BROOKINGS INDIA

Methodology: Brookings India Health Monitor

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The Brookings India Health Monitor brings together real time data, research and powerful analytics of India's healthcare sector on a common platform. This is created using publicly available data from across all states and Union Territories of India. It enables policy makers, corporates and researchers to access, monitor and analyse real time health measures at a highly disaggregated district level. We have developed health indices at state and district levels for Quality and Quantity of health infrastructure which will be updated on a real time basis.

The Health Monitor consists of:

- Infrastructure Index (Methodology below)
- Maternal Health Index (In Process)
- Child Health Index (In Process)
- Communicable Diseases (In Process)
- Non-communicable Diseases (In Process)

Our aim is to democratize health data by making it publicly available through easy-to-understand, real time indices at highly disaggregated level (district of India). We believe that having access to this information can be helpful for local level policy makers as well as to the health industry for core business or corporate social responsibility (CSR).

Data

The following publicly available datasets and journals have been used to retrieve data for the Brookings India Health Monitor.

- Census data, 2011 (latest available)
- HMIS – Health Management Information System, under the MoHFW
- The Rural Health Statistics published by the MoHFW, Government of India, 2014-15

The Rural Health Statistics paper details out the population norms per type of rural healthcare infrastructure i.e. Sub Health Centre (SC), Primary Health Centre (PHC) and Community Health Centre (CHC). These norms differ by terrain, and are different for plain and hilly/tribal/difficult terrains.

The health care infrastructure in rural areas has been developed as a three tier system (see *Figure 1*) and is based on the following population norms (*see Table 1*):

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Figure 1: Rural Healthcare System in India

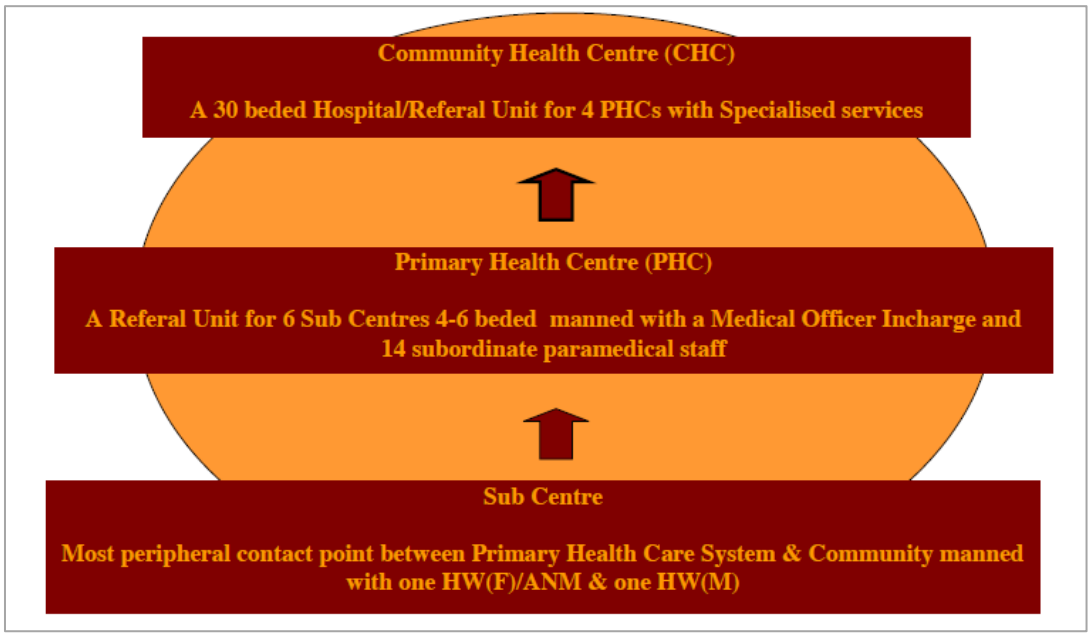

Table 1: Population norms for the three-tier health care system in India

Centre	Population Norms	
	Plain Area	Hilly/Tribal/Difficult Area
Sub Centre	5000	3000
Primary Health Centre	30,000	20,000
Community Health Centre	1,20,000	80,000

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I. Health Infrastructure Index (HII):

The Health Infrastructure Index (HII) is calculated by collating the Health Infrastructure Quantity Index (HQNI) and the Health Infrastructure Quality Index (HQLI). The quantity of health infrastructure is calculated using availability of infrastructure and the distance to infrastructure.

Quantity of public healthcare infrastructure is determined using two metrics: (a) availability of a healthcare facility and (b) average distance of the healthcare facility.

The norms for the average radial distance of a healthcare centre from any village are described below. The Census data (2011) has been used to compute the percentage of villages in each district that do not have Primary Health Centre, Sub Centre, Community Health Centre within the specified radial distance, as per enlisted norms.

- **Sub Centres**: access to a Sub Centre to be within 5 Kms radial distance
- **Primary Health Centre**: Access to a Primary Health Centre to be within 5 Kms radial distance
- **Community Health Centre**: Access to a Community Health Centre to be within 10 Kms radial distance

$$Health\ Infrastructure\ Index\ (HII) = Health\ Quantity\ Index\ (HQNI)\ \times\ Health\ Quality\ Index\ (HQLI)$$

I (a). Health Infrastructure Quantity Index (HQNI):

- The Health Infrastructure Quantity Index considers Sub Centres (SCs), Primary Health Centres (PHCs), Community Health Centres (CHCs), Sub Divisional Hospitals (SDHs) and District Hospitals (DHs) at a district and a state level.
- For Sub Centres (SCs), Primary Health Centres (PHCs) and Community Health Centres (CHCs), two variables are used: 'Availability' and 'Distance'. For Sub Divisional Hospitals (SDHs) and District Hospitals (DHs), only one variable is considered: 'Availability[1]'.

$$Quantity_d = \left\{\frac{SC^A + PHC^A + CHC^A + SDH^A + DH^A}{Total\ Population} \times 10{,}000\right\} + \frac{\{SC^D + PHC^D + CHC^D\}}{3}$$

A = 'Availability' (Total Number of Facilities)

[1] 'Availability' data is plotted on a per capita basis

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D = 'Distance'
d = District

- 'Availability' for SCs, PHCs and CHCs is based on data collected by the Ministry of Health & Family Welfare under the National Health Mission and uploaded to the Health Management Information System (HMIS). This data is updated on a monthly basis.
- This 'Availability' variable considers the total number of facilities at the SC, PHC and CHC level and then arrives at the per capita availability by considering the total population per district. This is not arrived at by considering the required number of facilities at each level because as per regulations, since certain districts[2] do not have a rural population, therefore by mandate, they do not require certain facilities. Therefore no benchmarks may be used.

$$\left\{\frac{SC_d^A + PHC_d^A + CHC_d^A + SDH_d^A + DH_d^A}{Total\ Population} \times 10{,}000\right\}$$

- 'Distance' is based on data collected by the Census and has not been updated since 2011
- 'Distance' is shown as a % of villages having access to the facilities within a certain distance, as determined by regulations. For Sub Centres (SCs) and Primary Health Centres (PHCs) the prescribed distance is under 5 kms; for Community Health Centres (CHCs), the prescribed distance is under 10 kms. This data is based on the sample of villages for each district that was surveyed by the Census.

$$^{3}SC_d^D = (\%\ of\ villages\ in\ a\ district\ with\ access\ to\ SCs\ under\ 5kms)$$
$$PHC_d^D = (\%\ of\ villages\ in\ a\ district\ with\ access\ to\ PHCs\ under\ 5kms)$$
$$CHC_d^D = (\%\ of\ villages\ in\ a\ district\ with\ access\ to\ CHCs\ under\ 10kms)$$

- 'Availability' for SDHs and DHs are plotted using population as a metric. The population is taken from the 2011 Census for each district.
- A sum is calculated adding the figure so arrived for all the district in a particular state. The average of the said figure provides us with the Index number for states.

$$Quantity_s = \sum_{d=1}^{N} \frac{Quantity_d}{N}$$

[2] Rural Population is missing for Kolkata, New Delhi, Central Delhi, Brihan Mumbai, Chennai, Hyderabad, Mahe and Yanam. Urban Population is missing for Lahul Spiti, Kinnaur and Nicobar. For these missing Sub Variables, we have used 0.
[3] Notations remain the same

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s = State
d = District
N = Number of Districts in the State

I (b). Health Infrastructure Quality Index (HQNI2)

- The Quality Index is calculated using data from SCs, PHCs and CHCs. This is done only on a state level for the current index. All the data is collected from the Ministry of Health & Family Welfare's annual publication titled "Rural Health Statistics[4]".
- Each of the facilities are further divided into the following variables: 'Infrastructure' and 'Human Resources'; CHCs have an additional variable available: 'Supply'. Details of the Sub Variables are recorded in Table 2.
- Sub Variables under 'Infrastructure' are ratios of the sub variables to the total number of facilities (Ex: $\frac{No.\ of\ SCs\ with\ ANM\ Quarters}{Total\ Number\ of\ SCs}$)
- Sub Variables under 'Human Resources' are ratios of the 'In Position' figures for the sub variable to the 'Required' figures. (Ex: $\frac{No.\ of\ Radiographers\ In\ Position\ at\ CHCs}{Number\ of\ Radiographers\ Required}$)
- Some Sub Variables under 'Human Resources' are a ratio of the sub variable to the total number of facilities (Ex: $\frac{Number\ of\ PHCs\ without\ Pharmacists}{Total\ Number\ of\ PHCs}$)
- Sub Variables under 'Supply' are ratios of the sub variables to the total number of facilities in the state (Ex: $\frac{No.\ of\ CHCs\ having\ a\ regular\ supply\ of\ allopathic\ drugs}{Total\ No.\ of\ CHCs}$)

$$Quality\ Index_s = \sum_{j=1}^{7} \frac{SC^j}{7} + \sum_{j=1}^{14} \frac{CHC^j}{14} + \sum_{j=1}^{18} \frac{PHC^j}{18}$$

j = District
s = State

[4] Source: http://wcd.nic.in/sites/default/files/RHS_1.pdf

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TABLE 2: Sub Variables used in Health Quality Index[5]

Variable[6]	Sub Centres	Primary Health Centres	Community Health Centres
Infrastructure			
With ANM Quarter	✓	×	×
With ANM living in Sub Centre Quarter	✓	×	×
Without Regular Water Supply	✓	✓	×
Without Electric Supply	✓	✓	×
Without All-Weather Motorable Approach Road	✓	✓	×
With Labour room	×	✓	✓
With Operation Theatre	×	✓	✓
With at least 4 beds	×	✓	×
With Computer	×	✓	×
With referral Transport	×	✓	✓
With AYUSH facility	×	×	✓
With functional X Ray facility	×	×	✓
With quarters for specialist doctors	×	×	✓
With specialist doctors living in quarters	×	×	✓
With functional laboratories	×	×	✓
With functional New Born Care Centre	×	×	✓
With at least 30 beds	×	×	✓
Human Resources			
Health Worker (Female) / ANM	✓	×	×

[5] Data taken from Rural Health Statistics, 2015.
[6] ✓ stands for available data & × stands for data not being available

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Health Worker (Male)	✓	×	×
Health Assistant (Female)	×	✓	×
Health Assistant (Male)	×	✓	×
Doctors	×	✓	×
Facilities without Lab Technician	×	✓	×
Facilities without Pharmacist	×	✓	×
Facilities without Lady Doctor	×	✓	×
Pharmacists at Facilities	×	✓	✓
Nursing Staff at Facilities	×	✓	✓
Lab Technicians at Facilities	×	✓	✓
Radiographers	×	×	✓
Total Specialists (Surgeons, OB&GY, Physicians & Pediatricians)	×	×	✓
General Duty Medical Officers (Allopathic)	×	×	✓
Supply			
Regular supply of Allopathic drugs for common ailments	×	×	✓
Regular supply of AYUSH drugs for common ailments	×	×	✓

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Appendix:

- For Quality of PHCs, three Sub Variables under 'Human Resource' namely 'Pharmacists', 'Laboratory Technicians' and 'Nursing Staff' is a collated figure for PHC and CHC combined. To avoid error of double counting, it is considered only once under PHCs.
- Due to lack of data reported by the Rural Health Statistics, 2015, certain Sub Variables are ignored for certain states. Table 3 lists out the same in detail:

Table 3: Missing Variables by State[7]

Name of State	Sub Variables for SCs omitted	Sub Variables for PHCs omitted	Sub Variables for CHCs omitted
Arunachal Pradesh			General Duty Medical Officers (GDMOs) - Allopathic at CHCs
Assam			General Duty Medical Officers (GDMOs) - Allopathic at CHCs
Bihar	- SCs without all-weather motorable road	-PHCs Without All-Weather Motorable Approach Road - SCs with at least 4 beds -SCs Without Regular Water Supply	
Mizoram			General Duty Medical Officers (GDMOs) - Allopathic at CHCs
Sikkim			General Duty Medical Officers (GDMOs) - Allopathic at CHCs

[7] These are not reported in RHS (2015)

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Uttar Pradesh			General Duty Medical Officers (GDMOs) - Allopathic at CHCs
Chandigarh		No Sub Variables considered	
Dadra & Nagar Haveli			General Duty Medical Officers (GDMOs) - Allopathic at CHCs
Delhi			No Sub Variables considered