transfer of funds for health.

2. OBJECTIVES AND RESEARCH QUESTIONS

The main objective of this exercise is to understand the parameters the states have to take into consideration for arriving at the components of a basic or essential health package for India and to arrive at a tentative costing of such a package. The fundamental premise is that adopting one single package may not be the right approach, and the states should be able to devise their own state-specific packages depending on three parameters: (1) disease burden, (2) infrastructural needs and (3) financing.

In particular, the following questions would guide the analysis:

- What has been the international experience in the design and composition of EHP? In particular, have countries been guided by disease burden? To what extent have different kinds of services—preventive, promotive and curative been included in such a package?

- How are the states placed in terms of some of the basic health outcomes of maternal and child health? What is the overall disease burden across states? For example, what are the variations across communicable, non-communicable, vector-borne and other diseases? This helps to understand state-specific emphasis in an EHP.

- Is the existing health infrastructure sufficient to cater to the needs of such an EHP, if implemented?

- Based on national and international experiences and policy prescriptions, would the recent MoHFW list for EHP suffice?

- What would be the costing of a proposed package of EHP? Are there any existing models that might guide such a costing?

- What would be the investment required to implement the proposed package, for the country as a whole and for states? Does the current financing situation indicate that such packages can be taken up in the near future?

- What kind of health sector reforms might be needed to launch an EHP in India? What should be the timing of such reforms?

The analysis ends with a list of implications and recommendations for the Finance Commission about the design and implementation of one or more EHPs in India.

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3. METHODOLOGY AND DATA

The data used for the analysis in this report come from various sources. Wherever required, an appendix has been provided as a source of more detailed data while the text retains some of the more analytical and communicative ones.

Information on country experiences with EHP has been collated from various secondary sources and presented in a succinct comparative framework.

For health outcomes, the indicators that are considered fall broadly into three categories— child health, maternal health, and morbidity/mortality status of the general population. The indicators are infant mortality rate (IMR), under-five mortality rate (U5MR), maternal mortality rate (MMR), and prevalence of select diseases. For immunization we consider the percentage of children who are fully immunized, and for nutrition, we consider the proportion of children who are stunted, underweight and anaemic. For the mortality indicators we have accessed the Sample Registration System (SRS) data. Data on childhood malnutrition are from National Family Health Survey (NFHS-3) (2005-06). Full immunization data is taken from DLHS-3 (2007-08) (for Nagaland from NFHS-3).

Availability of robust data on disease burden (both morbidity and mortality) is a challenge in India. Therefore, to examine disease profile at the state-level, we use data from two different sources— the National Sample Survey data on morbidity, treatment and condition of the aged (NSS 60th round, 2004) and the HMIS data (National Health Systems Resource Centre, 2012-13). This serves two purposes. Firstly, the NSS data is dated, the year of publication being 2004, a problem which is addressed by the more recent HMIS data. Secondly, the quality of HMIS data is a cause of concern and this is where a comparison with the NSS data is warranted.

Diseases are re-classified into five major categories— communicable, non-communicable, vector-borne, accidents/ injuries, and others. Communicable diseases (CD) include tuberculosis, diarrhoeal diseases, respiratory diseases including infections, HIV/AIDS and other fever related diseases. Non-communicable diseases (NCD) include heart disease or related to hypertension and neurological disease including strokes. Vector-borne disease (VBD) includes malaria. Accident/ injury includes trauma or accidents or burn cases, suicide, animal bites and stings

while others include all known acute and chronic diseases not included under any other categories. It is important to remember that disease categories vary across data sources and this has acted as a challenge in drawing a comprehensive and exhaustive listing under these five categories. For example while diabetes is included as a non-communicable disease in NSS, HMIS does not provide data for this disease and, therefore, is excluded from its list of non-communicable disease.

In the section on health infrastructure, we take fifteen indicators of gaps in health infrastructure under different categories like physical infrastructure, manpower, etc.

1. Sub-Centre (SC)
2. Primary Health Centre (PHC)
3. Community Health Centre (CHC)
4. Health worker (female)/Auxiliary Nurse Midwives (ANM) at SC and PHC
5. Health worker (male) at SC
6. Health assistant (female)/LHV at PHC
7. Health assistant (male) at PHC
8. Doctor at PHC
9. Obstetricians and Gynaecologists at CHC
10. Paediatricians at CHC
11. Total specialists at CHC
12. Radiographers at CHC
13. Pharmacist at PHC and CHC
14. Laboratory technicians at PHC and CHC
15. Nursing staff at PHC and CHC.

These data are taken from the National Rural Health Mission (NRHM, 2011/12). Gap in one indicator is calculated as relative percentage gap between required and available. For comparison, we have also taken data on physical infrastructure from another data source (OGDPI 2011). Here we have taken gaps in SC, PHC and CHC. We compute the required number of public health facilities in these states/ UTs on basis of Indian Public Health Standard population norms. Population of the states/ UTs is taken from the 2011 Census. The gap of health facilities (i.e., additional facilities needed) is calculated as relative percentage gap between the required number of facilities and facilities available. Subsequently, the states/ UTs are ranked

separately on the basis of the percentage gap (or unavailability) of healthcare facilities. The state/ UT with minimum gap is deemed the best and gets the rank of one.

To assess the relative position of states/ UTs with data on multiple dimensions of health and health infrastructure more tractable, we reduce the dimensions using standard statistical methodologies like Principal Component Analysis (PCA). PCA reduces a large set of variables to a much smaller set that still contains most of the information about the large set. It reduces the variation in a correlated multi-dimension to a set of uncorrelated components. The objective of PCA is to achieve parsimony and reduce dimensionality by extracting the smallest number of principal components that account for most of the variation in the original data without much loss of information (Chowdhury 2004: 40). Principal components with Eigen values greater than one are taken for the analysis. Where more than one principal component with Eigen value greater than one is obtained, we compute a composite index as a weighted average of the principal components or factors, where the weights are the following: (Eigen value of the corresponding principal component)/ (sum of all Eigen values) (Kumar et al 2007: 107-9). On the basis of the values of the composite index, all the states/ UTs are ranked. The above methodology is applied in the analysis of both health outcomes and health infrastructure.

For the section on health financing we use two sources of data. For public expenditure on health and family welfare, the RBI annual publication on "State Finances: A Study of Budgets" has been used. However, state-level expenditure as provided by the RBI does not include state spending through the non-treasury route i.e., through societies and implementing agencies. This information was provided by the Fourteenth Finance Commission. The private out-of-pocket (OOP) expenditures have been generated from the unit-level data of the 68th Round of the National Sample Survey on consumption expenditure. The population figures have been taken from Census 2011.

In the section on comparison of different health service delivery models, there are four relevant figures corresponding to Railways, Defence, NCMH and Prinja et al (2012). Health expenditure by the Railways has been extracted from the relevant detailed demand for grants of the budget of the Ministry of Railways. The

corresponding information for Defence has been culled out from the CAG report on the Ministry of Defence. All expenditure figures have been converted to 2011-12 prices using the GDP deflator calculated from GDP figures provided by the CSO. For the remaining two models, the relevant expenditure figure has been taken from the NCMH report and the published paper by Prinja et al (2012).

A detailed list of data source and their year of publication for the selected indicators under each selected dimension is given in Table A3.1 (see appendix).

4. ESSENTIAL BASIC HEALTH PACKAGE: INTERNATIONAL EXPERIENCE

In this section, we discuss some selected case studies of international experience with EHP. In all, we look at 12 case studies of developed and developing countries. Our aim was to understand how countries have defined their EHP and what all they include in their packages. From among developing countries, we take Afghanistan, Colombia, Ethiopia, Liberia, Mexico, South Africa, Sri Lanka, Thailand and Uganda. The developed countries included in the study are Belgium, Germany and Poland. Figure 4.1 indicates the number of countries that have included a particular service in their EHP, for both promotive/ preventive services as well as for curative care. The full table is given in the appendix (A4.1). In the last column, we present the total (out of 12) number of countries that have a particular service covered under their EHP.

Figure 4.1: Case Study of EHP for 12 Countries
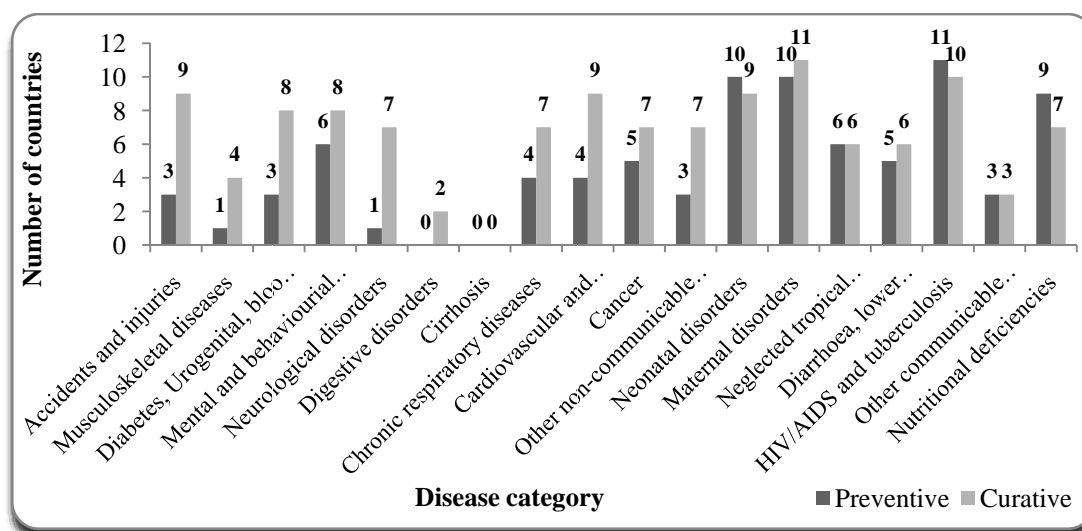
Overall, countries have included preventive, promotive as well as curative services in their packages. Maternal, child and newborn health has been almost universally included in EHP of countries with equal amounts of preventive and curative components. The other common inclusions have been reproductive health and family planning services, where the component of prevention has been substantial. Within CD, HIV/AIDS and tuberculosis have been included in most of the countries. The inclusion extends to mental health, diabetes, and dental health as well in a number of countries indicating the efforts to be comprehensive.

The EHPs in developing countries include a significant amount of services related to CD, in keeping with their disease burdens. For example, Liberia seems to have a very comprehensive package with a number of services pertaining to CD included in EHP. In Ethiopia, there are specific interventions to be provided at the health post, health centre and district hospital levels. The interventions include antenatal care, delivery and newborn care, post-natal care, family planning, child health, all under family health. Under Integrated Management of Childhood Illness (IMCI), the services are growth monitoring and essential nutrition, immunization and adolescent reproductive health. Under CD, the package includes TB and leprosy, HIV/AIDS and sexually transmitted infections, epidemic diseases including malaria surveillance. Basic curative care and treatment of major chronic diseases are also included. Under preventive and promotive services, the package includes hygiene and environmental health, as well as health education and communication.

Despite their developing status as economies, countries like Liberia and South Africa have a fairly comprehensive design of their EHP.

In developed countries that have social health insurance (SHI), the governments have made it mandatory for all or majority of the population. In most such countries, mandatory basic health insurance is combined with voluntary supplemental insurance, as is the case of OECD countries like Belgium and Netherlands. In the Netherlands, the standardized basic health package includes hospital care, General Physician services, prescription drugs and maternity care (Roos and Schut 2012).

Emergency care has also been a part of most EHP studied, as indicated in Table A4.1. Overall, the country case studies indicate the following areas of priority in these countries.

- Maternal, newborn and child health, especially immunization, antenatal care and labour and delivery care, emergency obstetric care, other childhood illnesses, growth monitoring and nutrition
- HIV/AIDS/STD, tuberculosis, malaria, respiratory diseases
- Diarrhoea
- Cardiovascular diseases, diabetes
- Mental health
- Dental health

- Emergency care

The packages have included curative as well as preventive care in these areas, especially under maternal, newborn and child health. In sum, the international experience does indicate that countries have moved towards a more inclusive design rather than narrowly focused EHPs, though they have prioritized based on their own situations.

5. HEALTH OUTCOMES ACROSS STATES

Since health is a state subject, the health status of the population is to a significant extent (in addition to incomes and other social dimensions of health) a reflection of the prevailing health system of a state and its evolution over time. To understand how disparate the health outcomes are across States of India, we consider the performance of states in a mix of mortality and morbidity indicators. This section also attempts to bring out the direction and extent of association between child mortality and some non-core health indicators like child nutrition and immunization.

a. Infant Mortality Rate

IMR is defined as the probability of dying between birth and exactly one year of age expressed per 1,000 live births. Figure 5.1 plots the IMR for all states, UTs and the country as a whole for the year 2012. The horizontal line represents the MDG target in IMR, which is 25 per 1000 live births, to be attained by 2015. The country as a whole has an average IMR of 42. Among the states, Goa, Manipur Kerala, Nagaland, Tamil Nadu, Sikkim and Maharashtra have already attained the MDG target.

Figure 5.1 : IMR across States/ UTs, India (SRS 2012)
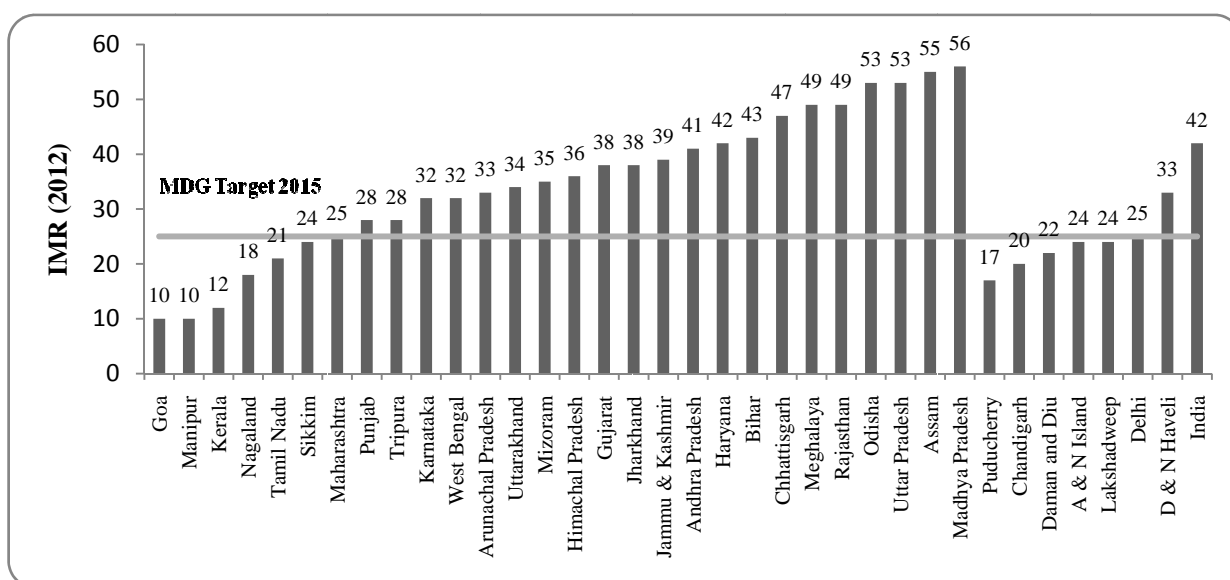
States that are way behind the MDG target are the historically poorer, less developed states. However, in some of the relatively developed states like Haryana, Gujarat and Karnataka, the IMR levels are also quite high.

b. Under-five Mortality Rate

Figure 5.2 plots under-five mortality rates (U5MR), which is defined as the number of deaths of children aged 1-4 years per 1,000 children in that age group over a period of a year, i.e., the probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period. The MDG goal for this indicator is 42. The current U5MR in India is 52. This data, unlike IMR, is not available for all states and UTs.

Figure 5.2 : Under-five Mortality Rates across States, India (SRS 2012)
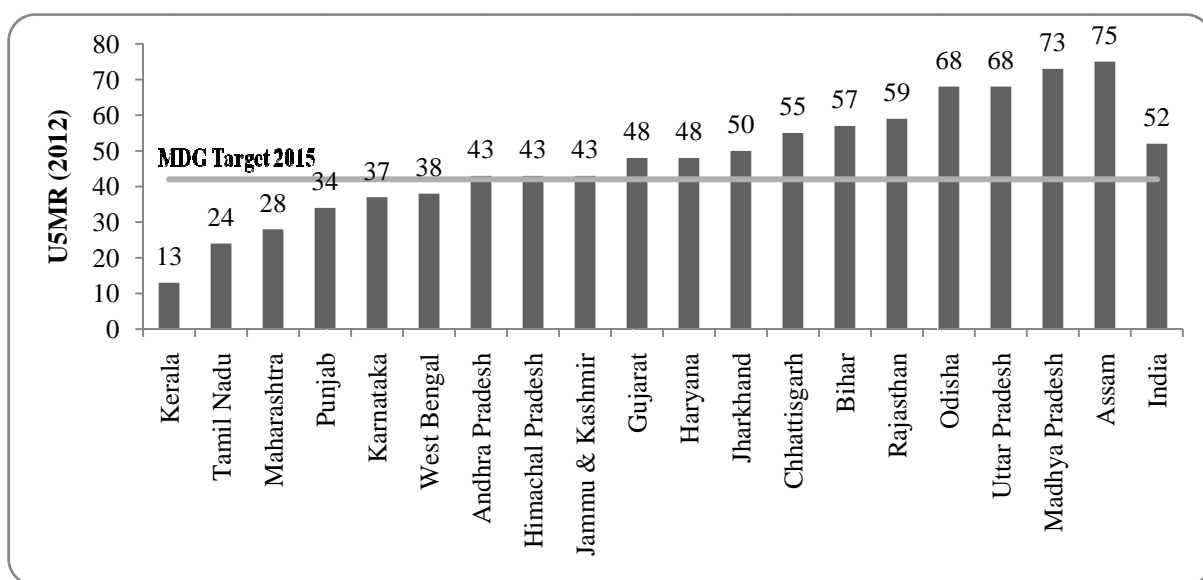
The relative positions of the states are roughly the same when compared to IMR. Only six states have already attained the MDG target on U5MR. The states with very high U5MR are again the less developed ones. Gujarat and Haryana standout as two developed states with relatively high U5MR.

Child survival depends on a complex set of factors, the key ones being economic status, maternal education and household access to essential infrastructure especially water and sanitation. Other than these so-called social determinants of child survival, there are key health interventions, e.g., the proportion of children who are fully immunized, that directly/ indirectly influence child survival. Figure 5.3 (a) plots

U5MR against the percentage of children who are fully immunized[1], for selected states.

The clear negative gradient indicates that immunization has a distinct positive association with child survival and states like UP and MP that have very low immunization rates are also states with very high U5MR.

Figure 5.3 (a): U5MR and Full Immunization
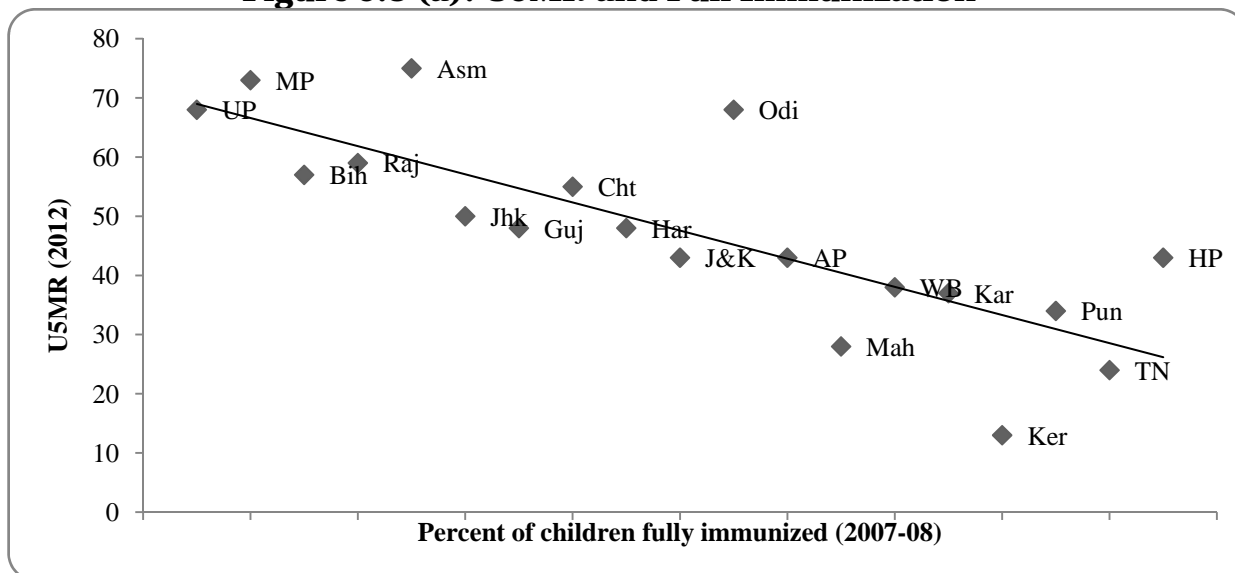
The clear negative gradient indicates that immunization has a distinct positive association with child survival and states like UP and MP that have very low immunization rates are also states with very high U5MR.

The other key determinant of child survival is nutrition, since adequate nutrition is essential for the healthy growth of children. We test this proposition in Figure 5.3(b) where U5MR is plotted against an index of child nutrition. The index is prepared as follows:

Index of child nutrition = 100 − {(UN1+UN2+UN3)/3}, where UN1, UN2 and UN3 stands for under-nutrition indicators, viz., percentage of children who are stunted, underweight and anaemic respectively.

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[1] Children 12-23 months fully immunized (Full Immunization: BCG, three injection of DPT, three doses of Polio (excluding Polio 0) and Measles). Data source: DLHS-3 (2007-08).

While slightly less pronounced than the previous association between U5MR and immunization, here, too, we see a negative association between U5MR and the index of child nutrition. Again, Bihar, UP, Jharkhand with low index of child nutrition have higher U5MR.

While the plotted relationships are not comprehensive as far as determinants of child survival is concerned, they definitely support the inclusion of immunization services and indicate also the need for an essentially inter-sectoral approach involving nutrition, water and sanitation and other social determinants of health.

Figure 5. 3(b): Under-five Mortality Rate and Child Nutrition across States, India
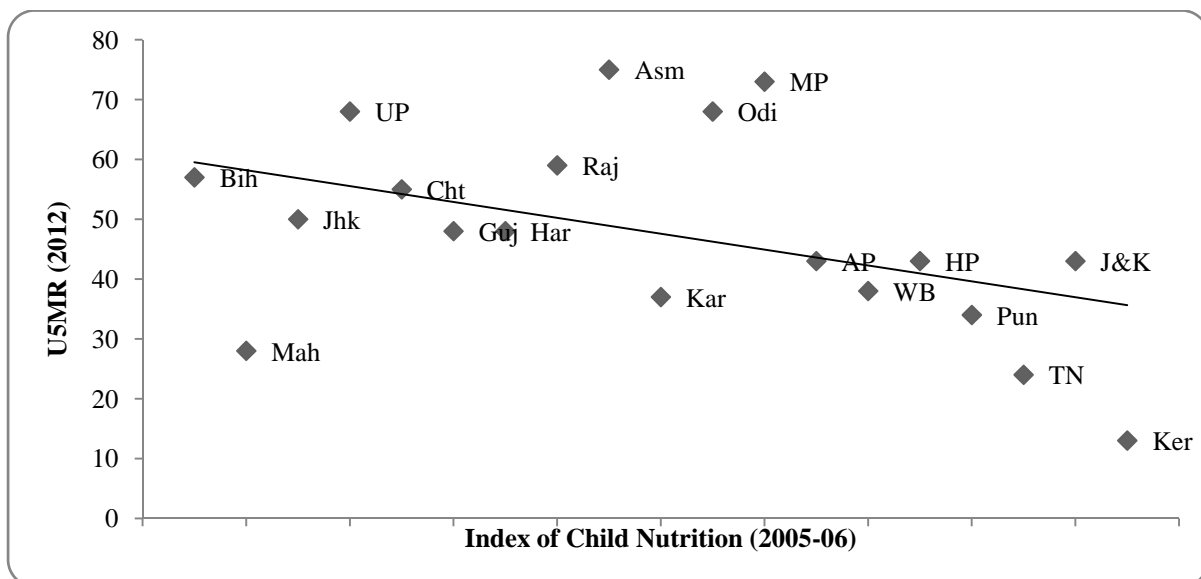
c.   Maternal Mortality Rate (MMR)

Complications during pregnancy and childbirth are the leading causes of death and disability among women of reproductive age in developing countries. MMR represents the risk associated with each pregnancy, i.e., the obstetric risk. MMR is defined as maternal deaths per 100,000 live births during a specified time period, usually one year. It is an MDG indicator for monitoring the goal of improving maternal health, and for India, the goal stands at 109. The MMR for India during 2010-12 stands at 178. Figure 5.4 plots the MMR for select states and the MDG target. Kerala, Maharashtra, Tamil Nadu and West Bengal are the only states to have

already attained the MDG goal in MMR. The less developed states are lagging far behind the MDG target of MMR.

Next, we attempt to combine these indicators of maternal and child health into an index using PCA, and the states are ranked in terms of their score in the mentioned indices (Table 5.1).

Figure 5.4: MMR across States, India (SRS 2010-12)
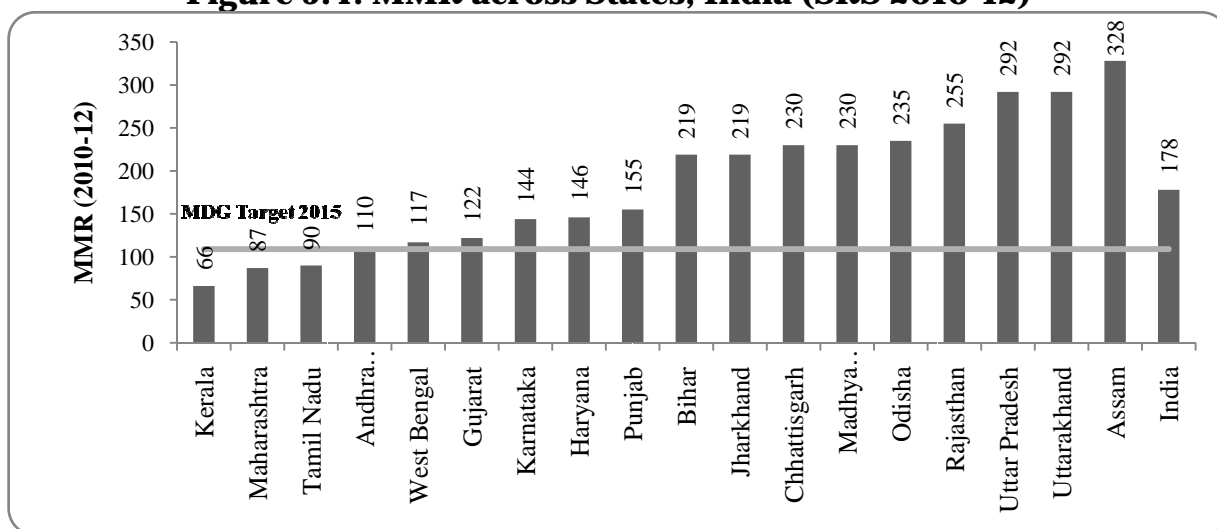
Table 5.1: State-wise Ranking in PCA of Mortality Indicators (IMR, U5MR, MMR)

State	PCA Rank	State	PCA Rank	State	PCA Rank
Kerala	**1**	Andhra Pradesh	**7**	Rajasthan	**13**
Tamil Nadu	**2**	Gujarat	**8**	Odisha	**14**
Maharashtra	**3**	Haryana	**9**	Madhya Pradesh	**15**
West Bengal	**4**	Jharkhand	**10**	Assam	**16**
Punjab	**5**	Bihar	**11**	Uttar Pradesh	**17**
Karnataka	**6**	Chhattisgarh	**12**		

The indicators and value of the principal components are provided in the appendix (Tables A5.1).

d.   Disease Profile

As discussed before, the diseases have been re-classified into five major categories—communicable, non-communicable, vector-borne, accidents and injuries, and others. Figure 5.5 presents the percentage share of these five epidemiological categories in total cases of morbidity for each state and the country. The states are arranged in order of increasing share of CD in their total disease burden.

Figure 5.5: Morbidity across States (NSS 60th round, 2004)
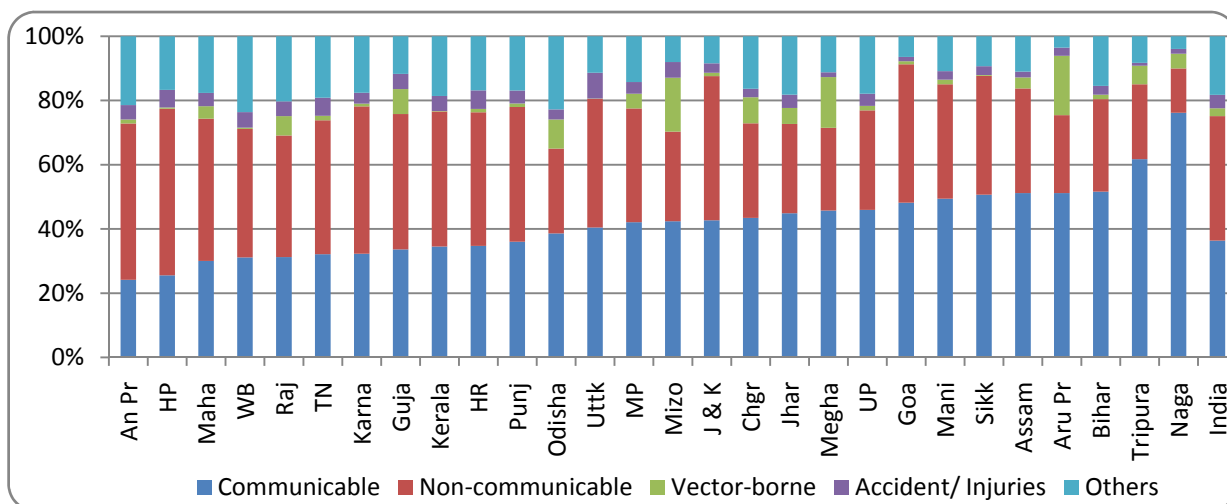
Almost 36 per cent of the total disease burden in India is contributed by CD. One immediate observation that can be made from Figure 5 is that there is wide inter-state variation in the composition of disease burden. While for Nagaland the share of CDs in total burden is 76 per cent, the corresponding figure for Andhra Pradesh is just 24 per cent. The share of NCDs in total burden for the country is 39 per cent. It ranges from a low of 14 per cent in Nagaland to a high of 52 per cent in Himachal Pradesh. The highest variability across states is observed in case of VBDs. The percentage share of VBDs in total burden is very high for some of the north-eastern states like Arunachal Pradesh (19 per cent), Mizoram (17 per cent) and Meghalaya (16 per cent). Among the larger economically developed states, Gujarat has the highest share (8 per cent) of VBDs in total disease burden.

Although the shares differ substantially from the NSS, the variability in the relative shares of each category of disease across states is borne out by HMIS data as well (Figure 5. 6). The HMIS database puts the share of NCDs in India at 33 per cent, a clear 10 per cent higher than the share of CDs. The share of CD in total disease

burden is the highest for Uttar Pradesh and the lowest for Chhattisgarh. The corresponding states with respect to NCDs are Punjab and UP respectively.

Figure 5.6: Morbidity across States (HMIS data 2012-13)
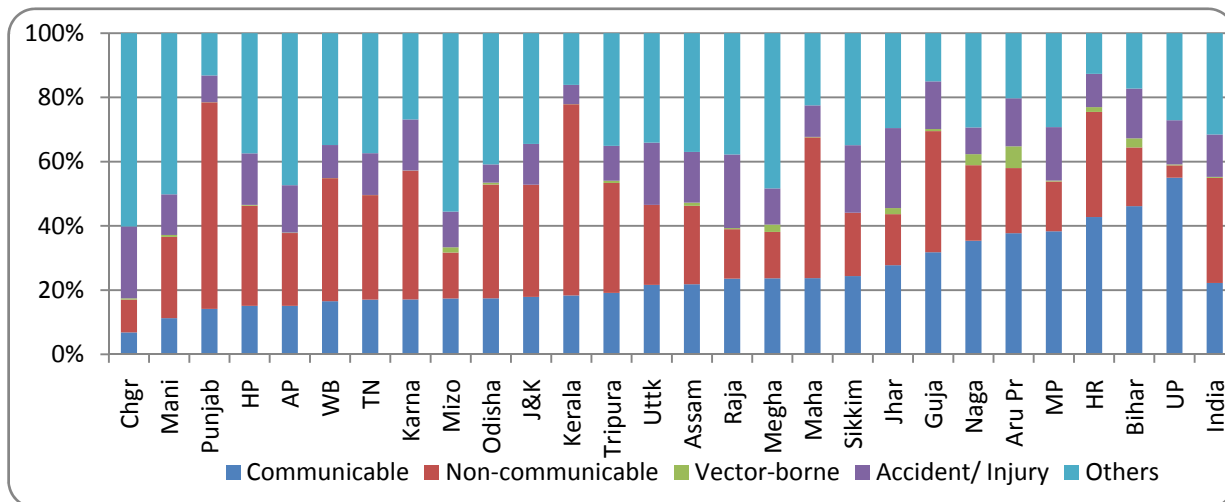
Figure 5.7 presents the percentage contribution of communicable (including maternal and perinatal), non-communicable, injuries and other diseases in total burden of mortality for India and its States. If we exclude the 'others' category (38 per cent share), communicable, maternal and perinatal diseases emerge as the major cause of mortality in India. Thirty four per cent of all deaths in India are due to them. This is followed by NCDs (23 per cent) and injuries (5 per cent) respectively. The state-level variations are significant; for example, 83 per cent of all deaths in UP is from CDs. The corresponding number is just 14 per cent for Himachal Pradesh. NCDs are the major killer in Mizoram (39 per cent), Maharashtra (38 per cent) and Punjab (36 per cent). On the other hand, for States like UP (2 per cent), Manipur (2 per cent) and Bihar (6 per cent), NCDs are not really a threat as far as mortality is concerned.

There are some key messages that emerge from this discussion. Firstly, India is still way behind in ensuring maternal and child survival— one of the most basic outcomes of a health system. Secondly, there exists a huge disparity across states in maternal and child health outcomes. The poor performing states on these counts also happen to be the economically under-developed ones. However, it is not uncommon for a few developed states to register poor scores on these indicators as well. Thirdly, VBDs are

very important in some states of the country, though malaria is ubiquitous across India. The discussion also brings forward at least two interventions that display a positive impact on child health outcomes: immunization and nutrition. A final point is that in terms of the relative share of various categories of diseases in the total disease burden, there is a huge divergence in the relative position of states in the epidemiological ladder. The relative shares of CDs, NCDs, VBDs in the total disease burden vary significantly across states.

Figure 5.7: Mortality across States (HMIS data 2012-13)
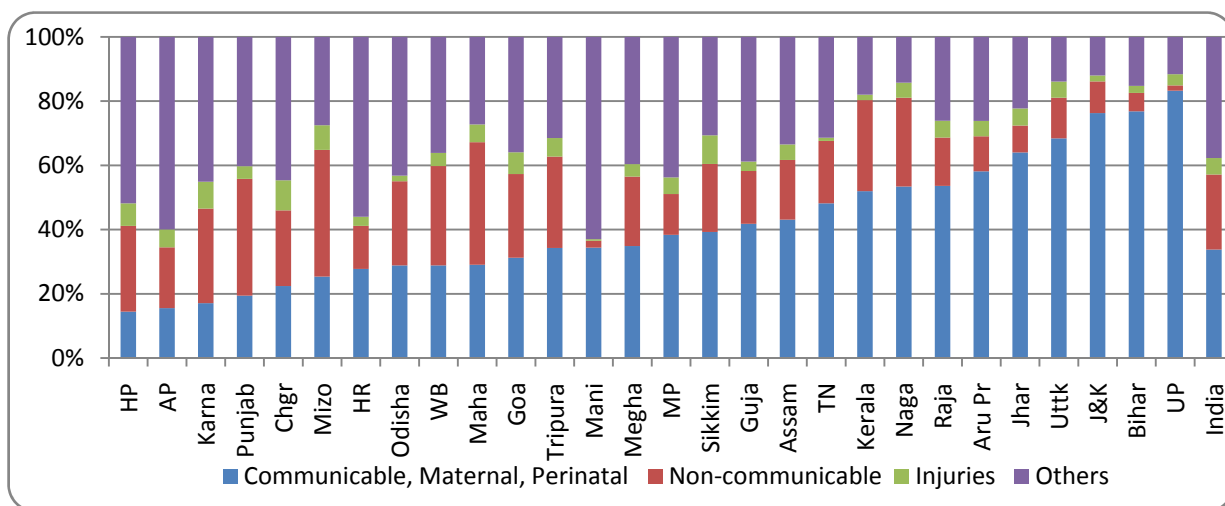
6. HEALTH INFRASTRUCTURE

We focus in this part of the analysis only on public healthcare system, which is the cornerstone of any UHC. The discussion starts with the formal healthcare system in rural areas, with some discussion around urban facilities as well. The public healthcare system in the rural areas is a three-tier formal structure based on the Indian Public Health Standard (IPHS) (NHM 2012) (Table 6.1).

Table 6.1: Population Norms for Health Facility (Indian Public Health Standard)

Facility	Average population coverage by health facility	
	Plain area	**Hilly/ tribal/ difficult area**
Sub Centre (**SC**)	5,000	3,000
Primary Health Centre (**PHC**)	30,000	20,000
Community Health Centre (**CHC**)	1,20,000	80,000

The SC is at the bottom of the system and is the first contact point between the public healthcare system and the community (Figure 6.1).

Figure 6.1: Public Healthcare System in Rural India

Community Health Centre (CHC)
A 30-beded Hospital/ Referal Unit for 4 PHCs with specialised services

Primary Health Centre (PHC)
A Referal Unit for 6 Sub Centres; 4-6 beded; manned with a Medical Officer Incharge and 14 subordinate paramedical staff

Sub Centre (SC)
Most peripheral contact point between Primary Health Care System and Commuity manned with two ANM and one HW (M)

The personnel in each SC comprise two ANMs and one male Multi-purpose Worker (MPW [M]). A Lady Health Worker (LHV) is in charge of six SCs. The SCs are given

basic drugs for minor ailments and are expected to provide services relating to maternal and child health, family welfare, nutrition, immunization, diarrhoea control and control of CD (Bhandari et al 2007; MoHFW 2012). In other words, these centres are supposed to take care of basic health needs of men, women and children. They are meant to provide preventive, promotive and basic curative healthcare. At present, there are 1,48,124 SCs functioning in India (OGDPI 2011)—at least[2] 39 per cent lower than the norm set by IPHS. PHC constitutes the second tier of the rural formal healthcare system. They are meant to provide integrated curative, preventive, promotive healthcare and family welfare services. PHCs are established and maintained by state under the Minimum Needs Programme/Basic Minimum Services Programme. A PHC is supposed to have a Medical Officer (MO) and 14 paramedical and other staffs. It also acts as a referral unit for six SCs, and has four to six beds for inpatients (Bhandari et al 2007). There are 23,887 PHCs functioning in India in 2011 (OGDPI 2011), which is at least 41 per cent lower than the IPHS norm.

CHC/ Block Primary Health Centre (BPHC)/ Rural Hospital (RH) form the topmost tier of the system. CHCs are also established and maintained by the state. CHCs were designed to have four medical specialists (Surgeon, Physician, Gynaecologist and Paediatrician) supported by 21 paramedical and other staffs. A CHC should have 30 indoor beds with Operation Theatre, X-ray, Labour Room and Laboratory facilities. CHC is a referral unit for four PHCs and provide specialized and obstetric care facilities (Bhandari et al 2007). There are 4,809 CHCs functioning in India in 2011 (OGDPI 2011), which is at least 52 per cent lower than the IPHS norm. There is also a shortfall of 75 per cent of Surgeons, 65 per cent of Obstetricians and Gynaecologists and 80 per cent of Physicians and Paediatricians at the CHCs (MoHFW 2012).

Health infrastructure includes physical infrastructure as well as human resources. In this section, we will discuss the availability and accessibility of health infrastructure. The scheme of discussion is given below (data source in parentheses).

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[2] Required number of SCs is computed based on Indian Public Health Standard (IPHS). IPHS suggests that there should be one SC per 5000 people in plain area and per 3000 people in hilly/ tribal areas. For simplicity, we computed required number of SCs by dividing state population (Census 2011) by 5000. Gap is calculated as relative percentage gap as {(required-available)*100/required}. Gap will be even higher if we divide by a weighted average of 5000 and 3000.

Box 1: Indicators of Public health care facility and data sources

- ➢ Availability of public healthcare facility
- • Lack of public health infrastructure (NRHM)
- • Average population coverage/ density of public health facility
    - o Average population per public hospital (NHPI)
    - o Average population coverage by public health facility (SC,PHC,CHC) (DLHS-3)
    - o Density of public health facility in villages (DLHS-3)
- • Unavailability of physical infrastructure (SC, PHC, CHC) (OGDPI 2011)
- ➢ Accessibility of public health facility (NHSRC)

6.1 Availability of Public Health Facility among the States/ UTs

6.1.1 *Lack of Public Health Infrastructure among States/ UTs*

Accessibility is also a function of availability of health facilities, and gaps in availability of health infrastructure have consequences for health access and finally outcome. In this section, we analyse the gaps in health infrastructure following the methodology discussed in Section 3.

State-wise PCA rankings in gap in public health infrastructure are given in Table 6.2. Goa, Maharashtra and Andhra Pradesh are among better performing states. Kerala's position is somewhere in the middle of these rankings. The eight backward states fared poorly along with Gujarat.

6.1.2 *Average Population Coverage/ Density of Public Health Facility*

Density of public health facilities is related to quality and utilization and ultimately to outcomes (Collier et al 2002; Hanlon et al 2012). Smaller the number of people a facility caters to, more efficient will be the quality of care, ceteris paribus. In the analysis below, we looked at the average population coverage by a health facility and density of facilities among the states/ UTs.

6.1.2.1 *Average Population Coverage per Public Hospital*

First, we look at the public hospitals available in rural and urban areas in a state/ UT. We compute average population served per govt. hospital in each state/ UT on the basis of 2011 Census population. The states/ UTs are ranked on the basis of average population coverage (Table A 6.2). Backward states like Chhattisgarh, Uttarakhand, Odisha, Rajasthan and Assam are among top ten states with lower population

pressure per public hospital. The states that seem to have greater population pressure on their hospitals are Uttar Pradesh, Andhra Pradesh, Haryana, Bihar, Goa, Punjab and Maharashtra.

6.1.2.2 *Average Population Coverage by Public Health Facility (SC, PHC, CHC)*

State-wise average population coverage by a SC, PHC and CHC and their PCA ranking is given in Table A 6.3. Lower the value of the principal component for a state/ UT, better will be the state/ UT. Here again the states from north-east and hilly states from north India fare well in terms of average population coverage by health facilities. Backward states like Rajasthan and Uttarakhand are also among the top ten states. States of Bihar, Maharashtra, Jharkhand, Uttar Pradesh, Assam, West Bengal and Andhra Pradesh stands at the bottom.

6.1.2.3 *Density of Public Health Facility in Villages*

We also looked into two other indicators of density of public healthcare facility: a) percentage of villages with Sub-Centre and b) percentage of villages with 'any government health facility' (includes SC, PHC, BPHC/ CHC or referral hospital, government hospital or government dispensary within the village (facilities as reported by village pradhan/ up pradhan/ any other panchayat member/ teacher/ gram sevak/ anganwadi worker)). state-wise ranking in density of health facility by PCA is given in Table A6.4 .

Ranking changes drastically with Kerala at the top and four states from north-east (Tripura, Mizoram, Sikkim and Assam) among the best ten states. Backward states like Odisha, Assam and Rajasthan seem to do better. However, other backward states like Madhya Pradesh, Uttarakhand, Jharkhand, Chhattisgarh, Bihar and Uttar Pradesh stand at the bottom. Among the UTs, Delhi and Puduchery performed poorly along with Andaman and Nicobar Islands.

6.1.3 Unavailability of Physical Infrastructure (SC, PHC, CHC)

Accessibility cannot be ensured unless there is availability of health facilities. Here we analyse the state/ UT-wise availability of the SC, PHC and CHC. We compute the required number of public health facilities in these states/ UTs on basis of IPHS population norms. Population of the states/ UTs are taken from the 2011 Census. The gap of health facilities (i.e., additional facilities needed) is calculated as relative

percentage gap between the required number of facilities and facilities available. Subsequently, the states/ UTs are ranked separately on the basis of the percentage gap (or unavailability) of healthcare facilities. The state/ UT with minimum gap is deemed the best and gets the rank of one. Here data is sourced from OGDPI and used for comparison.

Box 2: Additional infrastructure needs

- 94,000 more Sub-Centres
- 16,500 more Primary Health Centres
- 5,280 more Community Health Centres

State-wise gaps in SCs are presented in Table A6.5 (appendix). Barring Assam, the other states from the north-eastern region fared well in availability of SCs. The laggard states in terms of unavailability of SCs includes some backward[3] States like Bihar, Uttar Pradesh, Jharkhand, Madhya Pradesh and also some developed states like Maharashtra, Haryana, Punjab, Goa, Gujarat and Kerala. Also, among the UTs, Delhi, Chandigarh and Puducherry fared worse. At the all-India level, the gap in SCs is at least 39 per cent, indicating that the country needs 94,000 additional SCs to comply with its own public health standard.

Similarly, state-wise gaps in PHCs are presented in Table A6.6. For some developed states like Maharashtra, Punjab and Goa the gap in PHCs is more than 50 per cent. For the States of Jharkhand and West Bengal, the gap is almost 70 per cent. The all-India gap in PHCs is at least 41 per cent, indicating a requirement of 16,500 additional PHCs.

A similar exercise for CHCs is shown in Table A6.7. The gap in CHCs is huge for the developed states like Maharashtra, Goa, Haryana, Punjab, Gujarat. For the backward states like Bihar and Uttar Pradesh, the gap in CHCs is 92 per cent and 69 per cent respectively. For India as a whole, the gap in CHC is at least 52 per cent, indicating a requirement of 5,280 additional CHCs.

States/ UTs are ranked based on principal component score of the gaps in these three types of public healthcare facilities. The state/ UT with minimum value of principal

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[3] The 'backward' States referred to the Empowered Action Group (EAG) States (Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Uttarakhand, Rajasthan, Odissa) and Assam.

component is deemed the best and gets the rank one. State-wise PCA rank is given in Table A6.8 in the appendix.

As before, some north-eastern states and hilly states from north India have fared well in terms of overall availability of public healthcare facility. The backward states like Bihar, Uttar Pradesh, Jharkhand, Madhya Pradesh and Andhra Pradesh fared poorly indicating insufficient availability of public healthcare facility in these states. Public healthcare facility is also inadequate in the developed states like Maharashtra, Goa, Punjab, Haryana, Tamil Nadu, Gujarat and West Bengal. Kerala, the state with highest Human Development Index (HDI) stands almost in the middle in terms of overall availability of public healthcare facilities. Also, UTs with high HDI, like Delhi, Chandigarh and Puducherry, fared relatively poorly in terms of availability of public healthcare facilities.

6.2 Accessibility of Public Health Facility among the States/ UTs

We also rank the states on the basis of their share of inaccessible facilities out of total public facilities available. The state with the minimum share of inaccessible facilities is the best and assigned the rank one (Table A6.9). Hilly or north-eastern states are with high share of inaccessible facilities, whereas Uttar Pradesh, Gujarat, Tamil Nadu, Maharashtra and Andhra Pradesh seem to rank the best among all states in terms of accessibility of public health facilities.

6.3 Overall Ranking in Health Infrastructure among the States/ UTs

Combining the information on selected indicators and indices of accessibility and availability (Table 6.2), we find that states like J&K, Manipur, Sikkim, Chhattisgarh, AP, Mizoram, Kerala etc. are doing relatively better than other states, whereas, Haryana, Jharkhand, West Bengal and Bihar are among the worst performers. However, it is important to remember that combining these indices can lead to loss of information on the specific issues in each state, so an expanded analysis is useful as well.

Table 6.2: Statewise Composite Ranking in Health Infrastructure

State	Rank in Gap in Public Health Facility (OGDPI)	Rank in Gap in Public Health Infrastructure (NRHM)	Rank in Average Population Served per Public Hospital (NHPI)	Average of Ranks	Composite Rank
Jammu and Kashmir	10	6	2	6.0	**1**
Manipur	9	10	3	7.3	**2**
Sikkim	5	14	6	8.3	**3**
Chhattisgarh	7	17	4	9.3	**4**
Arunachal Pradesh	1	28	1	10.0	**5.5**
Mizoram	3	11	16	10.0	**5.5**
Kerala	15	8	8	10.3	**7**
Odisha	8	20	7	11.7	**8**
Karnataka	11	5	20	12.0	**9.5**
Assam	14	12	10	12.0	**9.5**
Nagaland	4	21	12	12.3	**11**
Uttarakhand	12	23	5	13.3	**12.5**
Rajasthan	13	18	9	13.3	**12.5**
Himachal Pradesh	2	25	14	13.7	**14.5**
Tripura	16	4	21	13.7	**14.5**
Tamil Nadu	19	13	11	14.3	**16**
Meghalaya	6	19	19	14.7	**17**
Andhra Pradesh	17	3	27	15.7	**18**
Goa	24	1	24	16.3	**19**
Maharashtra	26	2	22	16.7	**20**
Gujarat	18	22	13	17.7	**21.5**
Punjab	21	9	23	17.7	**21.5**
Uttar Pradesh	25	7	28	20.0	**23**
Madhya Pradesh	20	26	15	20.3	**24**
Haryana	23	16	26	21.7	**25**
Jharkhand	22	27	18	22.3	**26**
West Bengal	27	24	17	22.7	**27.5**
Bihar	28	15	25	22.7	**27.5**
UT					
Andaman and N Islands	2	4	1	2.3	**1**
Lakshadweep	1	7	2	3.3	**2**
Puducherry	5	3	3	3.7	**3**
Daman and Diu	4	5	4	4.3	**4**
Chandigarh	6	1	7	4.7	**5.5**
Delhi	7	2	5	4.7	**5.5**
Dadra and N Haveli	3	6	6	5.0	**7**

Note: This unweighted simple average of ranks include only three dimensions for which data is available for all states/ UTs. Data sourced from DLHS-3 and NHSRC does not provide information for all states/ UTs and hence they are not included in the calculation of average.

While the analysis clearly indicates that states are in very different positions with respect to infrastructure, it is important to see how states fare within the overall infrastructure requirements; in other words, for each state, where the gap is the most. Figure A6.1 shows that almost all the states have serious gaps in infrastructure like PHC, CHC and SC. Even a well-performing state like TN has substantial gaps in infrastructure.

7. HEALTH FINANCING ACROSS STATES

Despite a fairly robust macroeconomic scenario in the recent past, India has been unable to allocate an adequate share of its GDP to health; it spends less than five per cent of its GDP on health, with the major share being from private sources, especially OOP expenditure. Public expenditure on health currently stands at just over one per cent of GDP and has been historically rather static and inadequate. Of late, the government has acknowledged the severity of the problem and the Planning Commission set up the HLEG on UHC in October 2010. The HLEG recommended an increase in public funding of health to a minimum of two-and-a-half per cent of the GDP during the 12th Five Year Plan (2012–17) and a minimum of three per cent by 2022 (Planning Commission 2011).

If recent literature on public financing of health is any indication, the government is going to fall short of such well-intentioned targets. Studies by Berman et al (2008) examining trends in government health spending have found that although the NRHM was a big boost to the deteriorating health sector, it is still insufficient, one of the reasons being the inability of the states to finance their share of these schemes. Rao et al (2012) in their paper looked into the fiscal space for health care expenditure at the state-level and the stimulation and substitution effects[4] of Central transfers for health. They concluded that not only is public spending on health care in India too low, but its distribution across the country is very uneven. Taking NRHM as a specific purpose transfer program, the authors find that the objective of increasing the expenditures to two per cent of GDP has not been fulfilled, partly because the low-income states could not avail the grants, as they could not afford to pay their own component of spending. Funding has also been identified as a key constraint by the Planning Commission's Steering Committee on Health for the 12th Five Year Plan which states that "the health care system in the country suffers from inadequate funding" (Planning Commission 2012).

Since expenditure on health by the state Governments is about twice the expenditure by the Centre, the overall targets for public sector health expenditure can only be achieved if, along with the Centre, state Governments expand their health budgets

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[4] While funds transferred from the centre should ideally augment state spending, it might also result in states spending less of their own resources

appropriately (Planning Commission 2012). In this chapter, we, therefore, begin by assessing the current levels of health spending by the states. We also examine the levels of OOPS on health that constitutes close to 70 per cent of total health expenditure in the country. Finally, the chapter attempts to come up with estimates of additional public spending required to address a particular dimension of UHC.

7.1 Public Spending on Health by States

More than 60 per cent of total health spending in India is done at the state-level. Apart from the difference in needs, there are differences in fiscal capacities across states. Figure 7.1 shows per capita public spending on health by the states in increasing order. On an average, a state spent Rs. 598 per person on health and family welfare in the year 2011-12. There exists huge variation in the level of public spending across states. While Bihar spends just Rs. 286 per capita, Sikkim spends nearly 15 times of that amount.

Figure 7.1: Average Per Capita Public Health Spending across States (2011-12)
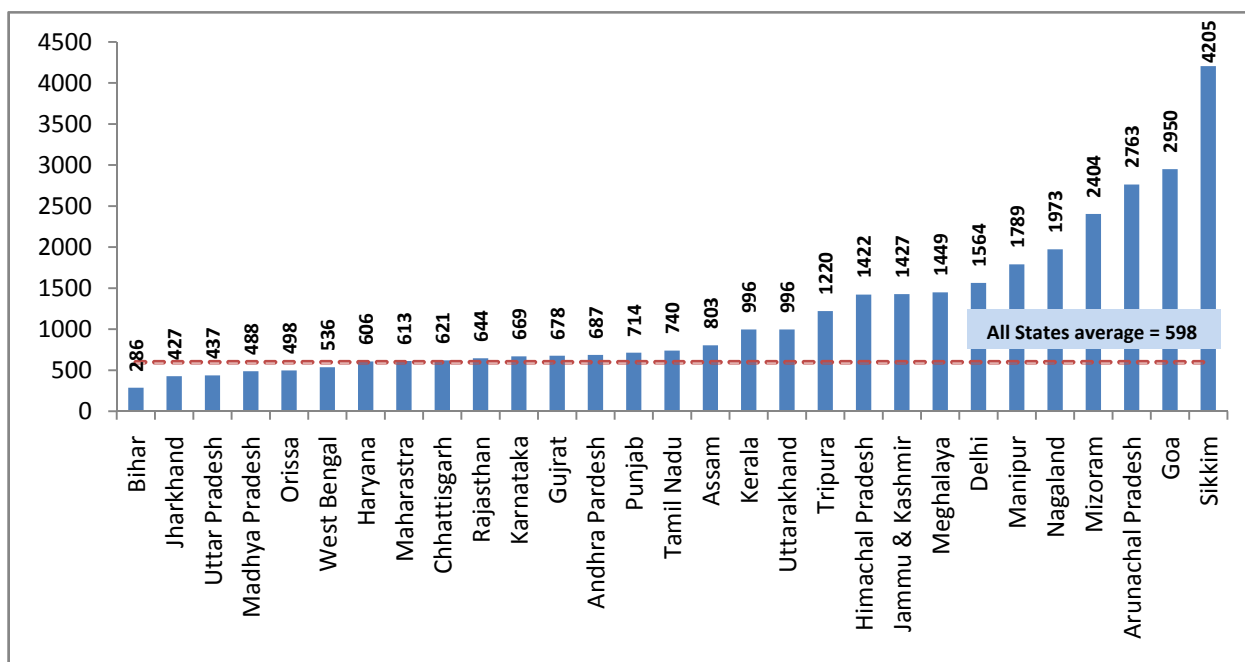
Among the major states, the three southern States of Kerala, Tamil Nadu and Andhra Pradesh spend more public resources per person on health. The states with low public spending are also those with lower per capita GSDP. Six major states, in terms of population, spend less than the all-state average public expenditure on health, which is denoted by the dotted line. Under the existing system, low levels of public

spending that result from low fiscal capacity to generate adequate revenues, is supplemented by grants from the Centre, both through the state treasury and as the Centre's share of centrally sponsored or central sector schemes. Even then, public spending levels are very low in low-income states.

Public expenditure however does not contribute a very substantial share of total health spending. It is OOP spending that the households rely on most, to finance necessary health care. Overall, almost 70 per cent of total health spending in the country is private OOP spending.

7.2   Private Spending on Health by States

Figure 7.2 shows average annual OOP expenditure per capita of states arranged in increasing order. Kerala has the highest levels of private OOP health expenditure per person. The other southern states, viz., Karnataka, Andhra Pradesh and Tamil Nadu also show very high OOP spending. All the north-eastern states register very low per capita OOP spending.

Figure 7.2: Annual OOPE Per Capita by State (Source 2011-12)
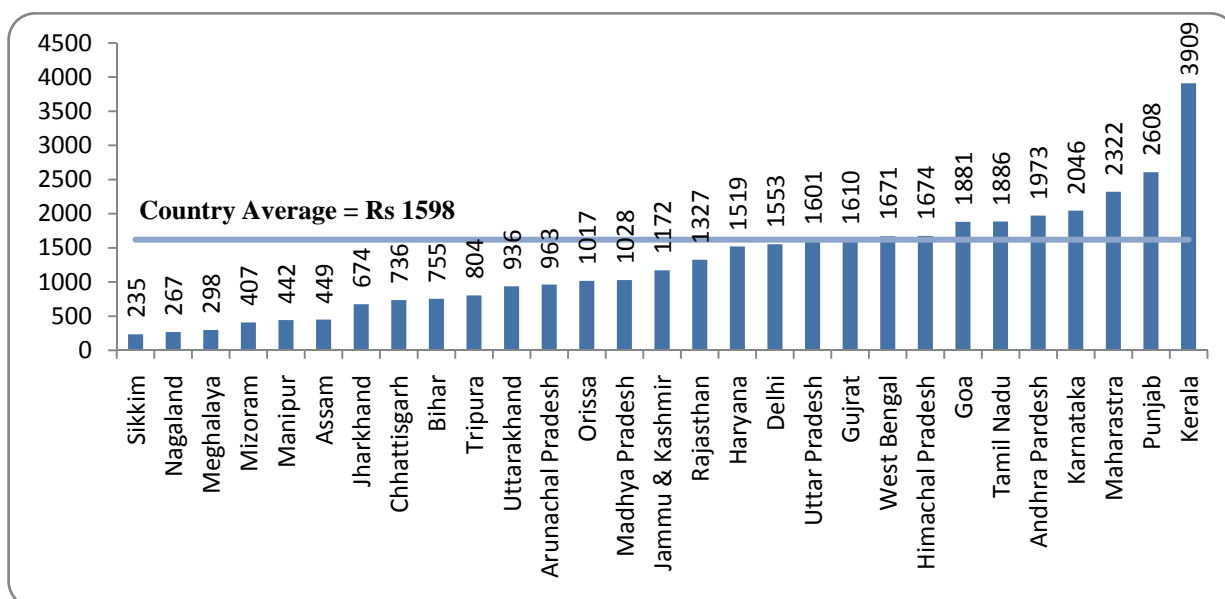
If we consider just the major states, private OOP spending is lower in the economically backward states. The patterns in public and private spending suggest that the economically developed states have higher public as well as private spending compared to the less developed ones. This can have several interpretations. Firstly, it

might be due to the higher capacity to spend and availability of private health care services in the developed states that results in higher OOP spending. Health care is a normal good and there is a higher demand for all types of health care in states with higher income. Secondly, for the economically backward states, the situation is serious. On the one hand, low public spending generates low quantity and quality of public health services and on the other, lower purchasing power of the people ensures the absence of good quality private providers from the health care market. The ultimate result is persistently bad outcome indicators in these states. Finally, only the north-eastern states demonstrate the desired complementarity between public and private OOP spending on health care.

7.3   Implications for UHC

The World Health Report 2010 (WHO 2010) represented the concept of UHC as comprising three dimensions of coverage— population, services and financing. The idea was presented in the form of two cubes— the smaller one signifying the status of coverage, while the larger one representing the aspired position, i.e., health coverage which is truly universal in all dimensions (Figure 7.3). The ultimate goal of UHC is to move towards filling more of the larger cube. In reality, no country fills the whole cube (provision of all necessary health services to every single person and with full financial protection). This is primarily because resource is a constraint in every country especially since the allocation is competitive across sectors. Very often governments engage in trade-offs and try to address the most pressing needs out of each of the three dimensions. However, some countries are much closer to "universal" coverage than others.

India currently spends around four per cent of its GDP on health. Public (Central, state and Local Governments combined) spending on health however accounts for just over one per cent of GDP with the remaining three per cent being spent by private and external sources. The share of public expenditure in total health expenditure is around 20 per cent while households account for another 70 per cent of total health spending, almost all of which is in the form of OOP expense. Coverage either cashless or reimbursement in any form is generally availed by the formal sector employees, who form a small part of the total workforce and also population.

Figure 7.3: Concept of UHC (WHO 2010)
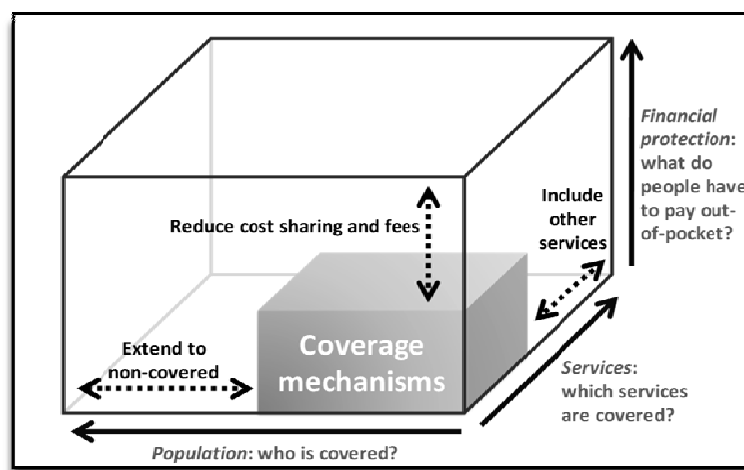
Such high levels of OOP spending by the households have certain adverse implications. While for some access to health care is reduced considerably, for others who purchase care, the prospect of catastrophic burden of health care expenditures and the risk of impoverishment is real. Numerous studies (Bhandari et al 2010; Bonu et al 2007; Doorslaer et al 2005; Garg and Karan 2005; Ghosh 2012; Shahrawat and Rao 2012) have computed illness induced impoverishment for India and its states. It is now believed that roughly three to four per cent of our population faces impoverishment because of OOP health expenses. This is in addition to those, who are already below poverty line and are further pushed into acute poverty because of OOP payments.

What would the states have to spend if they want OOPS to be zero? While we usually associate OOP expenses exclusively with the private sector, a substantial amount of OOP spending takes place at public facilities as well. The key reason for this is low levels of public expenditure on health with an associated introduction of user charges for cost recovery at public facilities. One way of thinking about it is for States to start with the aim of reducing OOPS at public facilities to zero. Such calculations would set a benchmark for additional funding to extend financial protection to the entire population of a state. Also, OOPS at private facilities – the major reason for high OOPS – can happen for a multitude of reasons including supplier- induced demand and voluntary demand for high-end care and treatment. One cannot, therefore, argue that the government must cover all such costs in a health package. So, what would be the likely quantum of state spending if all the current OOPS on public

institutions/facilities is financed by the government? Using the NSS Consumption Expenditure data for 2011-12 we arrive at the total OOP spending in the country and for each state. We compute the proportion of this OOP expenditure that goes exclusively to the public facilities using the NSS 60th round on morbidity.

In India, almost 30 per cent of total public expenditure on health is spent by the Central Government, the remaining 70 being spent by the states (Choudhury et. al 2012). Using the same ratio, we assume 70 per cent of this total is to be spent at the state government level. In other words, we assign this 70 per cent of the OOP spending (on public facilities) to each state, based on the respective shares of each state in current OOP spending on public facilities. This amount should be ideally spent by the state governments to ensure free healthcare through the public system. We then examine this additional expenditure as a proportion of GSDP of each state to understand their preparedness for such a venture.

Figure 7.4: Average Expenditure Gap per Capita and as Share of GSDP (NSS 2011-12)
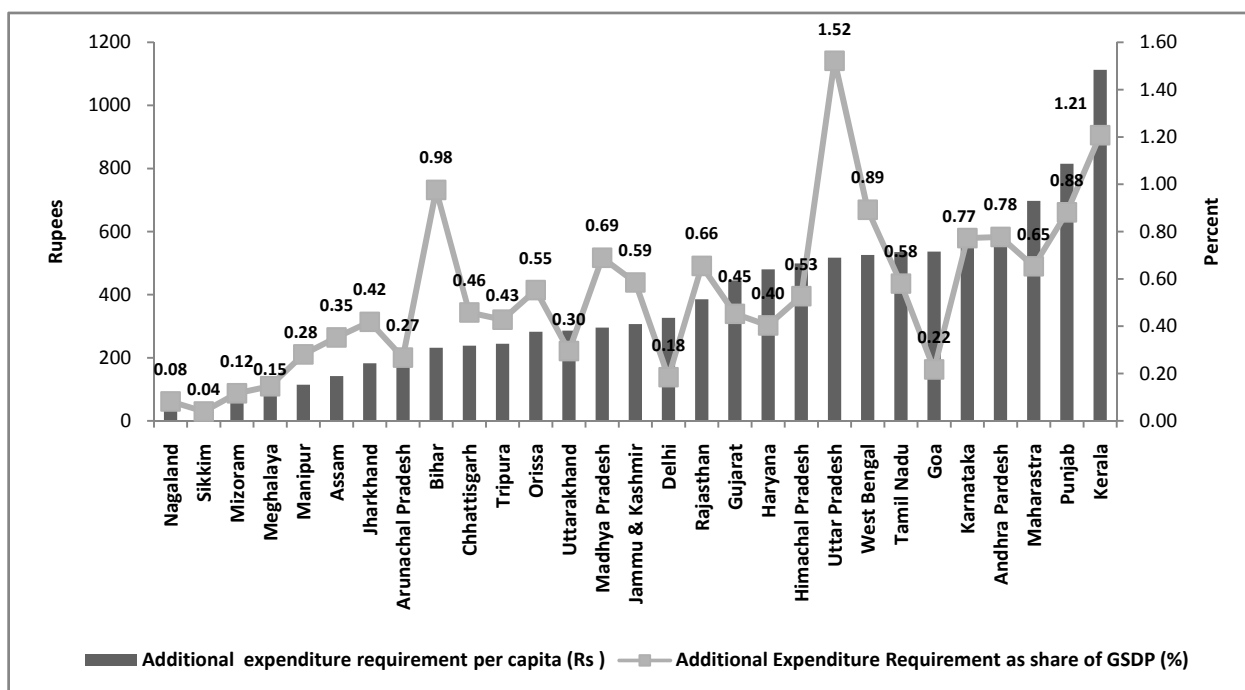
The total private OOP expenditure on health in India stands at Rs 3.5 lakh crore in 2011-12 out of which 0.8 crores i.e., around 23 per cent is spent on the public health care system. The Centre's share, assuming the current pattern of spending comes to around Rs. 0.2 lakh crore. The remaining Rs. 0.6 lakh crore would be the state's

responsibility. Figure 7.4 shows the additional spending that would be required from each state and its share in the respective GSDPs for 22 major states.

On a per capita basis, Kerala would need the maximum increase in public expenditure on health amounting to Rs. 1113 per person while Nagaland would need an enhancement of a mere Rs. 55. The top five states in terms of expenditure requirement are Kerala, Punjab, Maharashtra, Andhra Pradesh and Karnataka. The share of this requirement in GSDP could be interpreted as a crude measure of the ability to finance this expenditure. In other words, lower the additional spending as a proportion of GSDP, higher the ease with which additional resources can be allocated. The top five states in terms of financing requirement as proportion to their GSDP are respectively Uttar Pradesh, Kerala, Bihar, West Bengal and Punjab. The centre needs to spend another Rs. 0.2 lakh crore to realise free health care to all the citizens of this country. As a proportion of India's GDP, public expenditure on health has to increase by 0.9 per cent with the Centre contributing 0.3 per cent and the states contributing 0.6 per cent of the estimated gap.

It needs to be emphasized that this exercise is carried out only for expenditure that is undertaken at public health facilities. The fact that Kerala has very high OOPHE does not necessarily imply that its government facilities are expensive. The high OOPHE at public health facilities has to do with policies like user fees and the extent of subsidies States offer to their residents. Nevertheless, the analysis does suggest that states that have high OOPHE in general also have high expenditures at public health facilities. This raises some doubts about the possible misclassification of the data on OOPHE between private and public facilities in the NSS. Also, NSS in general has been underestimating consumption expenditure especially when compared to the NAS estimates (Sundaram et. al. 2003, John 2008), so even these estimates could be on the lower side. Overall, these results seem to indicate that to reduce OOPS at public facilities to zero the additional expenditures do not have to increase by a very significant amount, while the Centre needs to step up expenditure on health by 0.3 per cent of GDP, the corresponding increase is 0.6 per cent for the states.

The financial implications from this analysis, however, are not based on a costing exercise, which is the right way to approach the resource availability question. Reduction of OOP expenditure at public faculties would not really ensure provision of

EHP. In the next section, we look at the costing issue more closely and re-estimate the resource requirements based on our best estimate of costs.

8. ESSENTIAL HEALTH PACKAGE FOR INDIA: ALTERNATIVE MODELS AND COSTING

The analysis and discussion above lead to the following conclusions about an EHP in the Indian context.

- Given the wide variation in disease outcome, a single-design EHP will not serve the purpose.

- If the state is in charge of planning and implementation, then the design can be tailor-made for the state, keeping in mind its disease profile.

- If the Centre is mandating the process of implementation, then there can be a few alternative designs which can incorporate some of the variations across states.

- The typical disease profile in India indicates that maternal and child health and CD need to find significant places in the design of EHP. These are the absolute basic parts of the EHP. However, for states that have already done very well on these fronts, a greater part of the EHP could be other diseases that are more relevant to these states, like NCD.

- NCDs are increasingly becoming a major part of the disease profile in many states as well, necessitating some basic inclusion, but also possible wider inclusion in states that have a higher burden of NCD. VBDs are also important in some states, needing attention in EHP. state-specific surveys would be important to carry out to understand the true distribution of disease burden in each state.

- International experience indicates that countries have included preventive and promotive services in their EHP as well. Given the huge positive externalities associated with such services, and their impact on future disease burden, any EHP must include a significant amount of such services in their design. The type of services should depend on the disease profile.

- There are wide variations across states in infrastructure gaps and financing, indicating that to bring all states to the same level with EHP would require a wide variety of adjustments in financing.

- If government were to absorb and finance all OOPS at public facilities in the current scenario, it would require an additional public expenditure of 0.9 per cent of GDP, 0.6 per cent of which is to be borne by the states.

In 2013, the MoHFW had proposed the following EHP (Table 8.1) in its proposal for piloting UHC in states. The essential list spans 20 services that aim for a continuity of care from primary through tertiary. The list visualizes preventive and promotive care as integral part of services at each level and includes appropriate interventions for behaviour change communication through an appropriate mix of interpersonal, and mass media, and counselling at each level.

Table 8.1: Essential Package of Services (Assured Services under UHC, Phase-1)

Primary Care	Continuity of Care to Secondary/ Tertiary levels
1. Safe Pregnancy (Maternal and Reproductive Health Services)	
Care for normal pregnancy and management of complications *not requiring* surgery, blood or specialist interventions-Ante-natal, delivery, and post-natal, care, and screening for medical conditions of pregnancy such as hypertension, anaemia, and gestational diabetes	Management of complications of pregnancy and delivery requiring surgery or blood transfusion, and second trimester abortion Services, and management screening for medical conditions of pregnancy such as hypertension, anaemia, and gestational diabetes
Disorders of menstruation and Syndromic management of common Reproductive Tract Infections/Sexually Transmitted Infections	Gynaecological surgery for post partum incontinence, uterine prolapse, fibroid, hysterectomy, as appropriate. Diagnostic and specialist consultation as required for RTI/STI
2. Newborn, Infant and Child Health Services	
Essential newborn care, care for common illnesses of newborn and of children, with skills to identify complications,	Sick Newborn Care
Prevention and community management of diarrhoea, fever and ARI	Institutional care for the sick child –pneumonia, diarrhoea with dehydration and fevers
Prevention and early detection of child hood disabilities	
3. Immunization	
Package of BCG+ 3 DPT+ measles+ Hepatitis	
4. Nutrition Related	
All aspects of prevention, counselling on Infant and Young Child Feeding (IYCF) and management of malnutrition, excepting those that require institutional care.	
Universal use of iodized salt.	
Identification and management of anaemia	
Follow up for Nutritional Rehabilitation Centres (NRC) children and community care for SAM	NRC for Severe Acute Malnutrition (SAM)
5. Contraceptive Services	

Counselling/ BCC to delay age at marriage, delaying first childbirth and spacing	
Provision of limiting methods: Oral Contraceptives, Condoms, IUCD	PPIUCD, Female and Male sterilization services

6. School and Adolescent Health Services

Biannual screening of children in AWW centres and annual year screening of children for developmental delays, diseases, disabilities and deficiencies, local health care provision, provision of glasses, all three levels of prevention	Package of referral care with links to tertiary care for congenital and rheumatic heart disease for rheumatic heart disease, malnutrition and anaemia management, and health education
Adolescent Health services: peer counselling, life skills education, and adolescent clinics	

7. Emergency Response and Patient Transport Services

Patient transport systems that can bring and drop back patients by prioritization-e.g. for safe delivery, newborns for first 28 days, sick infants, for disability, and special problems of access due to lack of transport	Emergency Response services for life saving emergencies with Emergency Medical technician on board

8. Emergency Care

First Aid Stabilization care for poisoning	Prevention and appropriate management in poisonings
Bites and stings: First Aid	Management of Bites and stings (snakebites and scorpion stings, and animal bites)
Complete first aid for trauma including management of minor injuries, and for fractures	Management of Fractures
Prevention and first aid: Burns and corrosions	Management of Burns

9. Acute Communicable Disease: Fevers

All measures, for prevention of VBDs, early and prompt treatment, and referral of complicated cases. including point of care diagnostics for malaria, kala-azar, Japanese Encephalitis	Diagnostics in ambulatory care; Hospitalization when needed for malaria, kala-azar, encephalitis, (for any fever with loss of consciousness--altered sensorium), for dengue requiring platelets
Primary care for other infectious diseases, presenting as fevers-especially acute respiratory infections	Diagnostics in ambulatory care and where institutional care is required as in pneumonia

10. Acute Communicable Disease: Gastrointestinal

Preventive action and primary care for waterborne disease, especially diarrhoeas (cholera, other enteritis) and dysentery, typhoid, hepatitis (A and E)	Typhoid, leptospirosis requiring admission, hepatitis acute (chronic hepatitis not included) especially hepatitis in pregnancy)
Control of helminthiasis	
Reduction of infectious hepatitis and identification and referral	Hepatitis B anti-viral not included

11.Chronic Communicable Disease: TB and Leprosy

Screening for leprosy, referral on suspicion, and follow up on cases with confirmed diagnosis and prescribed treatment	Start of treatment. Rehabilitative surgery
Referral of suspect tuberculosis, family level screening of known patients, and follow up with DOTS for confirmed diagnosis and prescribed treatment	Start of treatment, MDR TB

12. Chronic Communicable Disease: HIV

HIV testing, appropriate referral and follow up on specialist-initiated treatment	Drug treatment for HIV, Prevention of mother to child transmission

13. In Chronic Non-Communicable Disease (Package of 5): Hypertension, Diabetes, Epilepsy, Chronic Obstructive Pulmonary disease (COPD), Asthma

Mass Screening for diabetes and hypertension--all population above 30. Detection of epilepsy, COPD and asthma by self-reporting/ opportunistic screening. Ensuring follow up on doctor initiated drugs in diabetes, hypertension, epilepsy, COPD, asthma and secondary prevention– so that no complications develop	Specialist consultation—initially for prescription and diagnostics, and then admission and management for complications--(including stroke, heart attack (MI)--but not including renal failure, respiratory failure beyond a DH's capacity)

14. Endemic/ Occupational problems: (state-specific, e.g., Sickle cell, fluorosis, silicosis, etc as appropriate)

Opportunistic screening for a range of diseases – such as sickle cell disease as also part of RBSK, follow up for those diagnosed with sickle cell disease. No screening for sickle cell trait	Management of sickling crisis
Work-place screening and clinics for silicosis, occupational disease	Referral for specialists consultations, diagnostics

15. NCD-Mental Health

Screening for mental disorders and counselling, and follow up to specialist-initiated care	Specialist consultation and drug prescription
Counselling and support to victims of violence	Special counselling, medico-legal assist
Preventive measures against all harmful addictive substances-tobacco in the main, but also alcohol and addictive drugs	De-addiction centres in DH

16. NCD-Cancers

Screening for breast and cervical cancers in all women over the age of 40, counselling and support while on treatment	Chemotherapy, surgery, radiotherapy as indicated– only for these two cancers
Screening for oral cancers: Counselling and support for treatment	Same as above

17. Eye Care

Screening for visual impairments: Correction of refractive errors– especially the post 40s, Basic Eye Infections--conjunctivitis, trachoma	Cataract and Glaucoma (we could also add diabetic retinopathy) Corneal ulcers-acute-upto but excluding corneal transplant Lid, adnexa minor surgeries--excluding squint

18. Dental Care

Dental hygiene, screening, medical care of caries, gingivitis	Tooth extractions, Dentures, Root canals and fillings; excluding orthodontic surgery

19. Basic Surgical Care

Minor injuries, cuts, draining of abscesses	Surgery for acute abdomen, hemorrhoids, hydrocoele and hernias

20. General OPD

Regular ambulatory out-patient care and counselling--for minor illness not coming under above categories--body aches, headaches, gastritis	
Preventive and promotive measures to address musculo-skeletal disorders--mainly osteoporosis, arthritis of different sorts and referral or follow up as indicated	Specialist consultation and diagnostics for arthritis--especially rheumatoid
Health check-up	

This list seems quite comprehensive and as our analysis of the disease burden indicates, the inclusion of VBDs, NCD and CD, and also preventive and promotive parts is on the right track. The only addition we make is to add oral cancers, which is quite common in India, especially due to tobacco use. We assume it is a good starting point of checklists for states. This is also similar to the international experience that we have discussed, where we found that countries have been more comprehensive— rather than narrow— in their EHPs with significant emphasis on preventive services. However, the preceding analysis of health system factors also indicate that it might be a challenge to roll out such an EHP right away in the current scenario of severe infrastructure and personnel gaps. We return to this point on state-level prioritization shortly.

Currently, almost all these services are being offered by a few health coverage programmes of the government. These are the Central Government Health Scheme (CGHS) for Central Government employees, the coverage of railway employees by the Ministry of Railways and the Defence schemes for the Defence employees. While these schemes are for sub-populations that do not represent all of India, the range of services offered are similar to the list provided by the MoHFW. The per capita per year cost of running these schemes are extremely useful to benchmark the EHP exercise. It must also be remembered that these schemes are practically free for the employees and what little deductions occur (e.g., CGHS) are so low that ignoring these does not change the cost figures much.

Currently, to the best of our knowledge, there is no treatment listed in the MoHFW list given here that is denied to their employees under these three schemes. In our analysis below, we exclude the CGHS and the defence models because these are expensive and do not seem to be a replicable model for India (Gupta and Chowdhury 2014). The railways model, on the other hand, seems the most reasonable in terms of per capita cost, and is used as a reference point.

To do a proper costing exercise a bottom-up approach is necessary which is based on epidemiological data, data on service utilization and proper unit costing of services. Such a field-based exercise requires a significant investment of resources, especially time. Instead, we look at available costing methodologies and models to see whether

one can build on these in conjunction with the package proposed. We also compare different available estimates of per capita cost of EHP/UHC.

As mentioned in the introduction, one of the earliest serious exercises in drawing up an EHP for the Country was done by the NCMH (MoHFW 2005). The NCMH indicated a Core Package of Essential Health Interventions for universal free services for outpatients and a package of Basic Health Care services to be provided at 30-bedded community health facility. More recently, another analysis (Prinja et al 2012) presents costs of UHC, based on recurrent and annual costs for providing health services through a mix of public and private providers in Chandigarh located in northern India. Necessary health services required to deliver good quality care were defined by the IPHSs. The analysis uses NSS data to estimate the disease burden. We present these costs and compare with the costs obtained from the two government schemes mentioned above— Railways and Defence — in Table 8.2. The earlier estimates of NCMH and Prinja et al have been recalculated for the year 2011-12.

Table 8.2: Alternative Costing Models for EHP

Alternate Models	Defence	Railways	NCMH	Shankar
Total Cost				
Annual Per capita Cost, 2011-12 (Rs)	6307	2439	1848	1854
Annual Total Cost, 2011-12 (Rs Crores)	763314	295202	223642	224369
Financing				
Centre's share (Rs Cr)	228994	88561	67093	67311
Centre's share per capita (Rs)	1892	732	554	556
State's share (Rs Cr)	534320	206641	156549	157058
State's share per capita (Rs)	4415	1708	1294	1298
Centre's contribution as % of GDP	2.7	1.0	0.80	0.80
State's contribution as % of GDP	6.4	2.5	1.9	1.9
Total Requirement as % of GDP	9.1	3.5	2.7	2.7

Note:
A. Cost under the defence and railway models are exclusive of capital cost.
B. The railways model includes the following cost components– (1) Control and superintendence at Headquarters and Divisions, (2) Hospitals and Dispensaries excluding cost of Medicines, (3) Cost of Medicines, (4) Reimbursement of medical expenses and miscellaneous, (5) Public Health and, (6) Maintenance of equipments--- Medical Department. The data source is Demand for Grant No. 11, Annual Budget, 2012-13, Ministry of Railways.
C. The Defence model includes the following cost components– (1) Pay and Allowances--Service Personnel, (2) Pay and Allowances--Civilians, (3) Local Purchases--Army, (4) Local Purchases--Navy, (5) Local Purchases--Air Force, (6) Central Purchases, (7) Other grants, (8) Pay and Allowances– Ex-Servicemen Contributory Health Scheme (ECHS), (9) Medicines--ECHS, (10) Medical treatment– ECHS and, (11) Others. The data source is CAG report on Ministry of Defence.
D. All expenditure figures have been updated to 2011-12 prices, using GDP deflator.

The first two rows indicate the annual cost per capita and total cost using Census population estimates. The total resource requirement is computed by multiplying the per capita cost of each model (at current prices) with the current population. Next, we use the 30:70 ratio for Centre-state share in financing, based on the current pattern of public financing of health to calculate the Centre's and the states' shares respectively.

The estimates indicate that the per capita cost of an EHP might range from Rs 1,900-6,300 per capita per year. Given that the NCMH package was narrower than the newly-defined MoHFW list, we would think that Rs 1,848 of NCMH is an underestimate. The estimate based on Prinja's analysis is very similar and, therefore, could be assumed to be on the lower side as well. The Defence morbidity profiles would be somewhat higher due to the specific nature of the occupation.

The cost per beneficiary of selected state-level schemes are as follows: Rs 156, Rs 154 and Rs 81 respectively for Kalaignar (TN), Rajiv Arogyshri or RAS (AP) and RSBY (national scheme) respectively (Gupta and Chowdhury 2014). All these schemes cover tertiary care only and are directed at the BPL or vulnerable populations. These are low-cost tertiary care schemes with modest covers; clearly, the true cost of providing a comprehensive EHP would be much larger.

Currently, the bulk of the expenditure of the government is on primary care – of the total expenditure on services, it could be spending about 70 per cent on primary care. Tertiary care is the smallest component in government's current expenditure in any case (around 6 per cent). If one assumes that the current expenditure of the government on these three services is insufficient (around Rs 850 per capita per year based on quick calculations) to provide an EHP, the question that needs to be posed is whether the estimate of Rs 2400 (based on Railways) is sufficient.

There is no easy way to answer this; proper costing has to be done using a bottoms-up approach which is not possible in the absence of costing data from facilities. Given that the Railways does have a very comprehensive coverage especially around tertiary care, one can only hazard a guess that the true cost of an EHP – which is narrower that the Railways package – can be somewhat less than Rs 2400. Currently, Railways spend about 17 per cent on reimbursement and allowances, which is mostly on tertiary care. Incidentally, only 5 per cent of such care is in-house and the rest are contracted out, indicating the possibility of cost escalation. Clearly, the current

government spending of 6 per cent and Railways spending of 17 per cent provide two limits on how much tertiary care should contribute to an EHP. Given that the current government spending is too little and Railways is too comprehensive covering a wide range of specialty and super specialty, the proposed EHP could be midway between these two numbers. While still a bit arbitrary, the band is narrow enough to reduce the scope of error. If we assume about 11 per cent is going to be the tertiary share, then we get a reduced per capita package cost of Rs 2200, which can be taken as closest to the true cost of the EHP.

Table 8.3: Resource Requirements of States for EHP (Railways model)

States	Total Expenditure Requirement (TER) (Rs cr)	TER as share of GSDP (%)
Andhra Pradesh	14442	2.2
Arunachal Pradesh	236	2.2
Assam	5328	4.2
Bihar	17775	7.2
Chhattisgarh	4362	3.3
Delhi	2867	1.0
Goa	249	0.7
Gujarat	10320	1.7
Haryana	4329	1.4
Himachal Pradesh	1172	1.8
Jammu and Kashmir	2141	3.3
Jharkhand	5633	3.9
Karnataka	10432	2.3
Kerala	5704	1.9
Madhya Pradesh	12401	4.0
Maharashtra	19188	1.6
Manipur	439	4.2
Meghalaya	507	3.1
Mizoram	187	2.6
Nagaland	338	2.6
Odisha	7167	3.3
Punjab	4737	1.8
Rajasthan	11705	2.9
Sikkim	104	1.2
Tamil Nadu	12319	1.9
Tripura	627	3.0
Uttar Pradesh	34118	5.0
Uttarakhand	1722	1.8
West Bengal	15585	2.9
All States	206641	2.5

In the rest of the discussion, we use Rs 2400 as the per capita annual cost of an EHP, though as the preceding discussion indicated, the cost could be somewhat lower than this. As mentioned before, these are the total costs of funding health services by the government, a part of which is already being spent currently. The resource requirements for each state in Table 8.3 are based on the Railways model. The total requirement of funding is 3.5 per cent of GDP, of which the Centre's share is 1 per cent and the states have to spend 2.5 per cent. This is much higher than the minimum requirements of 0.3 per cent (centre) and 0.6 per cent (states) of GDP calculated in sub-section 7.3 to make OOPS at public facilities zero. In a way, one can think of 0.6-2.5 per cent of GDP as the range of new investment needed from the states for launching an EHP.

As a proportion of GSDP, resource requirement would be relatively higher for the poorer states and lower for the richer states. The existing infrastructure and personnel gaps that exist in all the states need to be filled up at the very least to meet the norms laid down by the government, and would mean additional resource requirements. The personnel gaps would of course depend on the specific package and emphasis - for example, states that want NCD services strengthened more would require more investment in specialists. We do not attempt to cost the additional funding required for bridging the infrastructure and personnel gaps that the states would have to attempt before launching EHP.

9. TACKLING THE FUNDING GAP: PRIORITIZATION BY STATES

While the package discussed above is much more comprehensive than a basic package, one can also attempt to prioritize and narrow down the elements of a *basic health package,* and indicate what could go into a more comprehensive basic health package. This is attempted and presented in Box 3.

For maternal and child health, all the services are to be included in a basic package. Thus, preventive, promotive as well as curative services are to be included in a basic health package. Similarly, for diseases with major public health significance, like the major CD (VBD, respiratory diseases, gastrointestinal diseases, TB, HIV, leprosy), the services offered should include preventive, promotive as well as curative services. However, for NCD, preventive and promotive services would be in the basic package, whereas curative services are in the optional list. This is on the assumption that for NCDs at this point, it is more cost-effective to prevent conditions and diseases, also because these services are not available in most facilities. This is especially true of mental health, with almost non-existent preventive and promotive services. For eye care, in addition to preventive and promotive services, basic surgeries and treatment of cataract and glaucoma should be part of basic health package. Dental care, treatment of occupational diseases and school health has been included in the additional list. The last could potentially seem controversial, but effective promotive and preventive services on other fronts coupled with government's school health check-ups (which can be made mandatory in all schools) might go a long way towards addressing adolescent and child health.

One point that is immediately clear is that if the more "basic" package is adopted, the costs would be lower. It is difficult to say by how much, but given that some of the high-end specialized care is now in the optional list, the basic care package would cost much less than what a comprehensive package would cost.

We do not discuss the level at which these services are to be offered because it is not easy to do so. This can be operationalized at the state level and according to the convenience of states which in turn would be based on the structure of their health care delivery system. States in any case will have their disease burden information and can adjust the package across time. For states that have sparse disease burden data, fresh surveys might enable estimation of the distribution of disease burden across broad disease categories. For example, a state that does not need to invest too

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│                    Box 3: Prioritization in an EHP                        │
│                                                                           │
│  Basic package                                                            │
│     A.  Preventive, promotive and curative services for                   │
│            1.  Maternal and reproductive health including contraceptive   │
│                services                                                   │
│            2.  Newborn, infant and child health including immunization    │
│                and                                                        │
│            3.  Child nutrition                                            │
│            4.  Emergency care and patient transport services             │
│                                                                           │
│     B.  Preventive, promotive and curative services for the following CD  │
│            1.  VBDs                                                       │
│            2.  Gastrointestinal diseases                                  │
│            3.  Respiratory infections                                     │
│            4.  TB, leprosy and HIV                                        │
│                                                                           │
│     C.  Preventive (including screening) and promotive services for the   │
│         following NCD                                                      │
│            1.  Hypertension                                              │
│            2.  Diabetes                                                  │
│            3.  Epilepsy                                                  │
│            4.  COPD                                                      │
│            5.  Asthma                                                    │
│            6.  Breast, cervical and oral cancer                          │
│            7.  Mental health                                             │
│                                                                           │
│     D.  Preventive and promotive eye care and treatment/surgery of       │
│         cataract, glaucoma and other minor surgeries                     │
│                                                                           │
│     E.  Basic surgical care (cut, burns, abscess etc)                    │
│                                                                           │
│  Additional/optional services for a more comprehensive package           │
│            1.  Management and treatment of major NCD including mental     │
│                health                                                     │
│            2.  Endemic occupational diseases                              │
│            3.  Dental care                                               │
│            4.  School and adolescent health services                     │
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much— in the current period at least— on NCDs may pare down resources required for NCDs. However, each disease would have its own resource requirements. Therefore, keeping excess capacity in the EHP by design is always a better approach. Nevertheless, in a resource-constrained setting, some prioritization may be called for. Table 9.1 below indicates the situation with respect to disease burden, infrastructure and financing in four different states: an EAG state– Jharkhand, a state which is an average economic performer– Himachal Pradesh, a developed state– Tamil Nadu and a north-eastern state – Arunachal Pradesh.

Table 9.1: Disease Burden and Health Systems in Selected States

Disease burden and health system indicators	Jharkhand	Himachal Pradesh	Tamil Nadu	Arunachal Pradesh
Disease burden				
IMR	38	36	21	33
U5MR	50	43	24	—
MMR	219	—	97	—
% of CD	45	26	32	51
% of NCD	28	52	42	24
% of vector-borne	5.0	0.4	1.4	18.5
Health infrastructure gaps				
Rank in average public health infrastructure	22	25	13	1
Rank in average population served	18	14	11	1
Health financing				
PHE as % of GSDP	1.0	1.5	0.8	3.6
OOP as % of GSDP	1.0	4.3	3.8	1.4
Total health Expenditure as % of GSDP	1.7	5.6	4.5	4.1

The question is should all the four states described above have the same EHP? Jharkhand has the highest MMR in this group making it a prime candidate for greater focus on safe pregnancy. HP and TN have a high share of NCDs, indicating these states can devote more resources to NCDs. Arunachal Pradesh has the highest VBDs in the group, and should have services for prevention and treatment of such diseases. VBD is negligible in HP and does not warrant too much investment on these diseases.

As for health systems indicators, Arunachal Pradesh seems to be doing very well in terms of public health infrastructure. The same cannot be said about Jharkhand. Tamil Nadu, despite its well-publicized health system improvements is somewhere in the middle, and HP is doing slightly worse. Clearly, how the states want to approach the infrastructure gap issue is dependent on where the gaps are and how much additional investments would be required and where, depending on the disease priorities.

Finally, resource requirements are linked to current spending, and both HP and Arunachal Pradesh seem to be doing better on public investment on health compared to the other states. However, the private OOP expenditures are very high in the better off States of HP and TN. The mix of public and private is something that has to be left

to the states to decide in their EHP, but the consensus that OOPS is detrimental to welfare of the people needs to be kept in mind. In other words, which services will not be covered by the EHP and who gets affected by being forced to go to the private sector should be guided by the overall principle of reduction of user fees and increase in the width as well as depth of financial protection.

Table 9.2: Estimates of Total Cost Allocation across Components of the Essential Package of Services (Assured Services under UHC Phase-1)

Note: P—Primary, S—Secondary, T—Tertiary

Diseases/ Conditions	Level of provision	Manpower	Equipment	Test	Drugs	System
1. Safe Pregnancy	P	12	0	0	44	44
	S/ T	36	2	2	15	20
2. Newborn, Infant and Child Health Services	P	41	0	2	4	53
	S/ T	49	12	1	12	26
3. Immunization	P	32	21	0	12	35
4. Nutrition Related	P, S/T	32	21	0	12	35
5. Contraceptive Services	P	27	2	5	1	72
	S/ T	46	7	1	39	7
6. School and Adoles Health Service	P, S/ T	0	63	0	0	37
7. Emergency Response and Patient Transport Services	P	41	0	0	25	34
	S/ T	41	0	0	25	34
8. Emergency Care		41	0	0	25	34
9. Acute Communicable Disease: Fevers	P	46	0	2	23	30
	S/ T	25	0	16	6	54
10. Acute Communicable Disease: Gastrointestinal	P	60	0	1	4	44
	S/ T					
11.Chronic Communicable Disease: TB and Leprosy	P	33	0	1	34	32
	S/ T	32	0	0	38	30
12. Chronic Communicable Disease: HIV	P					
	S/ T	32	0	0	38	30
13. In Chronic Non-Communicable Disease: (Package of 5)	P	12	0	38	38	11
	S/T	37	4	17	33	8
15. NCD: Mental Health	P	63	0	0	0	37
	S/T	36	0	0	48	16
16. NCD: Cancers	P					
	S/T	37	0	6	34	16
17. Eye Care	P	42	4	0	16	38
	S/T	24	37	1	4	34
18. Dental Care	P	42	4	0	16	38
	S/T	24	37	1	4	34

Where do the states need to spend the most? Table 9.2 is a very rough attempt to use the MoHFW guidelines in combination with the NCMH detailed costing of a core health package to indicate how much of the expenditure might take place at the primary and secondary/ tertiary levels. The NCMH did not separately do the tertiary care costing, so here we club the two together. Some items are missing where information from the NCMH could not be used in any meaningful way. In some places where information was not available for an item, we have approximated with composition of some similar item.

Thus, for example, while implementing the safe pregnancy part of the EHP, about 12 per cent of this sub-cost at the primary level would be on manpower, 44 per cent on drugs and remaining on the system. At the secondary/tertiary levels, these are different, with 36 per cent, two per cent, two per cent, 15 per cent and 20 per cent on manpower, equipment, test, drugs and systems respectively. These are just indicative and basically points to the fact that such an exercise may be useful at the state-level to understand where the requirements would be the most. Thus, states— while keeping the broad heads intact— might want to operationalize a specific EHP to suit their disease burden and health systems needs.

10. KEY HEALTH SECTOR REFORMS AND POLICIES TO IMPLEMENT EHP

While the launch of UHC or EHP would require many reforms in the health sector, we mention some critical ones below, that we think need immediate attention, prior to any launch of any health coverage programme in the country. This is because mistakes would be very costly and irreversible in some ways if distortions are introduced in the system.

First of all, some key decisions need to be taken in the government about how it wants to move ahead on EHP: consolidating existing services in an expanded basket of services for EHP, or a new package with services hitherto not being offered, with earlier services continuing. Nowhere has the modus operandi of rolling out EHP been clearly articulated— in terms of whether current and new services offered would be substitutes to some extent or complementary. This discussion must precede any rollout of EHP in the country.

The second key point that needs proper policy articulation has to do with the role of the private sector. With huge infrastructure and manpower gaps in the government health system, the co-opting of the private sector has been taken as given. The current schemes like RSBY and Rajiv Arogyashri all co-opt the private providers and facilities to offer health coverage to selected populations. Is that the model that would continue or does the government visualize improving the gaps in the public health facilities first and then attempting to launch coverage for the population? This would minimize the involvement of the private sector to some extent, if not totally eliminate it. A middle path could be to offer incentives to states to improve their public health services so that in a pre-specified timeline, bulk of the services could be offered from non-private sources. Till such time, well-articulated and closely-monitored public-private partnerships might be the only way to offer the range of services of an EHP.

This point in turns raises the question of investment: if improved public health infrastructure has to be a prerequisite, there has to be additional investment from the states as well as the centre. The current level of investment is low and has even gone down for some states (Gupta and Chowdhury 2014). In this scenario, the public finance implications of such capital investment raise some concerns.

The long-pending issue of regulation of the private sector will have to dealt with simultaneously; whether or not India moves towards UHC, the unregulated and unaccountable private health sector remains a source of serious concern, especially because of high financial burden on households that is not commensurate with the quality of care received. If UHC/EHP is to be launched and involvement of private sector – minimal or otherwise – has to be a reality, an important policy step has to be the regulation of the private health care sector.

In addition to quantity, the issue of quality and accountability of the public health facilities remain unaddressed. While it is now widely acknowledged that there are serious quality concerns, no concrete plan has yet been put in place to work out how quality can be improved in the public sector and the question of provider incentives addressed to ensure availability of services at the very least.

The decision to move towards UHC cannot take place without an articulation of the policy regarding consolidation of schemes and the existing inefficient fragmented system of coverage. Consolidation and merging of existing schemes would be the most efficient way forward, which will also have significant revenue implications, because it will free up substantial amounts of resources, which can then be used in a proper roll out of UHC. However, this will be a controversial decision, due to the current privileges being given to a small but politically powerful section of the society. It is not clear, therefore, whether there will be any attempt to merge for example, the CGHS, railways, other state health schemes, RSBY etc together to form one pool. At the very least, one can think of a few pools if not one consolidated one.

The previous discussion points to an important conclusion; India needs a planning and coordinating body that can also undertake assessment, research and evaluation of existing as well as future health coverage programmes. Any roll out of UHC/EHP must be preceded by the setting up of an autonomous apex body that can carry out this function and help steer the country in the right direction by making the roll out evidence-based. Most countries that have successfully launched UHC do have such a body. It could be a body similar to the Insurance Regulatory and Development Authority (IRDA) but only for the health sector. It would do much more than what the IRDA does; it should be the body that is responsible not only for drawing up operational guidelines but also for planning out the entire health coverage scenario and addressing questions around where and what and how of UHC. This

organization can be a national body with strong and compulsory state presence and participation. In addition to the points mentioned above, some of the discussions would be around the administrative and financial division between the Centre and the states. This body needs to be set up immediately, so that the planning as well as roll out is done in a structured fashion.

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11. SUMMARY AND CONCLUSIONS

This report analyses the disease burden and health systems indicators for states, and for the country as a whole, to understand how India might implement an EHP under the UHC programme.

The analysis indicates much disparity among states, and suggests that they will need flexibility in terms of contents and mix of services as well as operational design in their EHP; one standard, countrywide EHP will not help. The operational part will depend on the availability of health infrastructure and personnel on the one hand and on the ability to raise resources for health on the other.

In principle, and based on disease burden, infrastructure and financing, the twenty-service EHP of the MoHFW will help states include specific items in their EHP. In addition, this report suggests a shorter list of basic health services (the remaining services are to be optional during the initial stages).

To do a proper costing exercise, it is necessary to take a field-based, bottom-up approach, based on epidemiological and service utilization data and proper unit costing of services. This needs significant investment of resources, especially time and is an exercise strongly recommended prior to drawing up and launching any package.

Instead, we look at available costing methodologies and models to see whether one can build on these in conjunction with the package proposed. Based on a variety of estimates, we estimate that a comprehensive EHP would cost between Rs 2200 and Rs 2400 (about $40, at the exchange rate in September 2014) per capita per year. This is in line with the estimate of the 1993 World Development Report (World Bank 1993) and of the 2001 Commission on Macroeconomics and Health. Notably, the cost is much less for Afghanistan ($5), Bangladesh ($1-3), Ethiopia ($21), Malawi ($13-26) and Uganda ($28) and indicate that the estimated costs may be considered the upper limit of an EHP.

Clearly, depending on the exact composition of each state's EHP, the average cost will differ; however, once a package is decided, the GoI or FC will find these estimates useful to benchmark the transfer required.

There are significant data requirements for narrowing the confidence intervals for unit costs further. States have to conduct a proper costing exercise, based on their local prices and priorities. In fact, for implementing the UHC and EHP, states must start their management information systems (MIS) and monitoring and evaluation (M&E) systems now. Cost data need to be collected and analysed at the level of primary, secondary and tertiary care, but it is not currently maintained in a way that is amenable to analysis.

The data on disease burden and health systems in this report can be used to understand state-level requirements. States can revise these data based on a sound household survey, and use this framework to develop, cost and present project implementation plans (PIP) to the GoI or Finance Commission to for further funding decisions.

In addition to some key pre-launch reforms necessary for any rollout of EHC, this report suggests an innovation that the Centre or FC can introduce to make the public sector more responsive: design transfers as incentives. In other words, given the significant gaps in public health infrastructure, initially states might have to partner with the non-government sector, especially the private sector, to deliver the package. There should be a gradual move towards maximum public provision; a timeline can be agreed upon, on the principle that the government will provide all primary care, and provide secondary and tertiary care in partnership with the private sector, but if and only if there are significant personnel and other gaps in the existing system. The Finance Commission can base its transfers on evidence that states are trying to improve the quality of secondary and tertiary healthcare facilities and are trying to bridge the gaps in public sector healthcare infrastructure.

Can states raise the finance necessary for implementing an EHP? There has not been any serious discussion with states on their constraints, so this question cannot be settled conclusively. Ultimately, states must decide their priorities and finance a package. A state might choose to fund vulnerable populations or primary care only, in which case its financial burden would be low. Health is a state subject; so, the Centre has little scope to impose a model. How a state proceeds will depend on its disease burden and financing, and on its philosophy of priorities and public-private division of financing and provision; but its proven sincerity in implementing UHC, which is

mostly publicly funded, should determine transfers from the Centre or FC for implementing a package or bridging infrastructure gaps necessary for such implementation.

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APPENDIX

Table A3.1: Data Sources for Selected Indicators			
Dimension		**Indicator**	**Data source**
Mortality (rate)	A	IMR	SRS Bulletin (2007, 2008, 2009, 2010, 2011, 2012). **Sample Registration System**, Office of the Registrar General, India, Ministry of Home Affairs.
	B	Under-Five Mortality Rate (U5MR)	SRS Bulletin (2008, 2009, 2010, 2011, 2012). **Sample Registration System**, Office of the Registrar General, India, Ministry of Home Affairs.
	C	MMR	Special Bulletin on Maternal Mortality in India, (1999-2001, 2001-03, 2004-06, 2007-09, 2000-12). **SRS**, Office of the Registrar General, India, Ministry of Home Affairs.
Childhood Malnutrition (%)	A	Stunting	**National Family Health Survey (NFHS)-3** (2005-06). India: Vol-I. MoHFW, Govt. of India. Mumbai: Intl. Inst. of Population Sciences. 2010. Table-10.2, pp-273.
	B	Underweight	**National Family Health Survey (NFHS)-3** (2005-06). India: Vol-I. MoHFW, Govt. of India. Mumbai: Intl. Inst. of Population Sciences. 2010. Table-10.2, pp-273.
	C	Anaemia	**National Family Health Survey (NFHS)-3** (2005-06). India: Vol-I. MoHFW, Govt. of India. Mumbai: Intl. Inst. of Population Sciences. 2010. Table-10.13, pp-290.
Burden of Disease (per lakh population)	A	Diarrhoeal diseases	**National Health Systems Resource Centre** (http://nhsrcindia.org/). Resources—Health Systems Database—HMIS Data Analysis—Causes of Death—Known Causes of Deaths HMIS 2012-13 (India and States). Accessed on 20-Feb-2014.
	B	Tuberculosis	
	C	Respiratory diseases including infections	
	D	Other fever related diseases	
	E	Heart disease/ related to hypertension	
	F	Neurological disease including strokes	
	G	Trauma/ accidents/ burn cases	
	H	Suicide	
	I	Known acute disease	
	J	Known chronic disease	
Major Causes of (reported) Mortality (per lakh population)	A	Communicable disease, maternal & perinatal (maternal & perinatal, diarrhoea, tuberculosis, respiratory (excluding TB), malaria, other fever related, HIV/AIDS)	**National Health Systems Resource Centre** (http://nhsrcindia.org/). Resources—Health Systems Database—HMIS Data Analysis—HMIS Analysis 2012-13 (various States/ UTs), Apr 2012- Mar 2013. Accessed on 3-Mar-2014.
	B	Non-communicable disease (heart disease/ hypertension, neurological including stroke)	

	C	Injuries (trauma, accidents, burns, suicide, animal bites)	
	D	Others (other known acute diseases, other known chronic diseases, other diseases (causes not known))	
	E	Total	
Major Diseases (Morbidity) (per lakh population)	A	Communicable disease	**National Sample Survey Organisation** (http://mospi.nic.in/). Calculated from unit-level data from NSS 60th Round: Morbidity, Health Care and the Condition of the Aged, Jan-June 2004. Ministry of Statistics and Programme Implementation, Govt. of India.
	B	Non-communicable disease	
	C	VBD	
	D	Accident/ injuries	
	E	Others	
Inaccessibility of Public Health Facilities (%)	A	Number of public health facilities (PHC, CHC, SDH (without SC and District Hospital)) identified as accessible by NHSRC post-review	**National Health Systems Resource Centre** (http://nhsrcindia.org/). Resources—Health Systems Database—Health Facilities- Accessibility—state Summary Report (data available for 20 States). Sep 2010. Accessed on 3-Mar-2014.
	B	Number of public health facilities (PHC, CHC, SDH (without SC and District Hospital)) identified as inaccessible or most difficult or difficult by NHSRC post-review are clubbed as inaccessible	**National Health Systems Resource Centre** (http://nhsrcindia.org/). Resources—Health Systems Database—Health Facilities- Accessibility—National Summary Report (data available for 24 States). Sep 2010. Accessed on 3-Mar-2014.
Gap in Public Health Infrastructure (%)	A	Gap in SC	**NRHM** (http://nrhm.gov.in/). National Health Mission—NHM state-wise Information—Health Profile—Health Infrastructure. (Source: RHS Bulletin, March 2011/ 2012). MoHFW, Govt. of India. Accessed on 5-Mar-2014. Gap is calculated as relative percentage gap as {(required-available)*100/required}.
	B	Gap in PHC	
	C	Gap in CHC	
	D	Gap in Health worker (female)/ ANM at SC & PHC	
	E	Gap in Health worker (male) at SC	
	F	Gap in Health assistant (female)/ LHV at PHC	
	G	Gap in Health assistant (male) at PHC	
	H	Gap in Doctor at PHC	
	I	Gap in Obstetricians & Gynaecologists at CHC	
	J	Gap in Paediatricians at CHC	
	K	Gap in Total specialists at CHC	
	L	Gap in Radiographers at CHC	

	M	Gap in Pharmacist at PHC & CHC	
	N	Gap in Laboratory technicians at PHC & CHC	
	O	Gap in Nursing staff at PHC and CHC	
Gap in Public Health Facility (%)	A	Gap in SC	**Open Govt. Data Platform India** (www.data.gov.in) as on Mar, 2011. Accessed on 5-Mar-2014. Required number of PHCs is computed based on IPHS. Gap is calculated as relative percentage gap as {(required-available)*100/required}.
	B	Gap in PHC	
	C	Gap in CHC	
Average Population Coverage by a Health Facility	A	Population Coverage by a SC	**District Level Household and Facility Survey (DLHS)-3** (2007-08). India. MoHFW, Govt. of India. Mumbai: Intl. Inst. of Population Sciences. 2010. Table-9.1, pp-214.
	B	Population Coverage by a PHC	
	C	Population Coverage by a CHC	
Density of Health Facility	A	Percentage of villages with SC	**District Level Household and Facility Survey (DLHS)-3** (2007-08). India. MoHFW, Govt. of India. Mumbai: Intl. Inst. of Population Sciences. 2010. Table-2.13, pp-29.
	B	Percentage of villages with 'Any Govt Health Facility' (Includes SC, PHC, BPHC/ CHC or referral hospital, govt hospital, and govt dispensary within the village	

Table A4.1: Preventive and Promotive Services in EHP of Selected Countries*

INDICATOR	A	B	C	D	E	F	G	H	I	J	K	L	RANK
Maternal and child health													
Antenatal care	√	√	√	√				√	√	√	√	√	9
Labour and delivery care	√	√	√					√	√	√	√	√	8
Postpartum care	√	√	√							√			4
Newborn care	√	√	√				√			√	√		6
Counselling	√												1
Reproductive services for women	√		√									√	3
Immunization	√	√	√	√			√	√		√	√	√	9
Childhood illness	√	√	√	√			√			√	√		7
Child nutrition/ Growth monitoring and promotion	√	√	√	√			√			√	√	√	8
CD													
STI/HIV/AIDS	√	√	√	√			√			√	√	√	8
Tuberculosis	√	√	√				√			√	√	√	7
Malaria	√	√	√							√		√	5
Typhoid	√												1
Meningitis	√									√			2
Jaundice and yellow fever	√												1
Rheumatic fever	√		√										2
Hemorrhagic fever	√												1
Measles	√									√			2
Pertussis	√												1
Acute waterry diarrhoea	√		√							√		√	4
Bloody diarrhoea	√		√									√	3
Neonatal tetanus	√												1
Acute flaccid paralysis	√												1
Leprosy		√	√							√			3
Rabies		√	√										2
Cholera			√							√			2
Dysentry			√										1
helminthiasis			√										1
NCD													
Mental illness	√	√	√							√			4
Blood in stools							√						1
Cervical cancer			√				√		√				3
eye screening for amblyogenic factors							√						1
Breast cancer			√				√		√				3
Cardiovascular diseases							√			√	√		3
Cancer							√				√		2
Mental illness							√						1

Table A4.1: Preventive and Promotive Services in EHP of Selected Countries*

INDICATOR	A	B	C	D	E	F	G	H	I	J	K	L	RANK
							COUNTRY						**RANK**
Asthma			√										1
Diabetes			√								√		2
cholecstytectomy									√				1
Congential disease							√						1
respiratory disorders											√	√	2
Anemia										√			1
Tumor										√			1
VBD													
Urinary Tract Infection	√												1
schistosomiasis												√	1
Accidents and injuries													
Prevention of deadly accidents							√						1
Snake / insect / animal bite										√			1
Others													
Work related health risks										√			1
Genetic disorders and birth defects							√	√					2
Condoms and contraceptives		√	√	√	√			√		√			6
Counselling on family planning	√	√	√	√	√					√		√	7
Reproductive adolescent health	√	√	√							√			4
Eye test			√										1
Hygiene and environmental health services		√					√			√			3
Health education	√	√	√	√	√					√	√		7
Depression and suicide			√				√						2
Healthy food and physical activity							√			√			2
Prevention of addiction (Smoking/Alcohol/Drugs)			√				√		√	√			4
Oral health		√	√	√			√		√				5
Dental health			√	√			√	√					4
School health services		√					√			√			3
Medical pension benefits								√					1
Curative and Rehabiliative	A	B	C	D	E	F	G	H	I	J	K	L	
MCH													
Ante-natal care	√	√	√		√		√	√	√	√	√	√	9
Labor and delivery care	√	√	√	√	√		√	√	√	√	√	√	10
Emergency obsteric care	√	√	√				√	√	√	√	√	√	8
Postpartum care	√	√	√							√			4
Newborn care	√	√	√								√		4

Table A4.1: Preventive and Promotive Services in EHP of Selected Countries*

INDICATOR	A	B	C	D	E	F	G	H	I	J	K	L	RANK
					COUNTRY								
Maternity leave allowance								√					1
Supply of drugs, dressings and medical aids								√					1
Home care and domestic help								√					1
Reproductive services for women			√										1
Childhood illness	√	√	√		√		√			√			6
Child nutrition/ Growth monitoring and promotion		√	√				√	√		√		√	6
CD													
STI/HIV/AIDS	√	√	√		√		√		√	√	√	√	9
Tuberculosis	√	√	√							√	√	√	6
Malaria	√	√	√							√		√	5
Typhoid	√												1
Meningitis	√									√			2
Jaundice and yellow fever	√												1
Rheumatic fever	√	√	√										3
Hemorrhagic fever	√												1
Measles	√									√			2
Pertussis	√												1
Acute waterry diarrhoea	√	√	√							√		√	5
Bloody diarrhoea	√		√									√	3
Neonatal tetanus	√		√										2
Acute flaccid paralysis	√												1
Leprosy		√	√							√			3
Rabies	√	√	√										3
Cholera			√							√			2
Dysentry			√										1
helminthiasis		√	√										2
NCD													
Mental illness	√	√	√					√	√	√			6
Cervical cancer			√						√	√			3
Breast cancer									√	√			2
Cardiovascular diseases				√	√		√		√	√	√		6
Cardiac arrest	√		√		√								3
Epistaxis	√		√										2
Cancer									√		√		2
Eye infections	√	√										√	3
Epilepsy	√	√							√				3
Asthma	√	√	√						√				4
Diabetes		√	√						√	√	√		5
Cancer				√	√								2

Table A4.1: Preventive and Promotive Services in EHP of Selected Countries*

INDICATOR	A	B	C	D	E	F	G	H	I	J	K	L	RANK
							COUNTRY						RANK
(Chemotherapy/Radiotherapy)													
Percutaneous transluminal coronary angioplasty				√									1
Coronary artery bypass grafting				√									1
Stent for treatement of atheroscleoratic vessels				√									1
Surgery for herniorrhaphy					√								1
Appendectomy					√								1
cholecstytectomy					√								1
hystrectomy					√								1
Renal failure					√				√				2
Cerebrovascular diseases					√				√				2
Congential diseases					√				√				2
cystic fibrosis							√		√				2
endocrine and metabolic diseases							√						1
blood and immunity disorders							√						1
(neuro)locomotorial disorders and disabilities							√						1
mental and neurological impairments							√						1
VBDs													
Intestinal parasite infestation		√											1
Urinary Tract Infection		√											1
Antifungal treatemnts for cryptococcol meningitis				√									1
schistosomiasis												√	1
Accidents and injuries													
Emergency care	√		√		√				√	√		√	6
Orthopedic care	√	√	√		√								4
Snake / insect / animal bite	√	√	√							√			4
Prosthetic hip replacement therapy				√	√				√				3
Prosthetic shoulder replacement therapy				√	√								2
Knee replacement					√								1
Major burns	√		√		√				√				4
Eye injury	√								√				2
Pneumothorax and hemothorax	√												1
poisoning			√										1
Others													
Genetic disorders and birth			√										1

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INDICATOR	COUNTRY												RANK
	A	B	C	D	E	F	G	H	I	J	K	L	
defects													
Counselling										√		√	2
Infertility treatments										√			1
Sterilization		√		√	√			√					4
Abortion		√						√		√			3
Reproductive adolescent health	√	√	√										3
Prevention of addiction (Smoking/Alcohol/Drugs)			√										1
Oral health			√										1
Dental health		√	√	√				√	√				5
Hearing impairment			√										1
Medical aids (For e.g. glasses, hearing aids, wheelchair etc.)			√		√	√							3
Geriaritics			√				√		√				3
Intensive care unit					√								1
Transportation(For referrals and catastrophic care)					√				√				2
Sickness allowance								√					1
Palliative care						√	√	√					3
Tracheotomy	√		√										2
Supply of essential drugs (National list)			√	√		√		√					4
Home care				√				√					2

Table A4.1: Preventive and Promotive Services in EHP of Selected Countries*

*A: Liberia, B: Ethiopia, C: South Africa, D: Thailand, E: Colombia, F: Poland, G: Belgium, H: Germany, I: Chile, J: Tanzania, K: Kyrgyz Republic, L: Malawi

Table A5.1: State-wise Values of Selected Mortality Indicators and PCA Rank

State	IMR_GM	U5MR_GM	MMR_GM	Principal Component	Rank
Kerala	12.3	13.8	96.4	-1.970	1
Tamil Nadu	26.4	28.6	116.7	-1.305	2
Maharashtra	29.1	32.8	124.3	-1.142	3
West Bengal	33.3	39	158.9	-0.823	4
Punjab	35.2	41.6	174.4	-0.683	5
Karnataka	39.3	44.9	201.4	-0.442	6
Andhra Pradesh	47.3	48.9	157.7	-0.315	7
Gujarat	45.2	55.2	158.6	-0.251	8
Haryana	48.8	55.5	164	-0.142	9
Jharkhand	42.7	57.7	305.2	0.189	10
Bihar	49.8	64.7	305.2	0.484	11
Chhattisgarh	52.5	61.9	316.9	0.536	12
Rajasthan	56.9	68.8	370.9	0.932	13
Odisha	62.3	77.8	308.4	1.027	14
Madhya Pradesh	64.1	82.3	316.9	1.176	15
Assam	59.7	82	412.7	1.364	16
Uttar Pradesh	61.4	78.8	418.6	1.366	17

Note: Only one principal component/ factor is constructed with eigenvalue greater than 1. The eigenvalue is 2.801. The total variance explained is 93.4%.

State	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Composite Index	Rank
Goa	-86.4	-5.6	-25	-7.1	33.2	5.3	100	-115.8	40	100	70	-40	-4.2	8.3	-144.4	-0.71	-0.37	-2.03	-2.03	-0.21	-0.975	1
Maharashtra	21.1	17.3	33.6	-78.6	37	-33.2	-62.7	-52.4	50.4	50.1	64.6	76.6	-2.9	40.9	-87.4	-0.9	-1.67	0.3	1.01	-0.32	-0.583	2
Andhra Pradesh	-1.9	19	43.9	-54.5	63.2	-38.6	100	-112.3	64.8	60.9	69.2	76.9	2.8	25.4	-16.3	-0.95	-0.77	-0.19	0.44	-1.05	-0.574	3
Tripura	20.4	41.5	63.6	-46.5	24.5	-96.2	-77.2	-50.6	100	100	100	41.7	-1.1	20.9	-573.6	0.94	-3.4	0.71	0.22	0.01	-0.547	4
Karnataka	2.1	-59.9	50.1	-2.3	64.5	55.2	64.4	9.6	2.8	47.2	31.3	4.4	2.9	57.5	-39.4	-1.86	0.57	-0.79	-0.39	0.4	-0.544	5
Jammu & Kashmir	37.4	13.2	26.3	-71.1	71.6	77.8	77.3	-113.4	31	64.3	48.5	3.6	-46.9	-41.7	11.9	-1.17	0.53	0.29	-2.07	-0.13	-0.486	6
Uttar Pradesh	33.9	28.6	60.2	7.2	91.6	44.7	-22.4	22.5	7.8	-6.2	15.5	64.9	-32.7	56.4	64	-2.52	-0.09	0.68	0.67	1.01	-0.48	7
Kerala	-29.8	-38.1	-48.6	22.5	71.9	1.7	21.8	-42.4	100	100	10.8	90.8	-0.1	73.9	13.5	-0.64	-0.92	-1.66	1.25	0.82	-0.447	8
Punjab	14.8	22.2	8.3	-23.5	42.6	13.6	41	-1.8	50	55.3	47.2	6.8	-51.1	17	-50.2	-0.88	-0.15	0.23	-1.06	0.8	-0.359	9
Manipur	33.6	14.9	30.4	-95	-11.7	20	18.8	-112.5	100	93.8	98.4	25	-32.3	-37.5	-199	0.66	-0.98	0.54	-1.31	-0.51	-0.247	10
Mizoram	-110.2	-119.2	-50	-52.2	-6.5	66.7	61.4	14	100	100	100	44.4	30.3	7.6	-27.5	0.62	0.29	-2.8	-0.16	-0.34	-0.227	11
Assam	21.2	-2.3	54.2	-56.4	48.2	53.6	100	-51.6	36.7	81.7	72	40.4	-20.2	-14.7	-60.8	-0.55	0.41	0.21	-1.1	-0.31	-0.217	12
Tamil Nadu	-15.2	2.2	-23	6.8	85.5	16.3	-95	-85.1	100	100	100	60.8	12.4	33.4	-79.7	0.73	-1.55	-0.54	0.47	0.83	-0.157	13
Sikkim	2.6	-9.1	60	-70.2	-983	16.7	50	-33.3	100	100	100	0	61.5	-7.7	36.8	0.65	0.46	-0.48	-0.15	-3.53	-0.12	14
Bihar	47.7	39.6	90.9	-46.6	88.9	80.8	70.2	-89.6	44.3	38.6	46.1	81.4	77.3	74.2	26.2	-1.4	0.45	0.84	1.63	-1.07	-0.018	15
Haryana	39.4	32	33.5	-67.6	33.3	11	-12.5	23.5	89.9	90.8	93.3	-30.3	-58.3	29.1	-40.3	0.74	-0.2	1.17	-1.47	0.93	0.217	16
Chhattisgarh	-4.2	2.7	23.2	-188.8	50.8	0.8	79.7	42.4	87.9	87.2	88.1	41.6	32.4	50.9	69.3	0.42	0.37	0.34	0.65	-1.44	0.244	17
Rajasthan	24.3	34.3	34.3	-35.5	86.1	7.1	86.8	-14.9	96.3	97.1	90.3	31.9	71.2	-38.2	-183.8	1.02	-0.14	0.66	-0.35	-0.6	0.258	18
Meghalaya	49.7	7.6	0	-55.5	66.5	27.5	36.7	4.6	82.8	96.6	92.2	24.1	-2.9	2.9	-32.7	0.84	0.15	0.83	-0.65	0.44	0.371	19
Odisha	17.8	6.3	-15.3	-3.8	42.8	48.7	100	12.8	59.7	79.8	79	85.4	5.5	76.9	77.6	-0.1	0.74	0.15	0.84	0.55	0.39	20
Nagaland	15.4	-80	-23.5	-66.1	40.9	70.6	100	21.4	90.5	81	89.3	100	59.2	52.4	-39.9	0.53	0.67	-0.56	1.45	-0.42	0.446	21
Gujarat	20.6	19.2	11.2	23.7	33	24.4	34.5	32.8	97.2	99.1	94	47.2	3.3	7.5	20.1	0.99	0.18	0.53	-0.23	0.93	0.492	22
Uttarakhand	21.1	26.8	32.2	4.2	90	65.8	88.7	20.2	76.3	66.1	78.4	71.2	7.6	74.4	63.7	-0.07	0.81	0.66	0.73	0.65	0.493	23
West Bengal	21.5	58	35.7	-15.1	56.8	100	100	-10.7	66.7	83	87.4	35.1	19	58.2	-35.8	0.24	1.03	0.92	-0.15	0.33	0.523	24

Table A6.1: State-wise Gap in Public Health Infrastructure and PCA Rank

Table A6.1: State-wise Gap in Public Health Infrastructure and PCA Rank																						
State	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Composite Index	Rank
Himachal Pradesh	-0.5	-53.2	1.3	23.1	42.7	87.1	95.3	7.6	100	97.4	98.4	5.3	32.8	64.4	62.5	0.82	1.29	-0.55	-0.26	0.68	0.561	25
Madhya Pradesh	28	41.5	32.6	-1.8	57.9	52.8	74.7	29.6	78.1	79.9	80	42.3	54.5	59.1	28.6	0.36	0.78	0.84	0.64	0.23	0.588	26
Jharkhand	34.5	65.8	22	-53.3	75.8	78.8	90.9	-23.3	84	91.5	88.6	69.1	42.5	28.4	40.7	0.61	0.84	1.15	0.41	-0.27	0.641	27
Arunachal Pradesh	19.7	-83	-269.2	-3.1	48.3	100	19.6	5.2	100	97.9	99.5	81.3	61.4	39.3	32.3	1.58	0.68	-1.43	1	1.59	0.758	28
UT																						
Chandigarh	-240	0	0	-70.6	52.9	0	0	0	-50	0	12.5	0	-700	-300	-228.6	-1.34	-1.57	-0.84	-0.13	-0.3	-1.584	1
Delhi	50.6	38.5	100	-10.2	100	0	100	-137.5	0	0	0	0	62.5	75	62.5	-1.46	1.46	0.82	0.14	-0.36	-0.075	2
Puducherry	32.1	-84.6	0	-61	100	62.5	79.2	-54.2	66.7	66.7	58.3	0	-7.4	-7.4	-193.3	0.31	-0.62	1.16	-0.32	-0.02	0.074	3
Andaman & Nicob	-5.3	16.9	42.4	-53	59.5	29.2	-18.2	-44.6	44.5	58	63.7	58.4	4.6	22.5	-16.3	0.11	0.57	-0.87	-0.65	1.9	0.259	4
Daman and Diu	-116.7	-50	0	-37.9	7.7	100	33.3	-66.7	100	100	100	-50	20	20	35.3	0.89	0.7	-1.19	-0.49	-1.46	0.375	5
Dadra & N Haveli	7.4	25	50	-44.6	82	83.3	100	0	100	100	100	0	-14.3	-28.6	-130.8	0.9	-0.45	1.04	-0.71	0.01	0.405	6
Lakshadweep	-27.3	-300	0	22.2	7.1	100	100	-50	100	100	100	0	-200	0	-24	0.59	-0.09	-0.12	2.17	0.24	0.547	7

Note: Indicators—A: Gap in SC, B: Gap in PHC, C: Gap in CHC, D: Gap in Health worker (female)/ ANM at SC & PHC, E: Gap in Health worker (male) at SC, F: Gap in Health assistant (female)/ LHV at PHC, G: Gap in Health assistant (male) at PHC, H: Gap in Doctor at PHC, I: Gap in Obstetricians & Gynaecologists at CHC, J: Gap in Paediatricians at CHC, K: Gap in Total specialists at CHC, L: Gap in Radiographers at CHC, M: Gap in Pharmacist at PHC & CHC, N: Gap in Laboratory technicians at PHC & CHC, O: Gap in Nursing staff at PHC and CHC.

Gap is calculated as relative percentage gap as {(required-available)*100/required}. NA in available is replaced with 0. Zero in required, then Gap is 0.

For states: Five principal components/ factors are constructed with Eigen value greater than 1. The Eigen values are 3.234, 3.076, 1.689, 1.639 and 1.055. Composite index is calculated as weighted average of principal factors where weights are (Eigen value/ Sum of Eigen values). The total variance explained is 71.3%. For UTs: Five principal components/ factors are constructed with Eigen value greater than 1. The Eigen values are 5.895, 4.464, 1.848, 1.272 and 1.041. The total variance explained is 96.8%.

Source: NRHM (http://nrhm.gov.in/). National Health Mission—NHM state-wise Information—Health Profile—Health Infrastructure. (Source: RHS Bulletin, March 2011/ 2012). MoHFW, Govt. of India. Accessed on 5-Mar-2014.

Table A6.2: State-wise Average Population Served per Public Hospital and their Rank

State	Rural Govt. Hospitals	Urban Govt. Hospitals	Total Govt. Hospitals	Population (Census 2011)	Average Population served per Govt. Hospital	Rank
Arunachal Pradesh	382	2	384	1383727	3603	**1**
Jammu & Kashmir	1402	567	1969	12541302	6369	**2**
Manipur	217	8	225	2570390	11424	**3**
Chhattisgarh	1903	120	2023	25545198	12627	**4**
Uttarakhand	666	29	695	10086292	14513	**5**
Sikkim	30	3	33	610577	18502	**6**
Odisha	1659	91	1750	41974218	23985	**7**
Kerala	1091	164	1255	33406061	26618	**8**
Rajasthan	2041	471	2512	68548437	27288	**9**
Assam	985	35	1020	31205576	30594	**10**
Tamil Nadu	1614	381	1995	72147030	36164	**11**
Nagaland	21	32	53	1978502	37330	**12**
Gujarat	1476	77	1553	60439692	38918	**13**
Himachal Pradesh	98	53	151	6864602	45461	**14**
Madhya Pradesh	1157	382	1539	72626809	47191	**15**
Mizoram	12	10	22	1097206	49873	**16**
West Bengal	1272	294	1566	91276115	58286	**17**
Jharkhand	545	4	549	32988134	60088	**18**
Meghalaya	29	11	40	2966889	74172	**19**
Karnataka	423	342	765	61095297	79863	**20**
Tripura	18	21	39	3673917	94203	**21**
Maharashtra	309	864	1173	112374333	95801	**22**
Punjab	98	145	243	27743338	114170	**23**
Goa	8	3	11	1458545	132595	**24**
Bihar	565	106	671	104099452	155141	**25**
Haryana	61	93	154	25351462	164620	**26**
Andhra Pradesh	308	152	460	84580777	183871	**27**
Uttar Pradesh	515	346	861	199812341	232070	**28**
UT						
Andaman & Nicobar Islands	31	1	32	380581	11893	**1**
Lakshadweep	3	0	3	64473	21491	**2**
Puducherry	27	23	50	1247953	24959	**3**
Daman and Diu	0	4	4	243247	60812	**4**
Delhi	0	109	109	16787941	154018	**5**
Dadra and N Haveli	1	1	2	343709	171855	**6**
Chandigarh	0	5	5	1055450	211090	**7**
India	**18967**	**4949**	**23916**	**1210569573**	**50618**	

Table A6.3: State-wise Average Population Coverage by a Health Facility and PCA Rank

State	Average Population Coverage by			Principal Component	Rank
	SC	PHC	CHC		
Arunachal Pradesh	1168	5216	9811	-1.4950	1
Mizoram	2254	9154	18299	-1.3131	2
Meghalaya	3484	16311	28346	-1.0757	3
Himachal Pradesh	3032	13158	59417	-0.9310	4
Manipur	3904	29206	37478	-0.8454	5
Uttarakhand	4801	24410	76344	-0.5624	6
Rajasthan	4149	28303	98505	-0.4195	7
Goa	5395	46409	56699	-0.4194	8
Tripura	6307	31985	69842	-0.4127	9
Jammu & Kashmir	6011	25802	89659	-0.3650	10
Karnataka	4575	25673	106006	-0.3637	11
Tamil Nadu	8334	32059	76521	-0.2125	12
Chhattisgarh	4430	25685	133882	-0.1841	13
Gujarat	7234	38171	90765	-0.1342	14
Kerala	5994	29683	118654	-0.1273	15
Odisha	6086	37978	106948	-0.1128	16
Punjab	6185	29157	127033	-0.0611	17
Madhya Pradesh	5912	43390	149413	0.2212	18
Haryana	7585	41500	167422	0.4512	19
Andhra Pradesh	10702	48110	137650	0.5541	20
West Bengal	6869	37867	196478	0.5570	21
Assam	4864	111408	126456	0.7026	22
Uttar Pradesh	8032	69037	176720	0.8392	23
Jharkhand	7184	127298	120303	1.0042	24
Maharashtra	20182	45267	123096	1.1439	25
Bihar	24589	158275	253523	3.5615	26
UT					
Lakshadweep	2628	3996	8363	-0.7987	1
Andaman and Nicobar Islands	2465	8430	7598	-0.7542	2
Puducherry	3968	11633	18407	-0.4843	3
Dadra and Nagar Haveli	7591	41602	50000	0.5269	4
Daman and Diu	9213	56166	170135	1.5103	5
India	**8372**	**49193**	**128356**		

Note: Nagaland, Sikkim, Chandigarh and Delhi are excluded because of missing data. Lower population coverage by a health facility is assumed to be better. For States: Only one principal component/ factor is constructed with Eigen value greater than 1. The Eigen value is 2.282. The total variance explained is 76.1%. For UTs: Only one principal component/ factor is constructed with Eigen value greater than 1. The Eigen value is 2.852. The total variance explained is 95.1%.

Source: District Level Household and Facility Survey (DLHS)-3 (2007-08). India. MoHFW, Govt. of India. Mumbai: Intl. Inst. of Population Sciences. 2010. Table-9.1, pp-214.

Table A6.4: PCA Ranks in Density of Public Health Facility in Villages

state	A	B	Rank in A	Rank in B	Principal Component	PCA Rank
Kerala	99.6	99.8	1	1	3.343	**1**
Tripura	62.3	78.3	3	2	1.457	**2**
Mizoram	64.5	69.8	2	3	1.266	**3**
Sikkim	56.3	64.5	5	6	0.834	**4**
Tamil Nadu	58.2	61.8	4	8	0.813	**5**
Odisha	52.4	66.3	6	4	0.762	**6**
Goa	49.0	65.3	7	5	0.620	**7**
Jammu & Kashmir	47.6	62.2	8	7	0.478	**8**
Assam	46.7	57.1	9	9	0.291	**9**
Haryana	46.6	49.1	10.5	10.5	0.041	**10**
Rajasthan	46.4	48.9	12	12	0.028	**11**
Himachal Pradesh	45.3	49.1	13	10.5	-0.002	**12**
Andhra Pradesh	46.6	46.7	10.5	15	-0.034	**13**
Gujarat	39.2	46.9	16	14	-0.270	**14**
Arunachal Pradesh	41.2	44.4	14	16	-0.282	**15**
Punjab	40.0	43.8	15	17	-0.339	**16**
Maharashtra	37.5	42.6	18	18	-0.458	**17**
Karnataka	37.2	42.1	19	19	-0.484	**18**
West Bengal	38.6	40.0	17	20	-0.503	**19**
Meghalaya	27.8	48.5	26	13	-0.594	**20**
Uttar Pradesh	31.1	39.7	21	21	-0.758	**21**
Bihar	32.7	36.0	20	23	-0.819	**22**
Manipur	28.4	39.3	25	22	-0.858	**23**
Chhattisgarh	30.0	32.1	22	24	-1.028	**24**
Jharkhand	29.6	30.0	23	25	-1.106	**25**
Uttarakhand	29.5	29.5	24	26	-1.125	**26**
Madhya Pradesh	25.6	28.9	27	27	-1.271	**27**
UT						
Lakshadweep	89.3	100.0	1	1	1.334	**1**
Chandigarh	80.0	80.0	2	2	0.780	**2**
Daman and Diu	66.7	69.4	3	3	0.352	**3**
Dadra and Nagar Haveli	59.0	61.5	4	4	0.068	**4**
Puducherry	47.7	61.4	5	5	-0.115	**5**
Delhi	24.0	52.0	6	6	-0.686	**6**
Andaman and Nicobar Islands	0.0	19.4	7	7	-1.732	**7**
India	**41.0**	**46.2**				

Note: Indicators—A: Percentage of villages with Sub-Centre, B: Percentage of villages with 'Any Govt Health Facility' (Includes SC, PHC, BPHC/ CHC or referral hospital, govt hospital, and govt dispensary within the village (Facilities as reported by village pradhan/up pradhan/any other panchayat member/teacher/gram sevak/aganwadi worker)). Nagaland is excluded because of missing data. Higher density of health facility is assumed to be better. In case of a tie, ranks are divided equally.
For States: Only one principal component/ factor is constructed with Eigen value greater than 1. The Eigen value is 1.938. The total variance explained is 96.9%. For UTs: Only one principal component/ factor is constructed with Eigen value greater than 1. The Eigen value is 1.961. The total variance explained is 98.0%.

Source: District Level Household and Facility Survey (DLHS)-3 (2007-08). India. MoHFW, Govt. of India. Mumbai: Intl. Inst. of Population Sciences. 2010. Table-2.13, pp-29.

Table A6.5: State-wise Gap in SC and their Ranks

State	SC Available	SC Required	SC Gap (%)	Rank
Mizoram	370	219	-68.61	**1**
Himachal Pradesh	2067	1373	-50.55	**2**
Sikkim	146	122	-19.56	**3**
Arunachal Pradesh	286	277	-3.34	**4**
Nagaland	396	396	-0.08	**5**
Chhattisgarh	5076	5109	0.65	**6**
Uttarakhand	1765	2017	12.51	**7**
Tripura	632	735	13.99	**8**
Rajasthan	11487	13710	16.21	**9**
Manipur	420	514	18.30	**10**
Odisha	6688	8395	20.33	**11**
Jammu & Kashmir	1907	2508	23.97	**12**
Andhra Pradesh	12522	16916	25.98	**13**
Assam	4604	6241	26.23	**14**
Karnataka	8870	12219	27.41	**15**
Kerala	4575	6681	31.52	**16**
Meghalaya	405	593	31.75	**17**
Madhya Pradesh	8869	14525	38.94	**18**
Tamil Nadu	8706	14429	39.66	**19**
Gujarat	7274	12088	39.82	**20**
Goa	175	292	40.01	**21.5**
Jharkhand	3958	6598	40.01	**21.5**
West Bengal	10356	18255	43.27	**23**
Punjab	2950	5549	46.83	**24**
Uttar Pradesh	20521	39962	48.65	**25**
Haryana	2508	5070	50.54	**26**
Maharashtra	10580	22475	52.93	**27**
Bihar	9696	20820	53.43	**28**
UT				
Andaman and Nicobar Islands	114	76	-49.77	**1**
Lakshadweep	14	13	-8.57	**2**
Dadra and Nagar Haveli	50	69	27.26	**3**
Daman and Diu	26	49	46.56	**4**
Puducherry	53	250	78.77	**5**
Chandigarh	17	211	91.95	**6**
Delhi	41	3358	98.78	**7**
India	**148124**	**242114**	**38.82**	

Note: Availability data is accessed from www.data.gov.in. Required number of SCs is computed based on IPHS. IPHS suggests that there should be one SC per 5000 people in plain area and per 3000 people in hilly/ tribal areas. For simplicity, we computed required number of SCs by dividing state population (Census 2011) by 5000. Required numbers are rounded to nearest integer. Gap is calculated as relative percentage gap as {(required-available)*100/required}. In case of a tie, ranks are divided equally.

Source: Open Govt. Data Platform India (www.data.gov.in) as on March 2011. Accessed on 5-Mar-2014.

Table A6.6: State-wise Gap in PHC and their Ranks

State	PHC Available	PHC Required	PHC Gap (%)	Rank
Arunachal Pradesh	97	46	-110.30	1
Himachal Pradesh	453	229	-97.97	2
Nagaland	126	66	-91.05	3
Mizoram	57	37	-55.85	4
Sikkim	24	20	-17.92	5
Karnataka	2310	2037	-13.43	6
Meghalaya	109	99	-10.22	7
Jammu & Kashmir	397	418	5.03	8
Manipur	80	86	6.63	9
Assam	938	1040	9.82	10
Odisha	1228	1399	12.23	11
Chhattisgarh	741	852	12.98	12
Kerala	809	1114	27.35	13
Uttarakhand	239	336	28.91	14
Rajasthan	1517	2285	33.61	15
Tripura	79	122	35.49	16
Andhra Pradesh	1624	2819	42.40	17
Gujarat	1123	2015	44.26	18
Uttar Pradesh	3692	6660	44.57	19
Bihar	1863	3470	46.31	20
Haryana	444	845	47.46	21
Tamil Nadu	1204	2405	49.94	22
Maharashtra	1809	3746	51.71	23
Punjab	446	925	51.77	24
Madhya Pradesh	1156	2421	52.25	25
Goa	19	49	60.92	26
Jharkhand	330	1100	69.99	27
West Bengal	909	3043	70.12	28
UT				
Lakshadweep	4	2	-86.12	1
Andaman and Nicobar Islands	19	13	-49.77	2
Puducherry	24	42	42.31	3
Dadra and Nagar Haveli	6	11	47.63	4
Daman and Diu	3	8	63.00	5
Delhi	8	560	98.57	6
Chandigarh	0	35	100.00	7
India	**23887**	**40352**	**40.80**	

Note: Availability data is accessed from www.data.gov.in. Required number of PHCs is computed based on IPHS. IPHS suggests that there should be one PHC per 30,000 people in plain area and per 20,000 people in hilly/ tribal areas. For simplicity, we computed required number of PHCs by dividing state population (Census 2011) by 30000. Required numbers are rounded to nearest integer. Gap is calculated as relative percentage gap as {(required-available)*100/required}.

Source: Open Govt. Data Platform India (www.data.gov.in) as on Mar, 2011. Accessed on 5-Mar-2014.

Table A6.7: State-wise Gap in CHC and their Ranks

State	CHC Available	CHC Required	CHC Gap (%)	Rank
Arunachal Pradesh	48	12	-316.27	1
Himachal Pradesh	76	57	-32.86	2
Nagaland	21	16	-27.37	3
Meghalaya	29	25	-17.29	4
Odisha	377	350	-7.78	5
Mizoram	9	9	1.57	6
Kerala	224	278	19.54	7
Jammu & Kashmir	83	105	20.58	8
Manipur	16	21	25.30	9
Chhattisgarh	148	213	30.48	10
Jharkhand	188	275	31.61	11
Rajasthan	376	571	34.18	12
Uttarakhand	55	84	34.56	13
Tamil Nadu	385	601	35.96	14
Gujarat	305	504	39.44	15
Punjab	129	231	44.20	16
Madhya Pradesh	333	605	44.98	17
Haryana	107	211	49.35	18
West Bengal	348	761	54.25	19
Assam	108	260	58.47	20
Goa	5	12	58.86	21
Andhra Pradesh	281	705	60.13	22
Sikkim	2	5	60.69	23
Maharashtra	365	936	61.02	24
Tripura	11	31	64.07	25
Karnataka	180	509	64.65	26
Uttar Pradesh	515	1665	69.07	27
Bihar	70	867	91.93	28
UT				
Lakshadweep	3	1	-458.37	1
Andaman and Nicobar Islands	4	3	-26.12	2
Daman and Diu	2	2	1.33	3
Dadra and Nagar Haveli	1	3	65.09	4
Puducherry	3	10	71.15	5
Chandigarh	2	9	77.26	6
Delhi	0	140	100.00	7
India	**4809**	**10088**	**52.33**	

Note: Availability data is accessed from www.data.gov.in. Required number of CHCs/ BPHC is computed based on IPHS. IPHS suggests that there should be one CHC per 120,000 people in plain area and per 80,000 people in hilly/ tribal areas. For simplicity, we computed required number of CHCs by dividing state population (Census 2011) by 120000. Required numbers are rounded to nearest integer. Gap is calculated as relative percentage gap as {(required-available)*100/required}.

Source: Open Govt. Data Platform India (www.data.gov.in) as on Mar, 2011. Accessed on 5-Mar-2014.

Table A6.8: State-wise Ranking in Gap in Public Health Facility and PCA Rank

State	SC Gap	PHC Gap	CHC Gap	Principal Component	Rank
Arunachal Pradesh	-3.34	-110.30	-316.27	-3.025	1
Himachal Pradesh	-50.55	-97.97	-32.86	-2.150	2
Mizoram	-68.61	-55.85	1.57	-1.850	3
Nagaland	-0.08	-91.05	-27.37	-1.426	4
Sikkim	-19.56	-17.92	60.69	-0.618	5
Meghalaya	31.75	-10.22	-17.29	-0.279	6
Chhattisgarh	0.65	12.98	30.48	-0.242	7
Odisha	20.33	12.23	-7.78	-0.184	8
Manipur	18.30	6.63	25.30	-0.099	9
Jammu & Kashmir	23.97	5.03	20.58	-0.063	10
Karnataka	27.41	-13.43	64.65	0.033	11
Uttarakhand	12.51	28.91	34.56	0.065	12
Rajasthan	16.21	33.61	34.18	0.150	13
Assam	26.23	9.82	58.47	0.189	14
Kerala	31.52	27.35	19.54	0.219	15
Tripura	13.99	35.49	64.07	0.282	16
Andhra Pradesh	25.98	42.40	60.13	0.475	17
Gujarat	39.82	44.26	39.44	0.566	18
Tamil Nadu	39.66	49.94	35.96	0.596	19
Madhya Pradesh	38.94	52.25	44.98	0.650	20
Punjab	46.83	51.77	44.20	0.742	21
Jharkhand	40.01	69.99	31.61	0.752	22
Haryana	50.54	47.46	49.35	0.777	23
Goa	40.01	60.92	58.86	0.805	24
Uttar Pradesh	48.65	44.57	69.07	0.823	25
Maharashtra	52.93	51.71	61.02	0.900	26
West Bengal	43.27	70.12	54.25	0.904	27
Bihar	53.43	46.31	91.93	1.008	28
UT					
Lakshadweep	-8.57	-86.12	-458.37	-1.713	1
Andaman and Nicobar	-49.77	-49.77	-26.12	-1.024	2
Dadra and N Haveli	27.26	47.63	65.09	0.162	3
Daman and Diu	46.56	63.00	1.33	0.258	4
Puducherry	78.77	42.31	71.15	0.474	5
Chandigarh	91.95	100.00	77.26	0.884	6
Delhi	98.78	98.57	100.00	0.960	7

For States: Only one principal component/ factor is constructed with Eigen value greater than 1. The Eigen value is 2.246. The total variance explained is 74.9%. For UTs: Only one principal component/ factor is constructed with Eigen value greater than 1. The Eigen value is 2.517. The total variance explained is 83.9%.
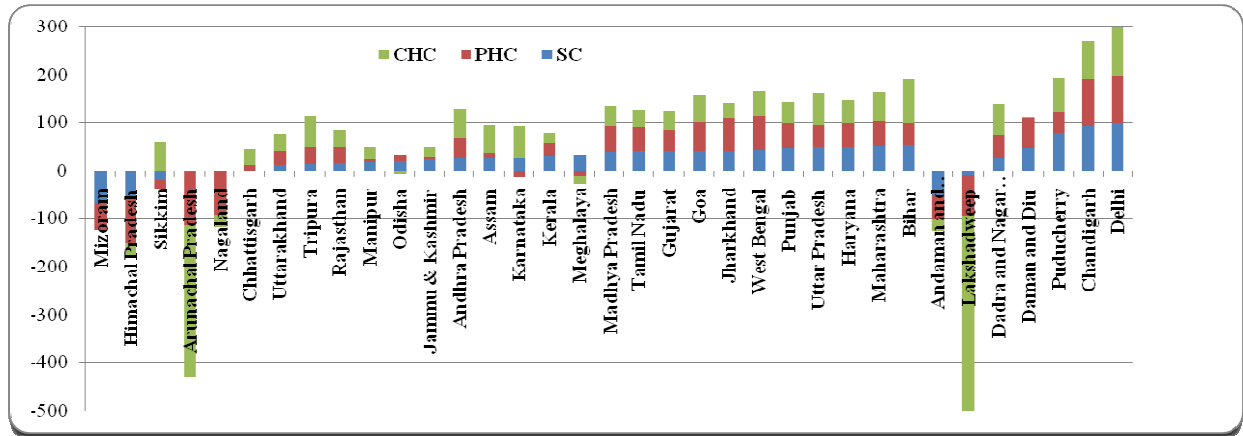
Table A6.9: State-wise Inaccessibility of Public Health Facilities and their Ranks

State	Inaccessible Facilities	Total Facilities	Share of Inaccessible Facilities	Rank
Uttar Pradesh	55	4205	1.31	1
Gujarat	46	1365	3.37	2
Tamil Nadu	72	1533	4.70	3
Maharashtra	112	2192	5.11	4
Andhra Pradesh	102	1737	5.87	5
West Bengal	85	1256	6.77	6
Karnataka	202	2517	8.03	7
Bihar	211	1846	11.43	8
Assam	143	952	15.02	9
Orissa	228	1510	15.10	10
Tripura	14	87	16.09	11
Jharkhand	88	515	17.09	12
Rajasthan	349	1870	18.66	13
Madhya Pradesh	286	1488	19.22	14
Jammu and Kashmir	89	460	19.35	15
Nagaland	29	144	20.14	16
Sikkim	6	24	25.00	17
Manipur	29	88	32.95	18
Uttarakhand	106	294	36.05	19
Himachal Pradesh	198	522	37.93	20
Arunachal Pradesh	68	160	42.50	21
Chhattisgarh	379	859	44.12	22
Meghalaya	63	133	47.37	23
Mizoram	51	66	77.27	24

Note: Number of public health facilities (PHC, CHC, SDH (without SC and District Hospital)) identified as inaccessible or most difficult or difficult by NHSRC post-review are clubbed as inaccessible.

Source: National Health Systems Resource Centre (http://nhsrcindia.org/). Resources—Health Systems Database—Health Facilities- Accessibility—National Summary Report (data available for 24 states). Sep 2010. Accessed on 3-Mar-2014.

Figure A6.1: State-wise Gap in SC, PHC and CHC

Source: Open Govt. Data Platform India (www.data.gov.in) as on Mar, 2011.