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**SITRA**

Field Study of Indian Health Care  
focus: States of Karnataka and Tamil Nadu

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## 1 INTRODUCTION

As part of Sitra's India program, Sitra wanted to study the opportunities for the Finnish health care sector in India and asked Finpro to conduct a field study in the states of Karnataka and Tamil Nadu. Due to short time and limited project, this can be seen as a pre-study only to understand the current situation, plans and main opportunities for cooperation. The study was conducted as desk study and interviews by Finpro India team located in New Delhi, Mumbai and Chennai. Interviews took place in Bangalore and Chennai. The following organizations were interviewed:

Ministry of Health and Family Welfare, State of Karnataka

Ministry of Health and Family welfare, State of Tamil Nadu

Narayana Hrudayalaya, private hospital in Karnataka

Apollo Hospital, private hospital chain having hospitals all over India, head quartered in Chennai

Figures of Census 2001 are the latest national statistics available. Next Census will take place in 2011.

In India, the financial year runs from April to March, so at the time of the study 2005-2006 was the latest possible available statistics and latest budget 2007-2008. Official statistics on health care infrastructure cover only governmental hospitals. Estimates on private sector share are academic guesses or based on some surveys. However, there are no estimates available specifically for Karnataka and Tamil Nadu.

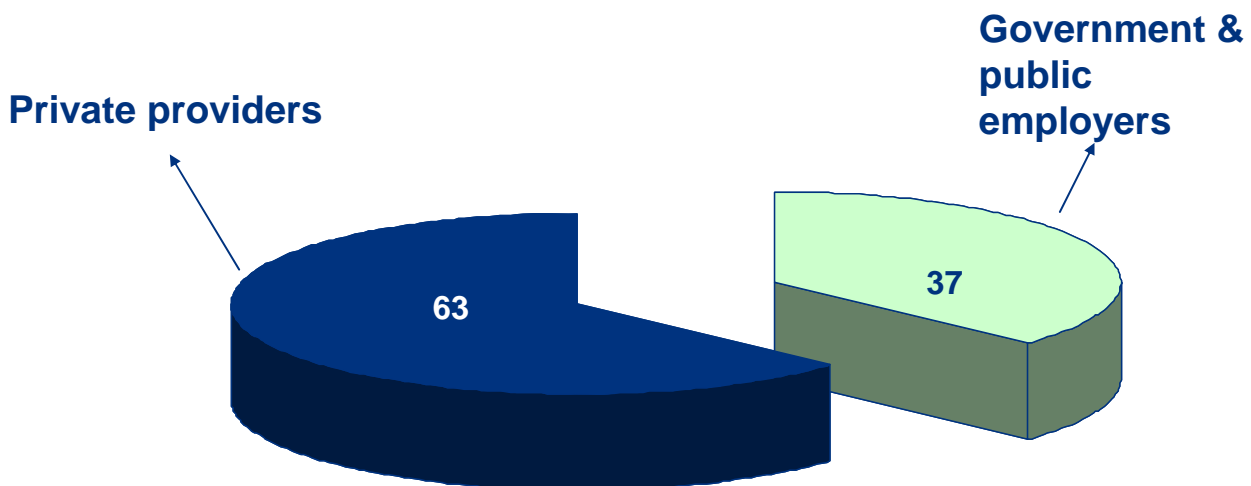
Exchange rate used to convert rupees into euros is 1 EUR = 60 INR. Local currency Rs or INR remains in conjunction with local development projects. Further on, 1 lakh = 100 000 and 1 crore= 10 million.

## 2 INDIA HEALTH CARE OVERVIEW

Healthcare is a state subject which follows a three tier system – primary health centre catering a group of villages, Secondary level health centre located at district level and medical college hospitals constitute the tertiary level located in the big cities. Besides, there are few advanced medical institutes of national importance having clinical, teaching and research facilities in many super-specialties. In addition to government run health system, same hierarchical healthcare services exist in private sector. There is no national health insurance system, though the government, public sector and corporate organizations sponsor the healthcare expenses of its employees and family. In the recent years few insurance companies are venturing into health sector. In spite of well networked health care system access to healthcare in rural areas is far from satisfactory. In the current scenario, 75% of the qualified consulting doctors practice in urban, 23% in semi-urban (towns) and only 2% in rural areas where as the vast majority of population live in the rural areas. Hospital beds/1000 people are 0.10 in rural as compared to 2.2 in urban areas. Further, a vast proportion of north and north-eastern region of country lie in hilly terrain and some territory in remote islands making healthcare reach impossible to such far flung areas.

### 2.1 Public vs Private Health Care

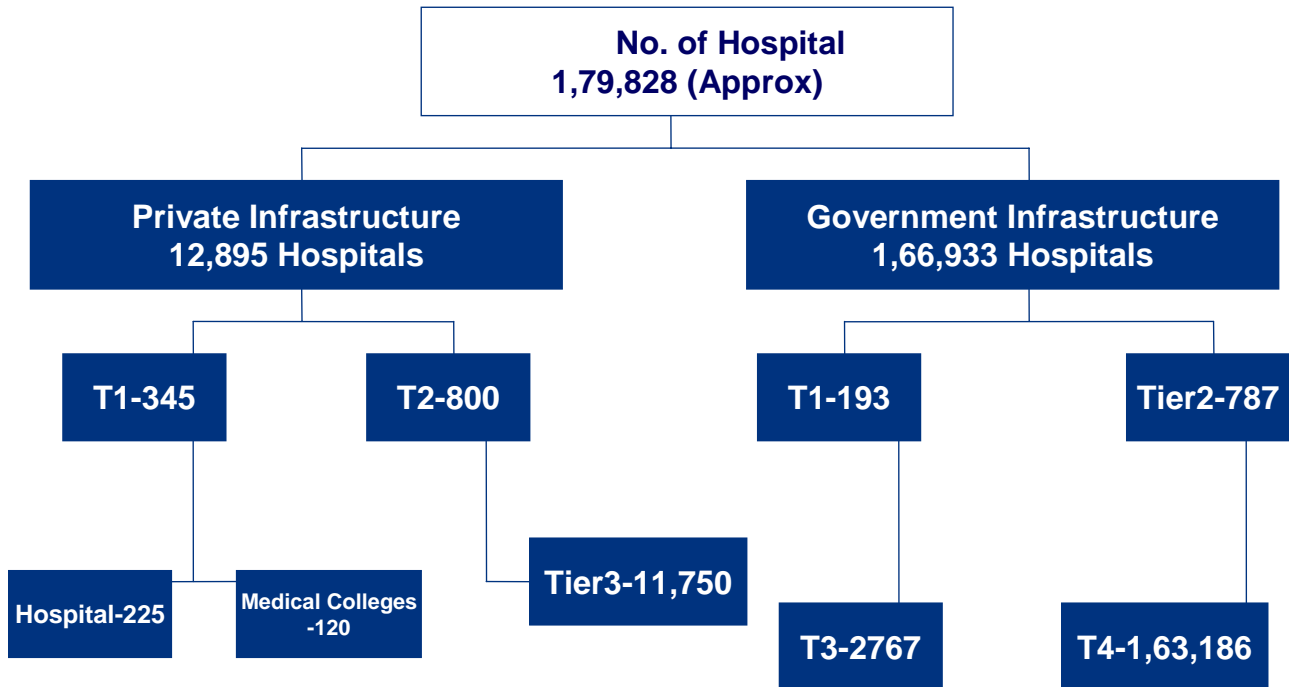
The official health care figures cover only public sector, as the government is currently not able to regulate the private providers. Share of the private sector is estimated to be 63% of the total health services spent (CII-McKinsey 2005). Health care growth is mostly on the private providers offering, so the share is on the rise.



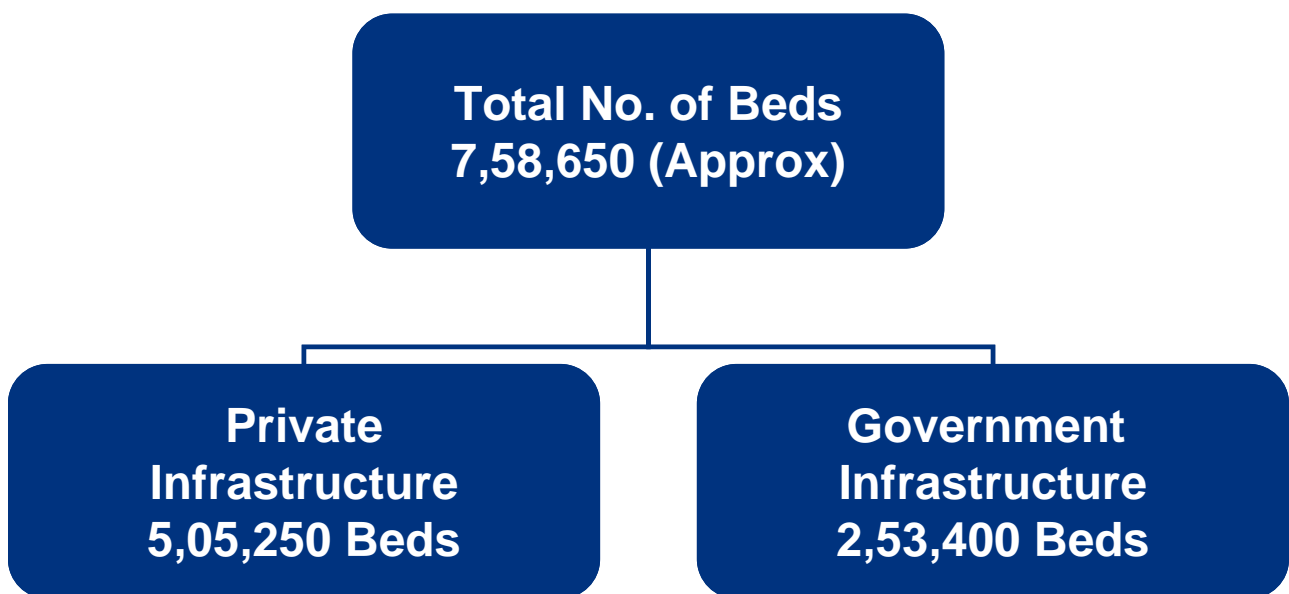
Source: CII -McKinsey

Private providers capture 63% of health expenditure, which in 2005 totaled USD 1,830 million.

The division of hospitals and hospital beds between public and private sector is shown in the charts below. Private sector covers 7% of the hospitals and 66,5% of the hospital beds.



Public and private hospitals in India. (Source: CII-McKinsey 2005)



Division of hospital beds between public and private infrastructures in India. (Source: CII- McKinsey 2005)

Public Private Partnership (PPP) is a mode of implementing government programs in partnership with the private sector. Private in this context can mean all non-governmental agencies like corporate sector, partnership firms, voluntary organizations, self-help groups, individuals and community-based organizations. The roles and responsibilities of the partners may vary from sector to sector.

In short, the most common PPP models are: service contracts, management contract, collocation, joint venture and BOL (build, own and lease). For service contracting, most common is to outsource the non clinical support functions such as cleaning, catering, laundry, security, building maintenance as well as clinical care services like radiology, laboratory services and specialized clinical services. In the management contract model the hospitals are build and financed by the government and a private firm is responsible for the management of both staff and facilities under annual funding contracts. The private operator has to treat all public patients who come to the hospital and government pays for the medical services based on a target volume of patients. An example of this is a hospital located in a slum operated by non-governmental organization. Colocation means in practical terms for instance a governmental hospital with a private wing for private patients, sharing joint costs, staff and equipment with public sector. In a joint venture private sector and public sector enter into JV agreement for setting up new hospitals. Government participation in funding is limited to providing land and in turn the facility is expected to offer free care to a certain percentage of patients. In typical build, own and lease (BOL) model private sector finances the construction of a new hospital and leases it back to government who manages the hospital and makes lease payments to private sector.

PPP benefits both the public and private sector. It is cost effective allowing higher productivity and better utilization of facilities. Service provider is able to reduce the risks. Increased volume of the services will spread the fixed costs and increase the profitability. Larger masses can be treated and the focus is in the customer, who will get the best possible care. The government can participate in four roles: regulator, facilitator, provider and payer.

## 2.2 Traditional health care

### **Department of ayurveda, yoga-naturopathy, unani, sidha&homoeopathy (AYUSH)**

The National Health Policy, 1983 suggested that it was necessary to initiate measures to enable India's rich medicinal heritage to develop in accordance with its genius. It took note of the fact that vast infrastructure is available in Indian Systems of Medicine and Homoeopathy and that it should be integrated at the appropriate level, within specified areas of responsibility and functioning in the over all health care delivery systems, specially in regard to the preventive, promotive and public health objectives.

The Central Council for Health and Family Welfare in 1999 also recommended, inter-alia, that at least one physician from the Indian Systems of Medicine & Homoeopathy should be available in every Primary Health Center and that vacancies caused by non-availability of allopathic personnel should be filled by ISM&H physicians. The Council also resolved that specialist ISM&H treatment centres should be introduced in rural hospitals and a wing should be created in existing state and district level government hospitals for extending the health care to the public.

The concern for preservation and scientific development of India's rich heritage of medicinal knowledge reflected in National Health Policy, 1983 led to the National Policy on Indian Systems of Medicine & Homoeopathy, 2002 which outlined following basic objectives:

- (a) To promote good health and expand the outreach of health care to people, particularly those not provided with health cover, through preventive, promotive and curative interventions through ISM&H.
- (b) To improve the quality of teachers and clinicians by revising curricula to contemporary relevance by creating model institutions and Centres of Excellence and extending assistance for creating infrastructural facilities.
- (c) To ensure affordable ISM&H services and drugs which are safe and efficacious.
- (d) To facilitate availability of raw drugs which are authentic and contain essential components as required under pharmacopoeial standards to help improve quality of drugs, for domestic consumption and export.
- (e) To integrate ISM&H in the health care delivery system and National Programmes and ensure optimal use of the infrastructure of hospitals, dispensaries and physicians.
- (f) To re-orient and prioritize research in ISM&H to gradually validate therapy and drugs to address in particular the chronic and new life style related emerging diseases.
- (g) To create awareness about the strengths of these systems in India and abroad and sensitize other stakeholders and providers of health.
- (h) To provide full opportunity for the growth and development of these systems and utilization of their potential, strength and revival of their glory.

## 2.3 Payment systems

Proportion of insurance in healthcare financing in India is extremely low, even if it has been growing 25% annually during recent years. In 2002, less than 15% of the population was covered through prepayment. Out of that only 0,4% is from private health insurances. 3,4% came from social insurance ESIS. Proportion of employer's spend was 5% and another 5% came from community insurance schemes. In addition to this, government provides coverage through free access to its facilities. In 2004 the proportion of population covered had grown to about 20%. In 2000 around 4 million were covered and the target was to grow it into 12million until 2006. However, there is a huge gap between rural and urban population covered by pre-payment.

### 2.3.1 Social insurance

Employer Social Insurance System (ESIS), is a mandated wage- based contribution from employees and employers.

### 2.3.2 Commercial health insurances

There are 13 insurance companies in India, out of which 4 are governmental and 9 private insurance companies. Health insurance is a rapidly growing market in India. According to the estimates of Earnst&Young, the sector is likely to grow from USD 771 million to USD 3,8billion between 2006 and 2012. However, commercial health insurances are out of reach of the masses in India.

### 2.3.3 Employer based

Both public and private sector provide health care for their employees.



#### **2.3.4 Community health insurance (CHI)**

CHI is a not-for-profit insurance scheme aimed primarily at the informal sector. CHI schemes involve prepayment and large enough pooling of resources to cover the realized health care costs. Other terms used in reference to community health insurance are micro health insurance, local health insurance and mutuelles.

Because the poor lack resources to pay for health care, they are more likely to avoid going for care or to become indebted or impoverished trying to pay for it. It has been estimated that at least 24 per cent of all Indians hospitalized fall below the poverty line because they are hospitalized and that out-of-pocket spending on hospital care might have raised by 2 per cent the proportion of the population in poverty. Community health insurance aims to improve access to health care among the poor as well as protecting the poor from indebtedness and impoverishment resulting from medical expenditures.

The government pays a certain sum per person to the CHI pool. The schemes vary in the sense of what costs are covered some covering only the direct costs during necessary operation, some also indirect costs like medicines. 25 bodies are licensed as third party organization (TPO), which is allowed to administer a CHI scheme. Membership is mainly voluntary even though in some communities the community would pay the premium for its members and they in turn contribute during the year e.g. milk to the community. Coordinator of the CHI scheme can be hospital, voluntary organization as insurer or voluntary organization acting as intermediary purchasing services both from hospital and insurance company. Success factors of a HCI scheme seem to be effective and credible community based organization, affordable premium, large enough community and also a suitable pool of health care service providers, who commit to the prices agreed with the CHI trust.

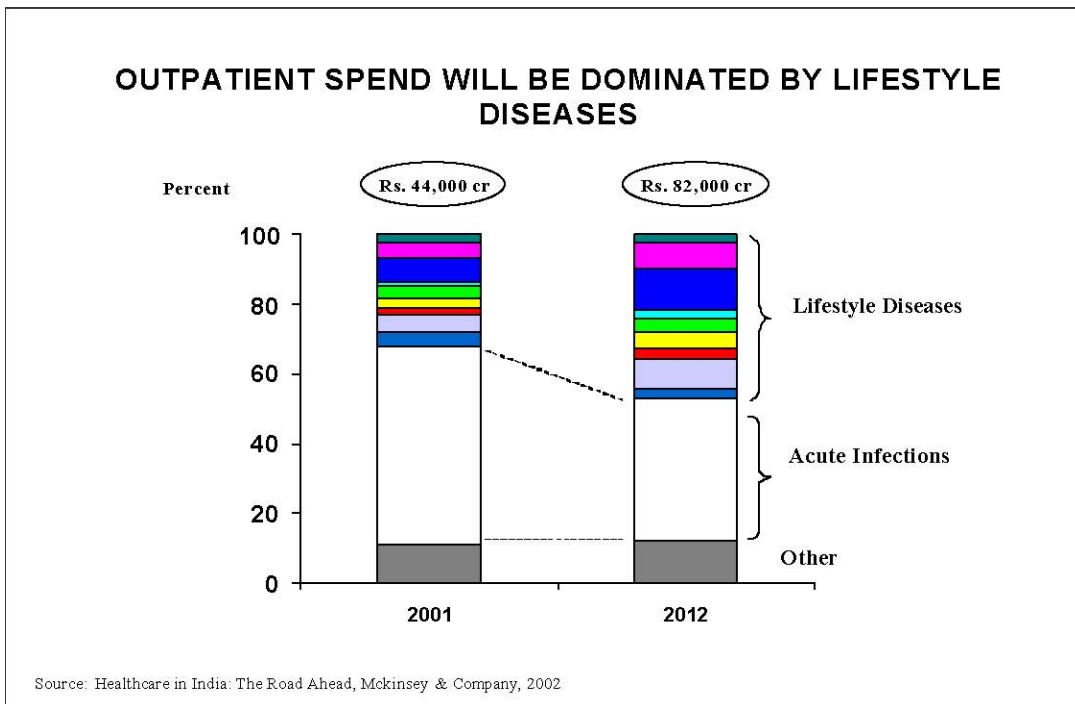
#### **2.3.5 Below Poverty Line (BPL)**

There is free health care everywhere in India for people below poverty line offered in the government hospitals as well as in most private hospitals. It seems that the BPL status is not questioned from patients and no identification proof is required.

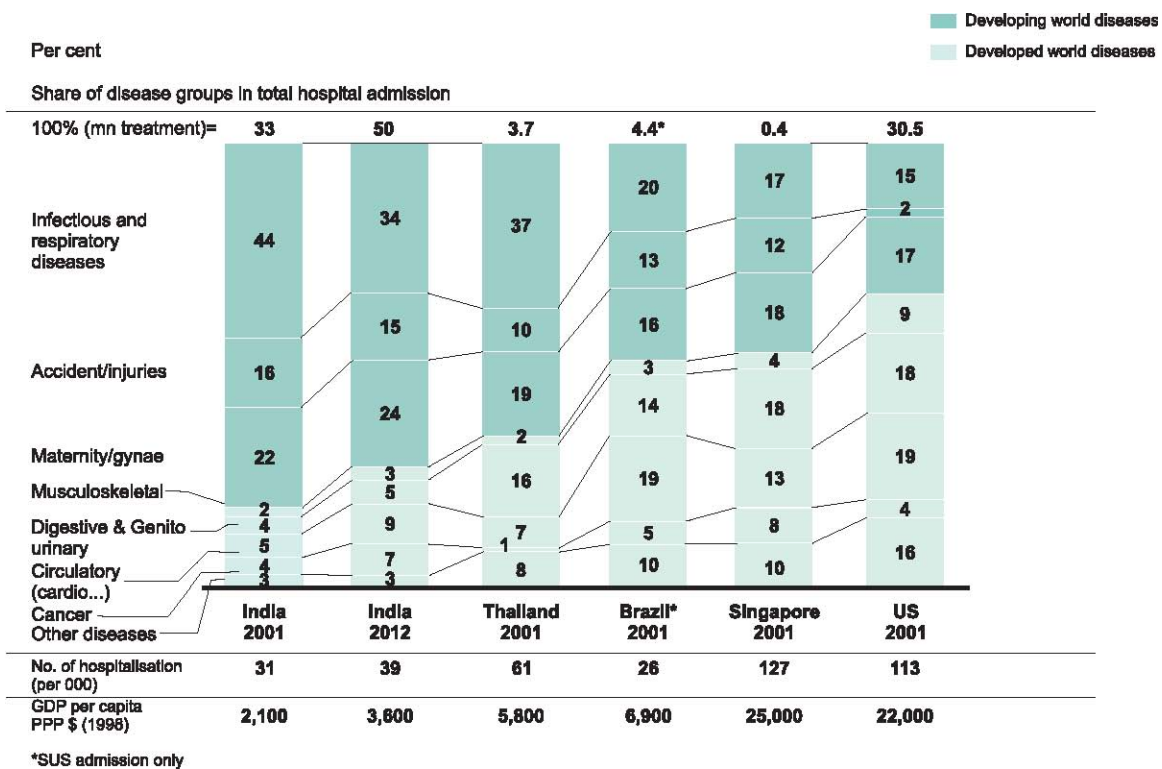
### **2.4 Burden of diseases**

In India at national level only about 46 per cent of the deaths are being covered by the registration machinery with large interstate variations as is the case of registration of births. Apart from a rising proportion of older adults, population exposure to risks associated with certain chronic conditions is increasing. Obesity is increasing, physical activity is declining and tobacco use is a substantial problem in the country. Non-communicable diseases like cardiovascular and cerebrovascular diseases, diabetes and cancer are emerging as major public health problems in India also as cause of death but especially as the cause of hospitalization.

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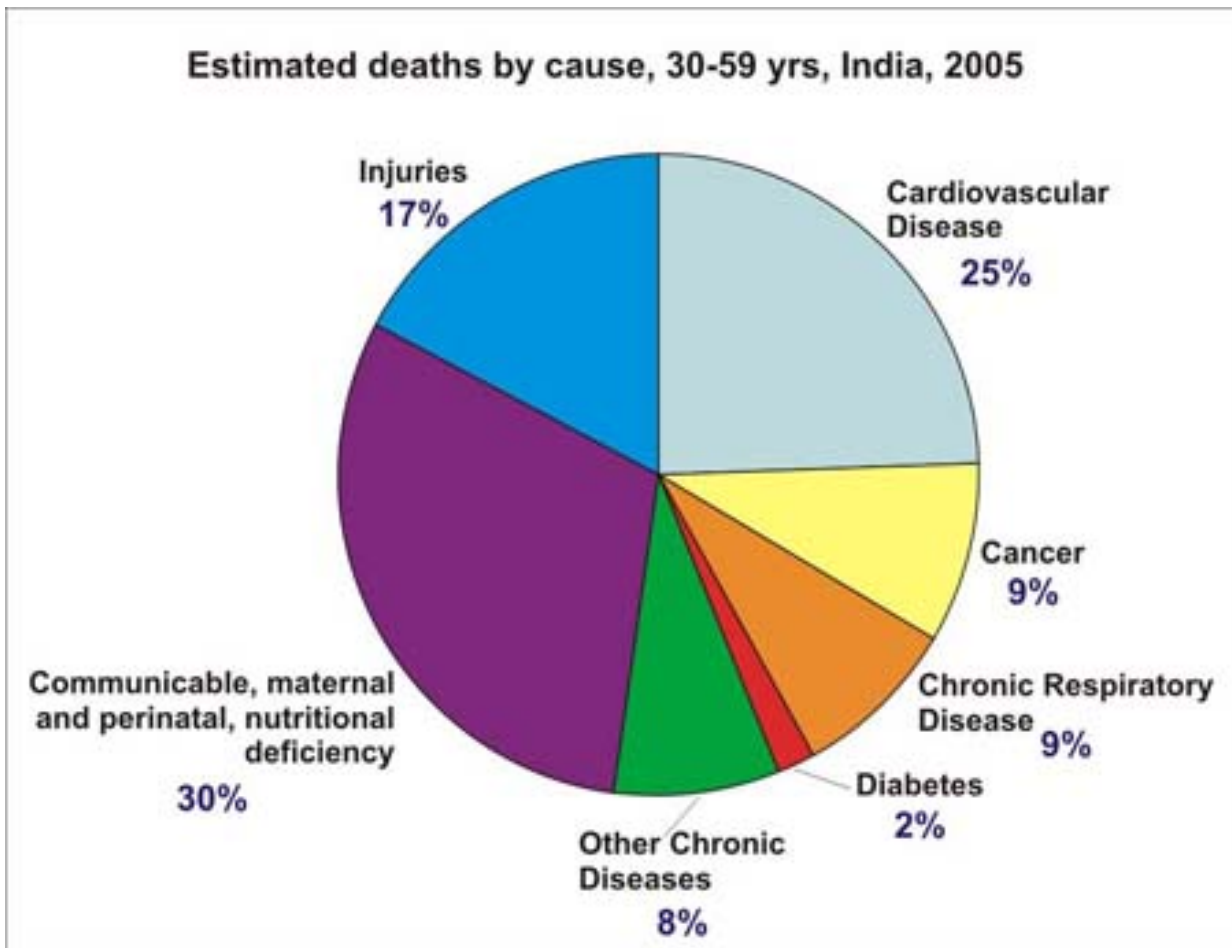


Estimated development of outpatient spending by 2012 in India.



Causes of hospitalization in India compared with other developing and developed countries.

Economic impact of NCD's is much wider due to often long sickness period compared to sudden death in accidents, both in developing and developed countries, as seen in the comparison below. The poor however are more prone to avoid going to the hospital because of the hosts of the hospitalization together with the lost wage because of sick days. Further on, regarding economic impact, it is remarkable that non-communicable diseases contribute to 53% of premature mortality in the most productive age groups between 39-59 years in India (WHO 2005), see chart below.



Causes of death of 39-59 year old in India, Source: WHO 2005.

## 2.5 Patient identification system

Patient identification is done by a form filled by the patient and the records are kept at the hospital. Body signs identification like birthmarks and scars are used. There been attempts for bio-identification, but the implementation was not successful.

## 2.6 Health records

Health records are kept manually or electronically and only in the hospital level. It is not shared with other hospitals or other institutes. Thus it is basically possible for a patient to go from one doctor to another e.g. to ask for proof of disability.

## 2.7 Dispensation of medicine

Besides governmental the hospital dispensaries and pharmacies, retailing has reached also medical sector. Apollo hospital has a chain of around 130 hospital dispensaries and stand alone pharmacies. Manipal Group has a concept of Manipal Cure&Care consisting of outlets offering services and products, mainly related to preventive health care.

## 2.8 Development plans

The **provision of assured and credible primary health services of acceptable quality** has emerged as a priority thrust area for both the central and the State Governments in view of the increasing urbanization and growth of slums and low income population in the cities. The focus till now has been on development of a rural health system having three tier health delivery structure. While on the other hand, no specific efforts have been made to create a well-organized health service delivery structure in urban areas especially for poor people living in slums.

Recognizing the seriousness of the problem, the Government of India has identified “Urban Health” as one of the thrust area in the Tenth Five Year Plan, National Population Policy, 2000, National Health Policy 2002, and the forthcoming 2nd Phase of the Reproductive Child Health Program. Urban Health is one of the elements placed under the “Flexi Pool” component of RCH Phase – II. During 2003-04, 25 Urban Health Projects were approved and the States were advised to continue Project activities from the ‘Flexi Pool’ under RCH Phase II. The expenditure reported for these proposal upto September, 2006 is INR 5.36 Crores. Under the on going RCH Phase-II programme, Urban Health has been included and sought to be effectively addressed under one component thereof viz. “Vulnerable Communities RCH”. For this purpose, Vulnerable Communities have been defined to include those groups, which are underserved due to problems of geographical access (even in better off States) and those who suffer social and economic disadvantages such as the scheduled castes/scheduled tribes and the Urban poor. The overall goal of the vulnerable communities RCH component is to improve the health status of the vulnerable population by ensuring accessibility and availability of quality primary health care and family welfare services to them.

The overall objective in this regard is to (i) improve accessibility, availability and acceptability of health services, including RCH services by strengthening infrastructure including training and skill development of service providers, improving supply of equipment, drugs etc. in an integrated and participatory manner and (ii) to bring them at par in this respect with the rest of the population and thus improving the aggregate indicators towards achieving the expected results set under RCH Phase – II.

During the past several months, Government of India has been making extensive efforts to encourage and support (both technically and financially) the various State / UT Governments to take up actively and implement vigorously the Urban Health projects in their jurisdiction. As an incentive to encourage and motivate the State / UT Governments to take up their Urban Health Programmes seriously and actively, under RCH Phase – II, there is also a provision kept whereby the States/ UTs which are able to show substantial and substantive work progress in regard to “Urban Health” would be able to stake their claim for a share of the “Performance Bonus” component of RCH-II. The State / UT Governments have been provided with comprehensive guidelines and Project Implementation Plan (PIP) for Urban Health formulated by the Government of India after and on the basis of extensive consultations with various concerned stakeholders, including the State/UT Governments and are also being given all the necessary support by the Government of India in formulation and implementation of effective Urban Health Projects in their territories in accordance with the said guidelines and PIP. In view of the significance and importance which

Government of India attaches to the issue of “Urban Health”, sometime back viz. on June 06, 2005, the Government of India constituted a Task Force to advise the National Rural Health Mission (NRHM) on ‘Strategies for Urban Health Care’. The Task Force has already submitted its report. The reports have been circulated to States, Union Territories and Urban Local bodies with a view to obtain their views/comments.

### **3 HEALTH CARE SITUATION IN KARNATAKA**

#### **3.1 PROFILE OF THE KARNATAKA**

##### **3.1.1 General Geography**

Karnataka is the eighth largest state in India in terms of both area and population. The state was formerly known as Mysore. On the 1<sup>st</sup> November 1973 the name Mysore was changed to Karnataka. Karnataka is situated on the western edge of the Deccan plateau and is surrounded by Maharashtra and Goa on the north, Andhra Pradesh on the east, and Tamil Nadu and Kerala on the south. On the west, it opens out on the Arabian Sea. Geographically, Karnataka occupies three natural regions like the Coastal strip, the Sahyadris and the Deccan plateau. They are known in Kannada as Paschima Karavali, Malnad and Maidan respectively. As per the 2001 census, the six largest cities of Karnataka in order of their population are the capital Bangalore, Hubli-Dharwad, Mysore, Gulbarga, Belgaum and Mangalore. Bangalore is the only city with a population of more than 1 million.

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### 3.1.2 Demographic Profile

	Total population	Decadal growth in population	Sex Ratio (females per 1000 males)	Urban population	Decadal growth in urban population
<b>Karnataka</b>	52,850,562	17.51%	965	34%	28.8%
<b>India</b>	1,028,610,328	21.54%	933	28%	31.2%

Source: Census 2001

According to the 2001 census of India, the total population of Karnataka is 52,850,562, of which 50.89% are male and 49.11% are female. Sex ratio (females per 1000 males) in the state is 965. There is a decadal increase in population of 17.51% from 1991 to 2001. As per the census office, projected population for Karnataka in 2008 is 57,399,000, meaning 8.6% increase in 2001 figures. Projected population in 2011 is 59,600,000 and 62,800,000 in 2016, respectively.

The population density in Karnataka is 275.6 per km<sup>2</sup>. Approximately 34% of the people live in urban areas and 66% in rural areas. Increase in urban population has been 28.8% between 1991 and 2001.

Population in Karnataka is spread over 24 urban agglomerations<sup>1</sup>, 270 towns and 29,406 villages in 27 districts.

### 3.1.3 Socio-Economic Profile

	Population below poverty line	Schedule Caste population	Schedule Tribe population	Female Literacy Rate	Male Literacy Rate
<b>Karnataka</b>	20.04%	16.2% (8.56 million)	6.6% (3.46 million)	56.9%	76.1%
<b>India</b>	26.10%	16.2% (166.64 million)	8.2% (84.33 million)	54.2%	75.9%

*Source: Census 2001*

According to Census 2001, the population below poverty line (BPL) in Karnataka is 20.04% of the total population of 52,850,562. Scheduled Caste (SC, see Appendix: Castes) population as percentage of total population is 16.2% (8.56 million). Scheduled Tribe (ST) population as percentage of total population is 6.6% (3.46 million). Karnataka is also the location of some forest-dwelling tribes like Soliga, Jenu Kuruba, Kadu Kuruba and Yerava. The joint family system is prevalent in the rural areas of Karnataka and there are extreme cases like the Narasinganavars who reside in the Dharwad district and are recognized as one of the largest undivided families in the world.

Literacy rates in India have improved over the years according to the estimates provided by Censuses. Table below depicts the rise in the literacy rates. Estimates from the recent Census 2001 indicate a significant rise in the literacy level. However large gaps in the male female literacy rate still exists and every effort must be made to decrease this gap.

Year	Literacy rate %		
	Persons	Male	Female
1951	18.33	27.16	8.86
1961	28.31	40.4	15.34
1971	34.45	45.95	21.97
1981	43.56	56.37	29.75
1991	52.21	64.13	39.29
2001	65.49	75.96	54.28

#### Literacy Rate (1951-2001) in India

Note: Literacy Rates of 1951, 1961 and 1971 relate to population aged five years and above. The rates for the years 1981 and 1991, 2001 relate to the population aged seven years and above.

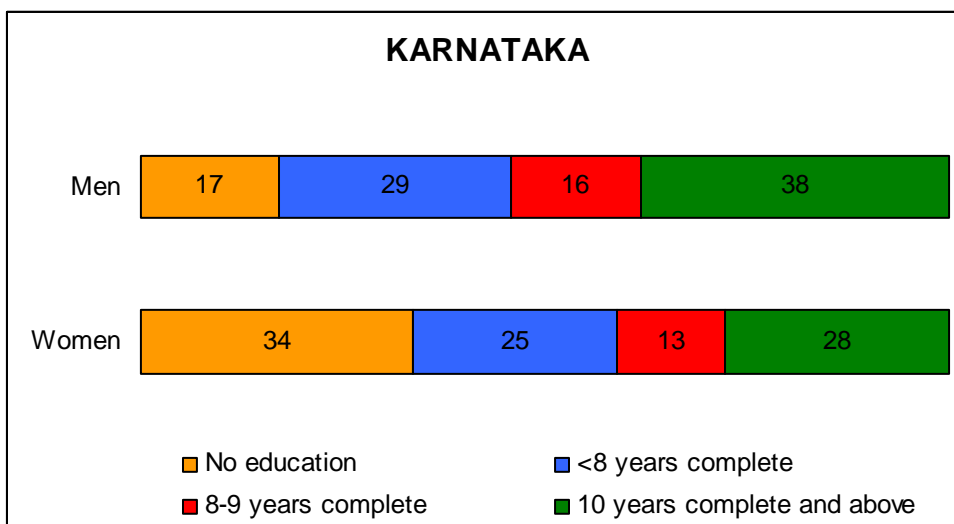
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<sup>1</sup> An urban agglomeration forms a continuous urban spread and consists of a city or town and its urban outgrowth outside the statutory limits. Or, urban agglomerate may be two or more adjoining cities or towns and their outgrowths. A university campus or military base located on the outskirts of a city or town, which often increases the actual urban area of that city or town, is an example of an urban agglomeration.

The literacy rate in Karnataka is 66.6 percent with 76.1 percent of males and 56.9 percent of females being literate. Kannada is the official language of Karnataka and spoken as a native language by about 64.75 percent of the people.

### 3.1.4 Educational Profile

In terms of level of education 28 percent of women in Karnataka have completed mandatory 10 years of education and above. Within men the figure is higher, 38 percent. Corresponding figures concerning all India are 22 percent for women and 35 for men. Similarly, in Karnataka 13 percent of women, and 16 percent of men have completed education between eight and nine years. Corresponding figures for all India are 14 percent for women and 16 percent for men. Likewise, in Karnataka, 25 percent of women have completed less than eight years of education, and 34 percent don't have any education at all. For men the same figures are 29 percent, and 17 percent, respectively. In whole country 23 percent of women have completed less than eight years of education, and only 41 percent of women have no education at all. Corresponding figures for men are 27 percent, and 18 percent.



Percent distribution of respondents 15-49 by highest level of education in Karnataka (India-wise Table can be found under Tamil Nadu chapter)

There are several arguments in the demographic literature, which explains the mechanism through which education has its impact on the other variables such as age at marriage, contraceptive behavior, fertility and mortality. Higher levels of literacy and education lead to a greater awareness and also contributes to improvement in economic conditions. Education acts as a catalyst for social upliftment enhancing the returns on investment made in almost every aspect of developmental efforts.

### 3.1.5 Household Profile

Number of households in Karnataka is 10,401,918. Mean household size in general is 4.6, in rural areas it's 4.7 and in urban 4.5 respectively. 89.3 percent of the households have electricity and 57.4 percent



use piped drinking water. Only 46.5 percent have access to a toilet facility and 49.8 percent live in pucca<sup>2</sup> houses. Differences between situation in urban and rural areas can be found in the Table below.

	Total	Urban	Rural
Have electricity	89.3	96.5	84.4
Use piped drinking water	57.4	71.2	48.0
Have access to a toilet	46.5	82.7	21.9
Live in a pucca house	49.8	76.2	31.8
Have a motorized vehicle	20.4	33.2	11.7
Have a television	53.6	76.6	37.9
Own agricultural land	43.6	17.3	61.5

Household Profile in Karnataka

### 3.1.6 Religious Profile

In Karnataka 83.8% of the population are Hindu, 12.2% are Muslim, 1.9% are Christian, 0.8% are Jains, 0.7% are Buddhist, and with the remainder belonging to other religions.

### 3.1.7 Health Profile

	Crude Birth Rate	Crude Death Rate	Total Fertility Rate	Infant Mortality Rate	Maternal Mortality Ratio
<b>Karnataka</b>	20.9 (SRS 06)	6.9 (SRS 06)	2.1 (NFHS-3)	43 (NFHS-3)	228 (SRS 01-03)
<b>India</b>	24.1 (SRS 06)	7.5 (SRS 06)	2.7 (NFHS-3)	57 (NFHS-3)	301 (SRS 01-03)

*Source: Ministry of Health and Family Welfare, Government of India (Sample Registration System SRS), National Family Health Survey NFHS-3 2005-2006*

The total fertility rate of the state is 2.1. The infant mortality rate is 43 and maternal mortality ratio is 228 which are lower than national average. Crude birth rate has increased from 20.6 in year 2005 to 20.9 in year 2006, and crude death rate has decreased from 7.1 to 6.9, respectively.

## 3.2 Public Health Infrastructure

Even though health care in Karnataka's private sector is among world's best, state as a whole has not been fully successful in providing effective primary health care. Apart from capital Bangalore and coastal districts of Udupi and Dakshina Kannada other parts of the state especially northern districts have not received sufficient attention by government and private sectors.

### Budget

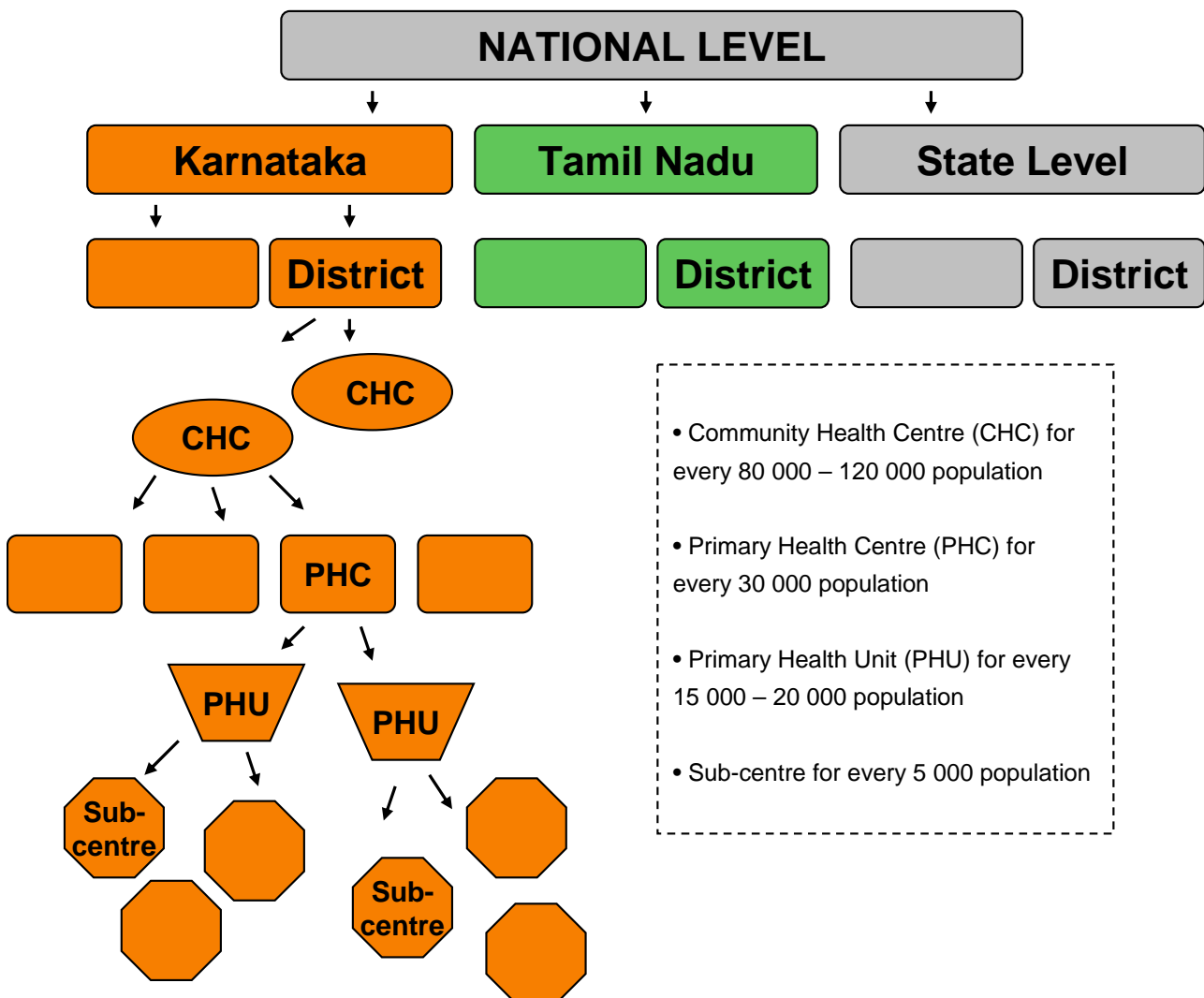
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<sup>2</sup> 'Pucca' houses are made from high-quality materials (such as bricks, tiles, cement and concrete) throughout, including roof, walls and floor. 'Kachha' houses are made from mud, thatch or other low-quality materials; 'semi-pucca' houses are made from partly low-quality materials and partly high-quality materials.

In Karnataka's Annual Plan for budget 2007-2008 Medical and Public Health consist 9.4 percent (61 706 lakh = 112.2 milj Euro) of the total budget for Social Services that is 658 557 lakh = 1197.4 milj Euro. Social Security and Social Welfare consists 6.3 percent (41 787 lakh = 76 milj Euro) of the budget, respectively. Altogether these two components providing financing to health care related sectors, Medical and Public Health and Social Security and Social Welfare, consist 5.8 percent of the total budget of the state (17 782.58 crore = 3.175 Billion Euro). For example, Welfare of SCs, STs and OBCs, and Nutrition are not included in the 5.8 percent of finance to health care related sectors but have separate budgets allocated directly for their purposes.

### Health Infrastructure

The organization of healthcare services (Appendix 2: Organization of the health system) in India extends from the national level to village level. From the total organization structure, we can slice the structure of healthcare system at national, state, district, community, PHC and sub-centre levels. In terms of rural health care the state is following the National pattern of three-tier health infrastructure in rendering Primary Health Centres, Health Units, Community Health Centres and Sub-Centres.



### 3.2.1 Health Institutions

Health services are converged through a wide net work of 36 medical colleges, 24 district hospitals (three districts have tertiary hospitals and do not require separate district hospitals), 177 state government hospitals, 254 Community Health Centres (48 in short), 1679 Primary Health Centres, 578 Primary Health Units, and 8143 sub-centres. Besides this, several dispensaries provide medical treatment, and AUUSH institutions alternative treatment methods. In addition there are mobile units, both urban and rural Family Welfare Centres and voluntary and private medical institutions.

Health Institution	Number	Beds
State Government Hospitals	177	28058
Hospitals of other agencies	61	5257
Hospitals of Indian System of Medicine, AYUSH	103	1545
Primary Health Centres	1679	17828
Primary Health Units	578	1229
Dispensaries	208	121
Dispensaries (AYUSH)	637	-
Sub-Centres	8143	-

*Source: Directorate of Economics and Statistics, Government of Karnataka 2006-2007*

Most of the major hospitals of the state are attached to the medical colleges and are provided clinical facilities along with almost all specialist services. They function as referral hospitals to other institutions. Specialities like Surgery, Obstetric, Gynaecology, ENT, Skin and VD, Pathology and Bacteriology, Radiology, Anaesthesia, besides latest modern medical services are few of the features.

General hospitals are located in all the district headquarters as well as in some important taluk Head Quarters with bed strength varying from 30 to 400. These hospitals provide specialist services such as medicine, surgery, obstetrics and gynecology. But district hospitals have specialty services like ophthalmology, ENT, pediatrics, orthopedic, skin and STD, penology, bacteriology, radiology, dental etc. and have been provided with facilities such as 'X'-ray unit, screening and laboratory, blood bank etc., District hospitals serve as referral hospitals to the peripheral institutions.

As part of the World Bank-funded Karnataka Health Systems Project, the State government has over the years strengthened and upgraded at a cost of more than 110 Million Euro the infrastructure in its taluk and district hospitals. As a consequence, six government hospitals have won ISO-9002 certification. Treatment is free for those below the poverty line (BPL) for almost all services in the State government hospitals.

Average population covered by a Community Health Centre in Karnataka is 137 358 while in India the figure is 189 895. The policy of the Government of India is to establish a Community Health Centre (CHC) for every 80 000 to 120 000 population, or form one out of four Primary Health Centers (PHC) to cater the health care of the rural mass. Average population covered by a PHC in Karnataka is 20 780, in whole India 32 754, respectively, under the policy there should be one PHC for every 30 000 population. In addition, state should have one Primary Health Unit (PHU) for every 15 000-20 000 population. Average rural population covered by a sub-centre in Karnataka is 4285. In India the figure is 5121, respectively. The policy requires one Sub-Centre for every 5000 population.

### 3.2.2 Health Personnel and Patients

There are around 22 000 practicing doctors in the state. Of them, 4,197 are working in the state's health institutions and about 15,000 in the private sector. The total bed strength in government health institutions is 43,479 while their outpatient departments serve 60,000 patients every day. There are nearly 2,000 hospitals in the private sector, which interestingly have as many beds as the state sector. While the doctor-population ratio is 1:10 260 (country wise 60:100 000), the bed to population ratio is 1:1 220. The national aim is to get doctor-population ratio as low as 1:1000.

According to officials, the shortage of doctors and supervisory staff, financial crunch and an ever-increasing population are some of the major reasons for the state sector's inability to provide a more effective health delivery system. The basic salary for the assistant surgeon (freshers) in the field is Rs 11,715 in all India and Rs 14,050 in Andhra Pradesh and Karnataka respectively. Also, it is difficult to motivate highly educated people to work in the rural areas. Rural health personnel in Karnataka in figures are in the table below.

Particulars	Required	In position	Shortfall
Multipurpose worker (Female)/ANM at Sub Centres & PHCs	9822	8544	1278
Health Worker (Male)/MPW(M) at Sub Centres	8143	4576	3567
Health Assistant (Female)/LHV at PHCs	1679	1170	509
Health Assistant (Male) at PHCs	1679	837	842
Doctor at PHCs	1679	2041	-
Obstetricians & Gynaecologists at CHCs	254	215	39
Physicians at CHCs	254	192	62
Paediatricians at CHCs	254	116	138
Total specialists at CHCs	1016	691	325
Radiographers	254	30	224
Pharmacist	1933	1880	53
Laboratory Technicians	1933	1451	482
Nurse/Midwife	3457	3100	357

TABLE: Rural Health Programme: Health Personnel

*Source: Ministry of Health and Family Welfare, Government of India – National Rural Health Mission 2008*

### 3.3 Medically Certified Deaths

(see Appendix 3: Medically Certified Deaths)

According to 1999 data Karnataka had 100 percent reporting of deaths. However, in the same year the percentage of medically certified deaths<sup>3</sup> out of total registered deaths was only 14.5 percent. In 2005

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<sup>3</sup> A large number of hospitals and other health care institutions are part of the Medical Certification of Death Scheme (or System). This includes a package of training and supervision. In 1999, the level of medically certified deaths out of all

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the same has already increased up to 22.5 percent. In Karnataka age groups 15-24, 25-34, 35-44, 45-54 and 55-64 together constitute 53.87 percent of total deaths. Diseases of the Circulatory System were medically certified major cause group of deaths in 2004 having a share of 25.65 percent of all medically certified deaths.

Medically Certified Major Cause Groups of Deaths	% of deaths Karnataka
Infectious and Parasitic Diseases	12.24
Neoplasm	
Nutritional Metabolic Disease and Immunity Disorders	
Diseases of Blood and Blood Forming Organs	
Mental Disorders	
Diseases of the Nervous System	
Diseases of the Circulatory System	25.65
Diseases of the Respiratory System	5.43
Diseases of the Digestive System	6.45
Diseases of the Genito Urinary System	
Complications of Pregnancy	
Dertain conditions originating in the Perinatal Period	9.54
Symptoms, signs and ill defined conditions	5.06
Injury and poisoning	11.48
Others	24.15
<b>TOTAL</b>	<b>100.0%</b>

*Source: Report on Medical Certification of Cause of Death 2005, Office of the Chief Registrar of Births & Deaths, Government of Karnataka*

### 3.4 Reproductive Health Scenario

In the Indian context, and particularly relating to the state of Karnataka, reproductive health (RH) related data is available from a number of sources, such as the National Family Health Surveys<sup>4</sup>

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reported deaths (inclusive of rural deaths) was 15.4% in 23 states and varied from <1% in Uttar Pradesh to >90% in Goa. In fact, several states are not reporting medically certified deaths.

<sup>4</sup> The National Family Health Survey (NFHS) is a large-scale, multi-round survey conducted in a representative sample of households throughout India. Three rounds of the survey have been conducted since the first survey in 1992-93. The survey provides state and national information for India on fertility, infant and child mortality, the practice of family planning, maternal and child health, reproductive health, nutrition, anaemia, utilization and quality of health and family planning services. Each successive round of the NFHS has had two specific goals: a) to provide essential data on health and family

(NFHS-1, 2 & 3), Rapid Household Surveys under the Reproductive and Child Health (RCH) project, the Sample Registration System (SRS) maintained by the Office of the Registrar General of India.

In Karnataka great emphasis is laid on improving the health of the mother and child. In the state's budget 2007-2008 approximately 29 Million Euro (INR 16262.04 lakh) was available under Reproductive and Child Health 2 (Appendix: Reproductive and Child Health) for different components. The major expenditure is made for reducing Infant Mortality Rate (IMR) Maternal Mortality Rate (MMR) in the head of Maternal Health under the head of Janani Suraksha Yojana<sup>5</sup> (JSY), and referral transport. The amount is released through Government of India, and majority of funds are also released in family planning services.

### Indicators of Reproductive Health Status

Indicators of reproductive health consist of maternal health indicators and child health indicators. Karnataka mirrors its development against Millennium Development Goals. Some of the most important indicators, their current status and 2010 goals can be found below.

Health Indicator	Current Status	2010 Goals
Maternal Mortality Ratio	228 (SRS 2001-2003)	90
Infant Mortality Rate	43 (NFHS-3)	30
Institutional Deliveries	66.9% (NFHS-3)	95%
Deliveries by SBA	66.6% (SRS 2004)	100%
% of children fully immunized	87% (UNICEF 2005)	100%
Total Fertility Rate	2.1 NFHS-3	2.7

#### 3.4.1 Maternal Health

##### Age at Marriage

According to NFHS-3 the median age at first marriage has risen over the past years three decades. Nevertheless, the survey shows that 57 percent of women less than 30 years in Karnataka married before they reached the legal minimum age at marriage of 18 which is lower than the all India average

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welfare needed by the Ministry of Health and Family Welfare and other agencies for policy and programme purposes, and b) to provide information on important emerging health and family welfare issues.

NFHS-3 provides trend data on key indicators and includes information on several new topics, such as HIV/AIDS-related behaviour and the health of slum populations. For the first time, NFHS-3 also provides information on men and unmarried women. In addition, HIV prevalence is measured at the national level and for selected states. The NFHS-3 fieldwork was conducted by 18 research organizations between December 2005 and August 2006.

<sup>5</sup> Janani Suraksha Yojana (JSY) is a scheme with the objective of reducing the maternal and neo-natal mortality rates by promoting institutional deliveries among poor women.

of 74 percent. In all India the median age at marriage for women is just 16.4 years and median age for cohabitation is just 17 years, well below the legal minimum age at marriage. In Karnataka the picture does not differ much, the median age at first marriage is 16.8 years and it is 17 years for age at first cohabitation.

### **Fertility**

According to SRS 2006 in all India the Crude Birth Rate (CBR) is 24.1 births per 1000 population and according to the NFHS-3 the Total Fertility Rate (TFR) is 2.7 births per woman for India. The corresponding figures for Karnataka are 20.9 and 2.1. The 2010 goal is to get TFR to drop down to 2.0 that is also stated at Millennium Development Goals.

The surprise component is that use of contraceptives is higher in rural areas (65.4 per cent) as against the urban centres (61 per cent).

### **Atenatal Care**

In India just half the women (50.7%) of women reported to have received three or more atenatal care (ANC) checkups, and just 22.3 percent of them reported to have consumed 100 tablets of Iron Folic Acid (IFA) tablets regularly. Altogether only one in five pregnant women is found to receive full ANC checkups.

The situation in Karnataka is comparatively better. The corresponding figures were 79.3 percent for ANC checkups, and 40 percent for IFA. For 75 percent of these children, mothers received the recommended number of TT vaccinations. However, in many of the northern districts like Raichur, Koppal, Bellary, Bijapur, Gulbarga and Bidar the situations in this regard is very poor.

### **Place of Delivery**

NFHS-3 reports that just 40.7 percent of the deliveries were institutional deliveries in India. The corresponding figures for Karnataka are 66.9 percent. Among births delivered at home, only 13.3 percent of the home deliveries were assisted by a health professional including a trained birth attendant (TBA).

The introduction of the JSY in 2005 under the National Rural Health Mission has yielded positive results, with institutional deliveries in the State having increased from 63.08 per cent in 2005 to 71.5 per cent till end of October 2007. Under the scheme, Rs. 700 (12.5€) is given to each woman delivering her baby in a hospital, and Rs. 1 500 (27€) if she undergoes a Caesarean.

The reason for the substantial increase in institutional deliveries is the constant awareness campaigns and programs organized particularly in rural areas by health workers. The statistics available with the Department of Health and Family Welfare states that 5,75,477 out of 9,10,788 deliveries were recorded as institutional deliveries in 2005-06 and 6,15,854 out of 9,70,059 in 2006-07.

While south Karnataka is far ahead in institutional deliveries and making rapid progress, north Karnataka is far behind. Records show that in 2005-06, Bangalore Urban district registered 95.03 per cent institutional deliveries, which increased to 96.06 per cent in 2006-07. In Udupi district, it was 93.06

per cent in 2005-06 and 97.05 per cent in 2006-07. Institutional deliveries in Mandya district increased from 86.03 per cent in 2005-06 to 89.08 per cent in 2006-07.

On the other hand, the figures for north Karnataka are disappointing. In 2005-06, institutional deliveries in Koppal district were as low as 23.03 per cent, which went up to 31.08 per cent in 2006-07. Gulbarga district recorded 31.02 per cent institutional deliveries in 2005-06, which marginally increased to 33.3 per cent in 2006-07. In Gadag district, institutional deliveries went up from 45.02 per cent in 2005-06 to 55.0 per cent in 2006-07.

### Maternal Mortality Ratio

In all India national policy is to reduce the Maternal Mortality Ratio (MMR) to less than 90 per 100 000 live births by the year 2010 (current level 301, SRS 2001-2003), and to increase the institutional deliveries to 90% by 2010.

Karnataka is better placed as far as the maternal health indicators are concerned in comparison to the national indicators. The MMR for Karnataka is 228 (SRS 2001-2003) compared to national level of 301. Maternal mortality in India continues to be unacceptably high. The main causes of maternal death in Karnataka are shown in the table below.

Major Cause of Death	No. of Deaths	% of Total Maternal Deaths
Other Pregnancies with Abortive Outcome (O00-O02 & O05-O08)	19	3.31
Oedema, Proteinuria and Hypertensive Disorders in Pregnancy, Child Birth and the Puerperium (O10-O16)	133	23.17
Obstructed Labour (O64-O66)	9	1.57
Complications pre-dominantly related to the Puerperium (O85-O92)	132	23.00
Other Complications of Pregnancy and Delivery (O20-O22, O24-O63, O67-O75, O80-O84)	193	33.62
Indirect Obstetric Deaths (O98-O99)	81	14.11
Others	7	1.22
<b>TOTAL MATERNAL DEATHS</b>	<b>574</b>	<b>100.00%</b>
<b>ALL OTHER FEMALE DEATHS</b>	<b>28580</b>	
<b>TOTAL FEMALE DEATHS</b>	<b>29154</b>	

*Source: Report on Medical Certification of Cause of Death 2005, Office of the Chief Registrar of Births & Deaths, Government of Karnataka.*

Strategies how to meet the goal of reducing MMR to the target level of than 90 per 100 000 live births include the following action points:

- Focus on quality antenatal and postnatal care in all sub-centers
- Registration of ANC cases during the village health and nutrition days
- Promotion and motivation to undergo institutional delivery if possible



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- Focus on 24h institutional delivery with essential and basic emergency care in all PHCs and in every CHC
- Focus on CHCs becoming venues for comprehensive emergency obstetric care
- Bring in PPP to close gaps in basic and comprehensive emergency obstetric care
- Bringing in NGOs to work in under-served areas
- Building up transport and referral systems
- Building up community care and support systems so as to improve health awareness and demand for institutional services, improve link between ANM and those in need of her services as well as to facilitate the delivery of maternity benefits (JSY) and referral arrangements.
- Focus on providing safe abortion services
- Focus on treating reproductive tract infections (RTI) and sexually transmitted infections (STI)

### 3.4.2 Child health

India is faced with an unparalleled challenge in the area of child survival child health. The country contributes 2.4 million of the global burden of 10.8 million under-five child deaths, which is the highest for any nations in the world. Nearly 26 million infants are born each year of whom 1.48 million die before completing the first four weeks in life and 1.7 million die before reaching first birthday.

#### Infant Mortality Rate

A reliable indicator of the health status and well being of children is the Infant Mortality Rate (IMR). The national population policy goal is to reduce IMR to 30 per 1000 live births by the year 2010. IMR has shown a significant decline during the years. According to National Family Health Survey, IMR has decline in all India from 79 in 1992-93 to 57 in 2005-06. Correspondingly the figures are 65 and 43 in Karnataka. Karnataka is among the states that have reached IMR below 50.

Improved access to immunization, health care and nutrition programs have resulted in substantial decline in IMR over the last five decades. However, it is a matter of concern that the decline in perinatal and neonatal mortality has been very slow.

The major causes of neonatal mortality are bacterial infections (52%), asphyxia (20%), premature birth (15%) and other cases (13%). Neonatal tetanus still causes over 48 000 deaths in the country according to WHO 2000 estimates. Newborn deaths in the first week of life are predominantly caused by birth asphyxia and premature birth, whereas those after the first week are mostly due to bacterial infections. In Karnataka out of total 81817 deaths registered during 2005 as many as 9265 were infant deaths meaning 11.32% of total deaths registered. 37.58 percent of infant deaths have been classified under "Slow Fetal Growth, Fetal Malnutrition and Immaturity." Leading causes of infant deaths in the state in 2005 listed in the table below.

Major Cause of Death	No. of Deaths	% of Total Infant Deaths
Diarrhoea and Gastroenteritis of Presumed Infectious Origin (A09)	130	1.4
Respiratory Tuberculosis (A15-A16)	58	0.63
Meningitis (G00&G03)	179	1.93
Slow Fetal Growth, Fetal Malnutrition and Immaturity (P05-P07)	3482	37.58

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Hypoxia, Birth Asphyxia and Other Respiratory Conditions (P20-P28)	2929	31.61
Other Perinatal Jaundice (P58-P59)	54	0.58
All other conditions originating in the Perinatal Period (P00-P04, P08, P29-P54, P56-P57, P60-P96)	1443	15.57
Congenital Malformations of the Circulatory System (Q20-Q28)	488	5.27
All other Congenital Malformations, Deformations & Chromosomal Abnormalities not elsewhere classified	216	2.33
All other cause of infant deaths	286	3.09
<b>TOTAL DEATHS</b>	<b>9265</b>	<b>100.0</b>

*Source: Report on Medical Certification of Cause of Death 2005, Office of the Chief Registrar of Births & Deaths, Government of Karnataka*

While having the goal to reduce IMR from 50 to 30 by 2010, Karnataka has the following objectives:

- To reduce child malnutrition levels
- Complete primary immunization by age one year to 100%
- TT coverage among pregnant women to 100%
- Safe deliveries to 100%
- Institutional deliveries to 90%
- IFA coverage among pregnant & lactating women - 100%
- Early reporting of pregnancies – 95%

Strategies for achieving these objectives are the following:

- 100% immunization including the booster dose
- Prompt and appropriate community level care for all sick children and neonates
- Regular house visits and counseling by community level care for preventive and promotive health
- Strengthening and supervising the subcenters
- Adequate referral arrangements and secondary care facilities for sending a sick child or neonate when it requires hospitalization
- Reducing cost of care especially on inessential and hazardous drugs and therapies so as to favorably impact on poverty levels

### **Child Immunization**

The trends in vaccination coverage, however, provide the sobering effect, emerging as areas of concern. According to NFHS-3, the overall coverage of children between 12 and 23 months (those who have received all recommended vaccines), has dropped from 60 percent during NFHS-2 to 55 percent. Again, while the percentage of underweight and stunted children has gone down to 41 per cent and 38 per cent respectively. Percentage of children who are wasted has gone down from 20 percent to 18 percent.

### 3.5 Special groups

#### Maternal and Child Health Services

Great emphasis is laid on improving the health of the mother and child. Under these programs, children are immunized against Tetanus, T.B, Polio, Measles, Diphtheria, Pertussis. Pregnant women too are immunized against Tetanus. Under the National program of Prevention of Blindness, Vitamin 'A' concentrate is being distributed to the children.

In Bangalore, only 26% women have three or more children (rural is at 44%), while the contraceptive prevalence rate is 83%. The under-five mortality rate too is encouraging at 14% but for rural it stands at 71%. More than 3 ANC [ante-natal care] visits in rural Bangalore is at 87% and Bangalore city is at 58%.

#### Women and Child Welfare

In order to implement various welfare program for the benefit of women and children, the Women and Child Development Department is assigned the responsibility of implementing the following welfare schemes:

Implementing social legislation like:

Child Marriage Act 1929

Probation of Offenders Act, 1958

Dowry Prohibition Act, 1961

Devadasi (Prohibition of Dedication) Act, 1982

Juvenile Justice Act 1986, and

Suppression of Immoral Traffic (Amended) Act 1986

Reservations for women in Karnataka (Panchayat Raj Act 1983)

In order to promote child welfare, The Integrated Child Development Services Program (ICDS) provides a package of supplementary nutrition, immunization, health check-up, referral services, treatment of minor illness, nutrition, health education, and pre-school education. Orphanages provide support and care to orphan children. Special Nutrition Programs to children and nursing mothers. There is also financial assistance for the education of the children of prostitutes, Devadasis and prisoners whose family income does not exceed INR 15,000 per annum.

Karnataka is also hoping to improve the birth rate, infant mortality and maternal mortality parameters in the State when the Government of India's Reproductive and Child Health-Phase II programme is implemented in 2005. The State government has set up regional diagnostic laboratories in seven districts to conduct sophisticated tests, including CT scans.

In the field of super-specialty health care, Karnataka's private sector competes with the best in the world.[44] Karnataka has also established a modicum of public health services having a better record of health care and child care than most other states of India. In spite of these advances, some parts of the state still leave much to be desired when it comes to primary health care.[45]

## **Schools Health Program**

Medical examinations are conducted for children in all the primary and higher primary schools in the rural areas. Immunization against DT and TT, treatment of ailments, health education to teachers and students etc., are included in this School Health Program.

## **Family Welfare Services**

In 1964 Family Planning Bureau was formed at each District Headquarters to coordinate the family welfare activity. Facilities have been provided in all medical institutions for conducting vasectomy, tubectomy, laproscopic operations and IUD placements. Intensive propaganda through lectures, film shows, exhibitions, publicity, literature etc., are conducted throughout the state to popularize the programs.

## **Labour Welfare**

The Labor Department headed by the Labor Commissioner is responsible for implementing Labor Welfare Schemes. The main functions of this department are:

- Prevention of strikes, lockouts, settlement of industrial dispute and maintenance of industrial peace and harmony in the State
- Administration and enforcement of various Central and State Labor laws and rules
- Fixing minimum wages for various scheduled employments under the Minimum Wages Act
- Popularization of Worker's Education Scheme and enforcement of recreational activities among workers through welfare centres
- Employees State Insurance (ESI) Scheme, introduced in the year 1952, provides:

There are following in kind medical benefits: sickness benefit , maternity benefit, disability benefit, dependents benefit and funeral benefit. Karnataka is the first State in the country to extend full medical care to families of insured persons.

Trade Union Movement is creating awareness in the minds of both management and workers about safety, health and welfare while working in factories. It is functioning in the state under Department of Factories and Boilers and is headed by the Chief Inspector of Factories and Boilers.

## **3.6 Development projects and special features of the state**

In a bid to achieve the "Millennium Development Goals", the Congress-Janata Dal (Secular) coalition government has decided to make primary health care (and primary education) the focus of its development effort. Presenting the new government's first Budget, Deputy Chief Minister Siddaramaiah announced an increase in the Plan outlay for the health sector from Rs.333 crores to Rs.377 crores, which would be utilised to improve taluk-level hospitals and the medical infrastructure in impoverished northern Karnataka. The enhanced outlay should partly stabilise the State's falling public

health expenditure, which had fallen from 1.02 per cent of the gross state domestic product (GSDP) in 1999 has fallen to 0.7 per cent in 2004. Ideally it should reach 2 per cent of GSDP.

### **Economic impact of hospitalization**

In Karnataka about 20% of the population is workers and among the working class population 70% is in unorganized sector. These people feel the pinch of the cost of health service. Even in public sector every treatment will not be free of cost particularly in chronic cases. The medicines not available in Government hospitals have to be procured from outside. As such, major portion of the earnings will be taken away for medical facility.

The other face of the economic impact is that in case of unorganized sector, the workers may not get their wages as long as they do not work due to illness. Therefore the wages earners will incur more expenditure but without income. Hence it is this class of people who cannot protect their health due to paucity of financial resources.

For the BPL population, which in Karnataka is estimated at 32%, the economic impact will be two dimensional: no income for the individual and no manpower to the community due to hospitalization.

### **3.6.1 World Bank assisted projects**

World Bank assisted Karnataka Health System Development and Reforms Project has a total funding of 206mUSD consisting of World Bank funding 141mUSD and Government funding 65mUSD. Project aims to increase utilization of essential health services, accelerate achievement of health related Millennium Development Goals. It focuses on implementation of organizational development plan and introducing innovations in service delivery and health financing. Time period of the project is 2007-2012.

Under the INR 765-crore World Bank-assisted 'Health, Nutrition and Population (HNP) Project' the government hopes to improve and extend the primary health care system. The focus of the five-year program is to increase access to health care for the rural poor and the underprivileged, and to strengthen primary health care with community participation". Aim is to stabilize and improve facilities. It is a misnomer to say that the services at government hospitals are not good. In fact, our understanding is that, especially in the rural areas, the level of satisfaction among the people is better with the government health service. People are even prepared to pay 'unregistered' (bribe) expenses.

In a bid to ensure effective primary, secondary and tertiary health delivery systems in the State, successive Karnataka governments have implemented a number of measures. The HNP Project seeks to improve the services at the 1,679 PHCs. To be implemented in three districts as a pilot project, this will also aim at increasing public-private participation and introducing an insurance scheme for the common people, with the government subsidising the premiums.

The INR 30-crore World Bank-aided Integrated Disease Surveillance Project, spread over five years, is designed to gather initially information regarding communicable diseases such as malaria, cholera, gastroenteritis and typhoid. Information on non-communicable diseases like cancer and hypertension, and trauma care will be compiled later. An information technology network has already been established at the taluk and district levels. The information thus gathered from the district, State and

national levels will be analyzed and utilized for more effective diagnosis, management and prevention of communicable diseases.

### **3.6.2 Community health insurances**

Largest and most successful community health insurance schemes are in Karnataka.

The largest one, Yashasvini covers 2,2million farmers and is targeting to 2,5 million during 2008. The farmers' health scheme in association with the State Co-operative Department government of Karnataka covers all types of operations of the stomach, brain, gallbladder, spine, bones, kidneys and heart entirely free of cost. The insurance also covers 50 of the check-up costs. The annual premium is 120Rs and the State Government pays a lump sum which equals around 250 Rs per farmer. Yashasvini is run by a nonprofit trust and it has 30 000 cooperatives in its system. Cooperatives often pay the premiums for the farmers, which then settle the payment throughout the year as farm products e.g. milk given to the cooperative pool.

Arogya Raksha Yojana is another insurance program offering healthcare for the residents of Anekal Taluk in Karnataka and Vivas scheme covers landless farmers as well as women and children.

### **3.6.3 Drug Logistics Warehouse Society**

The State is also giving shape to the INR15-crore European Union-funded Drug Logistics and Warehousing Project, under which 14 warehouses will be set up in the districts. The current system of indenting for packages would be replaced by the indenting for drugs.

Main objective of the Karnataka Drug Logistics Warehouse Society is to provide good quality drugs, chemicals and other essential items at lower prices as compared to market prices to various health institutions in the state under the Directorate of Health and Family Welfare Services as well as Directorate of Medical Education. It also intends to follow scientific drug management by using information technology. It aims to identify the essential drugs and to coordinate with the State Therapeutic Committee in preparing list essential drugs required by the State to cater to the needs of different level hospitals in the State. The society will also update, prepare and finalize the tender documents and manage all aspects of qualification and purchasing of drugs, chemicals and other items required by the various health institutions. Further on, it will analyze the efficacy of suppliers on the basis of their performance and manage the funds released to Karnataka Drug Logistics Warehouse Society. Management of all existing district warehouses as well as establishment of district warehouses remains in the district head quarters.

The society will supply essential drugs to connected hospitals for treating patients affected by natural calamities and patients affected by drought and control epidemic diseases such as dengue fever. The society is also procuring drugs, chemicals and other necessities required by the Karnataka State Aids Prevention Society. The procurement is being done as per World Bank norms.

### **3.6.4 Health City**

Narayana Hrudayalaya has started noncardiac units, with the plan to house each specialty in new building that are being constructed in the 35 acres around the hospital. Neurosurgery unit was started in May 2004. Orthopedic and trauma hospital started operations in 2005 and buildings for neurosurgery

and pediatric unit are under construction. The plan is to build 10 hospitals in total, each hospital housing one or two specialties.

## 4 HEALTH CARE SITUATION IN TAMIL NADU

### 4.1 PROFILE OF THE TAMIL NADU

#### 4.1.1 General Geography

Tamil Nadu is situated on the southeastern side of the Indian peninsula. The state is bounded on the east by Bay of Bengal, in the south by the Indian Ocean, in the west by the states of Kerala and Karnataka and in the North by the Karnataka and Andhra Pradesh. The land mass of the state can be divided into two natural divisions; The Eastern coastal plain and the hilly region along the North and the West. Chennai is the largest city in the state.



#### 4.1.2 Demographic Profile

	Total population	Decadal growth in population	Sex Ratio (females per 1000 males)	Urban population	Decadal growth in urban population
<b>Tamil Nadu</b>	62,405,679	11.72%	987	44%	42.4%
<b>India</b>	1,028,610,328	21.54%	933	28%	31.2%

Source: Census 2001

According to the 2001 census of India, the total population of Tamil Nadu is 62,405,679, of which 50.32% are male and 49.68% are female. Sex ratio (females per 1000 males) in the state is 987. There is a decadal increase in population of 11.72% from 1991 to 2001. As per the census office, projected population in 2011 is 67,600,000 and 69,900,000 in 2016, respectively.

The population density in Tamil Nadu is 479.8 per km<sup>2</sup>. Approximately 44% of the people live in urban areas and 56% in rural areas, respectively. Increase in urban population 1991-2001 has been 42.4%. Population in the state is spread over 17 244 villages in 30 districts.

#### 4.1.3 Socio-Economic Profile

	Population below poverty line	Schedule Caste population	Schedule Tribe population	Female Literacy Rate	Male Literacy Rate
<b>Tamil Nadu</b>	21.12%	19.0% (11.86 million)	1.0% (0.65 million)	64.4%	82.4%
<b>India</b>	26.10%	16.2% (166.64 million)	8.2% (84.33 million)	54.2%	75.9%

*Source: Census 2001*

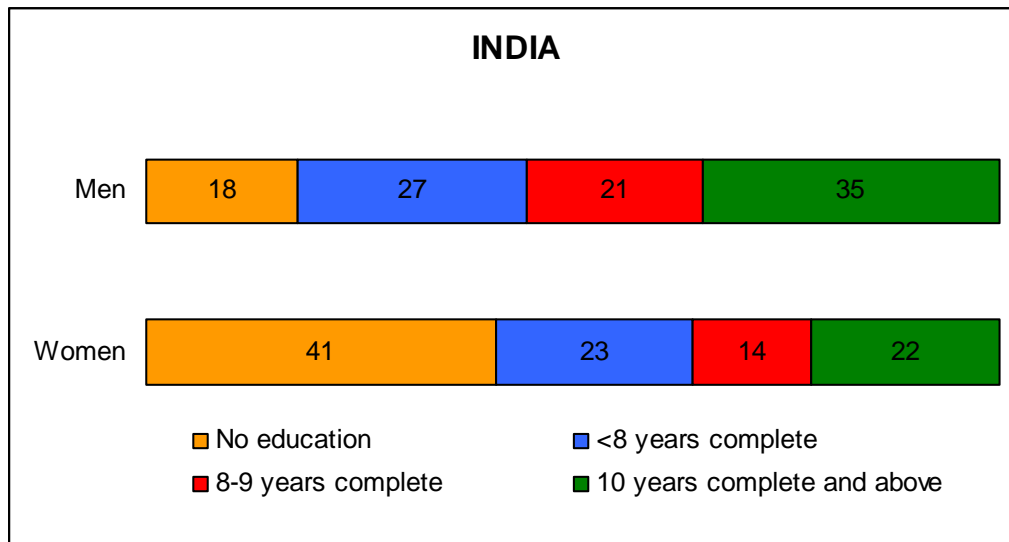
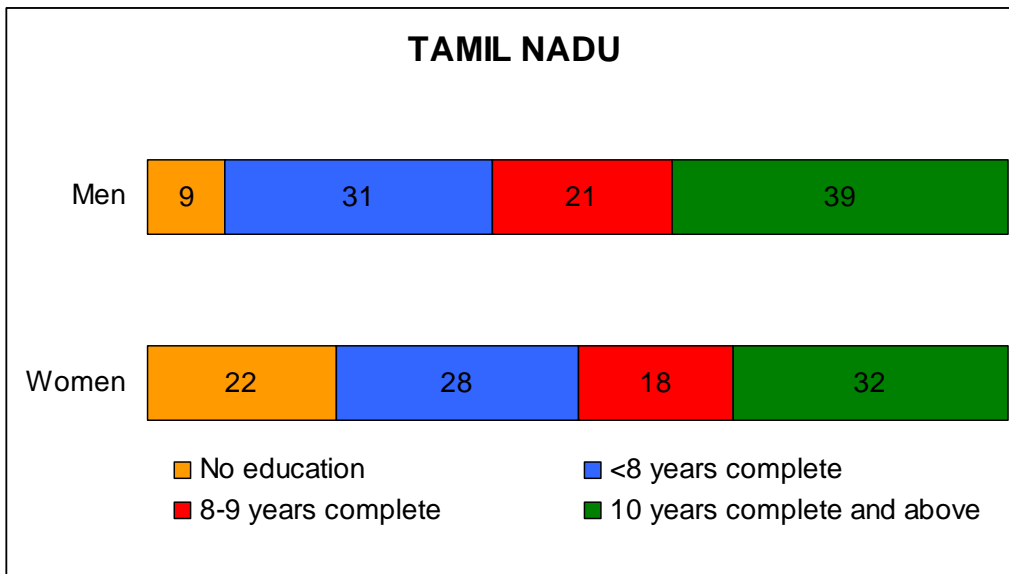
According to Census 2001, the population below poverty line in Tamil Nadu is 21.04% of the total population of 62,405,679. Scheduled Caste population as percentage of total population is 19% (11.86 million). Scheduled Tribe population as percentage of total population is 1.0% (0.65 million).

Nationwide literacy rates and general information in more detail can be found in previous chapter 3.1.4 In here, only figures regarding Tamil Nadu are discussed. The literacy rate in Tamil Nadu is 73.5% with approximately 82.4% of males and 64.4% of females being literate. Tamil is the official language of Tamil Nadu.

#### 4.1.4 Educational Profile

In terms of level of education 32 percent of women in Tamil Nadu have completed mandatory 10 years of education and above. Within men the figure is higher, 39 percent. If compared to nationwide figures the same are 22 percent for women and 35 for men. Similarly, 18 percent of women (as against the national average of 14 percent) and 21 percent of men (against 16 percent for the country) in Tamil Nadu have completed education between eight and nine years. Likewise, in Tamil Nadu, 28 percent of women have completed less than eight years of education, and 22 percent don't have any education at all. For men the same figures are 31 percent, and 9 percent, respectively. In whole country 23 percent of women have completed less than eight years of education, and only 41 percent of women have no education at all. For men the same figures are 27 percent, and 18 respectively. Tamil Nadu is performing better than the nationwide averages.





Percent distribution of respondents 15-49 by highest level of education in Tamil Nadu and India

#### 4.1.5 Household Profile

Number of households in Tamil Nadu is 14,665,983. Mean household size in general is 3.5, in rural areas it's 3.4 and in urban 3.5 respectively. 88.6 percent of the households have electricity and 84.2 percent use piped drinking water. Only 42.9 percent have access to a toilet facility and 69.6 percent live in pucca houses. Differences between situation in urban and rural areas can be found in the Table below.

	Total	Urban	Rural
Have electricity	88.6	93.8	84.3
Use piped drinking water	84.2	83.1	85.1
Have access to a toilet	42.9	73.5	17.0
Live in a pucca house	69.6	81.7	59.4
Have a motorized vehicle	22.6	30.4	16.0
Have a television	53.1	68.2	40.2
Own agricultural land	22.9	7.8	35.7

Household Profile in Tamil Nadu

#### 4.1.6 Religious Profile

88.1% of the population are Hindu, 5.6% are Muslim, 6.1% are Christian, 0.1% are Jains, and with the remainder belonging to other religions.

#### 4.1.7 Health Profile

	Crude Birth Rate	Crude Death Rate	Total Fertility Rate	Infant Mortality Rate	Maternal Mortality Ratio
Tamil Nadu	17.1 (SRS 06)	7.5 (SRS 06)	1.8 (NFHS-3)	31 (NFHS-3)	134 (SRS 01-03)
India	24.1 (SRS 06)	7.5 (SRS 06)	2.7 (NFHS-3)	57 (NFHS-3)	301 (SRS 01-03)

*Source: Ministry of Health and Family Welfare, Government of India (Sample Registration System SRS), National Family Health Survey NFHS-3 2005-2006.*

The total fertility rate of the state is 1.8. The infant mortality rate is 31 and maternal mortality ratio is 134 which are remarkably lower than national average. Crude birth rate has increased from 16.5 in year 2005 to 17.1 in year 2006, and crude death rate has increased from 7.4 to 7.5, respectively.

## 4.2 Public Health Infrastructure

We discussed public health infrastructure in India in more detail in previous Chapter 3.2. Here we concentrate on Tamil Nadu specific matters in terms of health institutions.

### Budget

In Tamil Nadu's Annual Plan for budget 2007-2008 Medical and Public Health consist 7.2 percent (46 914.51 lakh = 85.3 milj Euro) of the total budget for Social Services that is 652 402.40 lakh = 1186.2 milj Euro. Social Security and Social Welfare consists 15.3 percent (99 752.82 lakh = 181.4 milj Euro) of the budget, respectively. Altogether these two components providing financing to health care related sectors, Medical and Public Health and Social Security and Social Welfare, consist 10.5 percent total budget of the state (14 000 crore = 2.5 Billion Euro). For example, Welfare of SCs, STs and OBCs, and Nutrition are not included in the 10.5 percent of finance to health care related sectors but have separate budgets allocated directly for their purposes.

#### 4.2.1 Health Institutions

In Tamil Nadu health services are converged through a wide net work of 25 medical colleges, 29 district hospitals, 155 taluk hospitals and 80 non-taluk hospitals, 165 Community Health Centres (128 in short), 1252 Primary Health Centres, and 8683 sub-centres. Besides this, several dispensaries provide medical treatment, and AUYSH institutions alternative treatment methods. In addition there are mobile units, both urban and rural Family Welfare Centres and voluntary and private medical institutions.

In terms of rural health care the state is following the National pattern of three-tier health infrastructure in rendering Primary Health Centres, Health Units, Community Health Centres and Sub-Centres. Average population covered by a Community Health Centre (CHC) in Tamil Nadu is 211 647, in all India it is 189 895, respectively (policy to have one CHC for every 80 000 – 120 000 population). Average population covered by a Primary Health Centre (PHC) in Tamil Nadu is 27 893 that is below the national policy of having one PHC for every 30 000 population. In whole India the same figure is 32 754, respectively. Average rural population covered by a sub-centre in Tamil Nadu is 4022 compared to population of 5000 announced in the policy. In India the figure is 5121, respectively.

#### 4.2.2 Health Personnel and Patients

There are around 10 011 practicing doctors in the state. The total beds strength in government health institutions is 52 487 while the average number of outpatients treated daily is 189 000. Average number of inpatients treated daily is 17 000. Doctor-population ratio is 1:6233, and the bed to population ratio is 1:189.

The basic salary for the assistant surgeon (freshers) in the field is Rs 11,715 in all India and Rs 14,050 in Andhra Pradesh and Karnataka respectively, whereas the freshers in Tamil Nadu get Rs 8,000.

Rural health personnel in Tamil Nadu in figures are in the table below.

Particulars	Required	In position	Shortfall
Multipurpose worker (Female)/ANM at Sub Centres & PHCs	9935	9550	385
Health Worker (Male)/MPW(M) at Sub Centres	8683	1503	7180
Health Assistant (Female)/LHV at PHCs	1252	1734	-
Health Assistant (Male) at PHCs	1252	303	949
Doctor at PHCs	1252	2537	-
Obstetricians & Gynaecologists at CHCs	165	NA	NA
Physicians at CHCs	165	NA	NA
Paediatricians at CHCs	165	NA	NA
Total specialists at CHCs	660	NA	NA
Radiographers	165	NA	NA
Pharmacist	1417	1380	37
Laboratory Technicians	1417	1043	374
Nurse/Midwife	2407	NA	NA

TABLE: Rural Health Programme: Health Personnel

*Source: Ministry of Health and Family Welfare, Government of India – National Rural Health Mission 2008*

### 4.3 Medically Certified Deaths

According to 1999 data Tamil Nadu had 75 percent reporting of deaths, and 20 percent medically registered deaths of total registered deaths. The reporting efficiency of deaths was 96 percent in the year 2005. Now in 2008 officials say about 45 percent of the deaths are medically registered. Tamil Nadu contains having sustained efforts to achieve 100 per cent death registration in the state. Nevertheless, Tamil Nadu is considered to be among the best performers in the country in the field of registered deaths. Diseases of the Circulatory System were medically certified major cause group of deaths in 2004 having a share of 37.8 percent of all medically certified deaths.

Medically Certified Major Cause Groups of Deaths	% of deaths Tamil Nadu
Infectious and Parasitic Diseases	6.3
Neoplasm	4.6
Nutritional Metabolic Disease and Immunity Disorders	4.2
Diseases of Blood and Blood Forming Organs	0.8
Mental Disorders	0.1
Diseases of the Nervous System	2.0
Diseases of the Circulatory System	37.8
Diseases of the Respiratory System	7.4
Diseases of the Digestive System	2.2
Diseases of the Genito Urinary System	3.2
Complications of Pregnancy	0.2
Dertain conditions originating in the Perinatal Period	4.1
Symptoms, signs and ill defined conditions	18.6
Injury and poisoning	8.4
Others	
<b>TOTAL</b>	<b>99.9%</b>

*Source: Performance Budget 2007-2008, Health and Family Welfare Department, Government of Tamil Nadu*

## 4.4 Reproductive Health Scenario

As discussed in previous chapter regarding Karnataka reproductive health (RH) related data is available from several sources. In Tamil Nadu a great emphasis is laid on enhancing the health status of women and children. The main aim of the Family Welfare Program is to bring down the fertility through improving maternal and child health services in the state. Tamil Nadu is a forerunner in the implementation of Family Welfare Program all over the country. It is implemented as a people's programme involving the active co-operation and participation of the community at large.

### 4.4.1 Indicators of Reproductive Health Status

Indicators of reproductive health consist of maternal health indicators and child health indicators. Some of the most important indicators, their current status and 2012 goals can be found below.

Health Indicator	Current Status	End of Eleventh five Year Plan, as on March 31, 2012*
Maternal Mortality Ratio	134 (SRS 2001-2003)	45
Infant Mortality Rate	31 (NFHS-3)	20
Institutional Deliveries	90.4% (NFHS-3)	100%
Crude Birth Rate	17.1 (SRS 2006)	14
Total Fertility Rate	1.7 (NFHS-3)	1.4

*Source: \*Health and Family Welfare Department, Government of Tamil Nadu*

### 4.4.2 Maternal Health

#### Fertility

According to SRS 2006 in all India the Crude Birth Rate (CBR) is 24.1 births per 1000 population and according to the NFHS-3 the Total Fertility Rate (TFR) is 2.7 births per woman for India. The corresponding figures for Tamil Nadu are 17.1 and 1.8. The 2012 goal is to get CBR to drop down to 14 and TFR to 1.4.

The surprise component is that use of contraceptives is higher in rural areas (62 per cent) as against the urban centres (61 per cent).

#### Atenatal Care

In India just half the women (50.7%) of women reported to have received three or more atenatal care (ANC) checkups, and jut 22.3 percent of them reported to have consumed 100 tablets of Iron Folic

Acid (IFA) tablets regularly. Altogether only one in five pregnant women is found to receive full ANC checkups.

The situation in Tamil Nadu is significantly better. The corresponding figures were 96.5 percent for ANC checkups, and 43.2 percent for IFA.

### **Place of Delivery**

Experts point to the link between low IMR and an increase in institutional deliveries. NFHS-3 reports that just 40.7 percent of the deliveries were institutional deliveries in India. The corresponding figures for Tamil Nadu are 90.4 percent. While the percentage of institutional deliveries has always been in the nineties range, in urban centres, it has climbed to the highest ever at 95 per cent. Significantly, in the rural areas as well, 87 per cent of deliveries are conducted in institutions.

### **Maternal Mortality Ratio**

In all India national policy is to reduce the Maternal Mortality Ratio (MMR) to less than 90 per 100 000 live births by the year 2010 (current level 301, SRS 2001-2003), and to increase the institutional deliveries to 90% by 2010.

Tamil Nadu is significantly better placed as far as the maternal health indicators are concerned in comparison to the national indicators. The MMR for Tamil Nadu is 134 (SRS 2001-2003) compared to national level of 301. Maternal mortality in India continues to be unacceptably high but also improvement at the state level is still needed.

Strategies how to meet the goal of reducing MMR to the target level of than 90 per 100 000 live births include the following action points:

#### **STRATEGIES:**

- Promotion of maternal nutrition
- Improving quality of antenatal and postnatal care
- Round the clock access to essential obstetric and newborn care in 1415 PHCs
- Emergency obstetric first aid services in all the PHCs and HSCs
- Referral information networking system
- Emergency Help-Line in the districts in association with Tamil Nadu Health Systems Project (TNHSP)
- Blood donation programme
- Birth companionship programme
- Mentoring programme for field health functionaries
- Ensuring systematic conduct of verbal autopsy in the case of every maternal death
- Emergency Ambulance service

Expanding provision of emergency obstetric care through employment of specialists outside the government health sector helped to increase the number of caesarean sections in district and sub district hospitals and tubectomies in PHCs, and also to bring down the number of maternal deaths.

#### 4.4.3 Child health

##### Infant Mortality Rate

As discussed in the previous chapter India has the national population policy goal is to reduce IMR to 30 per 1000 live births by the year 2010. IMR has shown a significant decline during the years. According to National Family Health Survey, IMR has decline in all India from 79 in 1992-93 to 57 in 2005-06. Correspondingly the figures are 68 and 31 for Tamil Nadu. Besides, the IMR has reached an all-time low of 23 in urban areas. Because of the progress in reducing IMR, Tamil Nadu is among the well-performing states that have reached IMR below 50.

While implementing the Reproductive and Child Health program Tamil Nadu has been an outstanding performer. Its achievements included e.g. a substantial reduction in infant mortality rate, from around 53 infant deaths per 1000 live births in 1997 to 43 by 2003, and according to the National Family Health Survey to the current 31.

While having the goal to reduce IMR from 50 to 30 by 2010, Tamil Nadu has as an objective to reduce infant mortality and morbidity and improve child health. Strategies for achieving these objectives are the following:

- Ensuring provision of Basic Emergency Obstetric and Newborn Care (BEmONC) services in the PHCs. Provision of first aid services for scorpion bite, snake bite, other insect bites and poisoning in the PHCs.
- Empowering Village Health Nurses (VHN) for management of sick neonates
- Sustaining 100% immunization focus on the remote areas
- Vitamin A prophylaxis programme
- Quality care to sick children through the strategy of Integrated Management of Neonatal and Childhood Illness (IMNCI)
- Promoting exclusive breast feeding
- Institutionalizing infant death and still birth verbal autopsies
- Prevention and early detection of disability among newborns

##### Child Immunization

The trends in vaccination coverage, however, provide the sobering effect, emerging as areas of concern. According to NFHS-3, the overall coverage of children between 12 and 23 months (those who have received all recommended vaccines), has dropped from 89 per cent during NFHS-2 to 81 per cent. In urban areas, it has dropped from 97 per cent (NFHS-2) to 78 per cent (NFHS-3) and once again, the rural areas have performed better, dropping only one percentage point to stop at 84 per cent coverage.

Again, while the percentage of underweight and stunted children has gone down to 33 per cent and 25 per cent respectively, the corresponding figure for children too thin for height has climbed up to 22 per cent from 20 per cent, indicating that intervention in this area has to be stepped up.

#### **4.4.4 Special groups and programs**

If Kerala tops in ayurveda treatments, Bangalore, with its unusual offer of a mix of traditional systems like ayurveda and yoga and modern medical expertise, was uniquely poised to capture the health tourism market that currently thrives in Singapore, Malaysia and Thailand. It has the highest number of approved health systems and alternative therapies.

Tamil Nadu has a remarkable number of speciality groups.  
See appendix 5. TRIBES & CASTES

### **4.5 Development projects and special features of the state**

#### **4.5.1 World Bank projects**

World Bank funded Tamil Nadu Health Systems Project has a budget of 124mUSD consisting of World Bank funding of 100mUSD and Government funding of 25mUSD. It focuses on finding solutions for growing burden of NCDs as well as on women and children's health and the overall quality of care. Time period of the project is 2004-2009.

## **5 CURRENT STATUS OF TELEMEDICINE**

### **5.1 Overview of telemedicine in India**

Tele-healthcare concept is no longer new to India. Both government and private agencies are venturing into it. Few Indian companies are being capable of providing hardware and software solution for tele-health care. Products of reputed overseas tele-health industry have their presence. Efforts are directed towards setting up standards and IT enabled healthcare infrastructure in the country. All those activities carried out by various agencies are collected and summarized below.

A number of initiatives are underway in the area of telemedicine with the objective for providing quality consultation and caring for patients in areas where specialized patient care is not available. Although telemedicine implementation remains in its infancy, interest and activity appears to be growing to provide consultation of a Super-specialty doctor from a distance through videoconferencing along with exchange of medical records online. In addition to major support and thrust provided by DIT through projects and systems, organizations like ISRO, reputed academic medical institutions like SGPGI, AIIMS, PGIMER, AIMS, SRMC and corporate hospitals like Asia Heart Foundation, Apollo Hospitals, SGRH, Fortis, Max etc. have taken and continuing to take significant initiatives for installation of telemedicine systems at different parts of the country.

The Department of Information Technology (under MCIT) has taken a pivotal role in defining and shaping the future of Telemedicine application in India. Backed by a strong vision to build a national



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Telemedicine Network in India, DIT has been involved at multiple levels – this includes Development of Technology, Initiation of pilot schemes and standardization of Telemedicine in the country. Some of these are briefly described below.

DIT has funded development of Telemedicine software systems- the prominent ones being Mercury and Sanjeevani software by C-DAC. DIT has also sponsored the telemedicine project connecting three premier medical institutions- viz. SGPPI, Lucknow, AIIMS, New Delhi, and PGIMER, Chandigarh- using ISDN connectivity. These hospitals as in turn connected to other state level hospitals.

DIT Implemented Tele-medicine for Diagnosis & Monitoring of tropical diseases in West Bengal using low speed WAN, developed by Webel (Kolkata), IIT, Kharagpur and School of Tropical Medicine, Kolkata. The system has been installed in School of Tropical Medicine Kolkata and two District Hospitals.

Similarly, DIT has funded establishment of an Oncology Network for providing Telemedicine services in cancer detection, treatment, pain relief, patient follow-up and continuity of care in peripheral hospitals (nodal centers) of RCC. The project was implemented by C-DAC, Trivandrum and Regional Cancer Center (RCC), Trivandrum. The Kerala OncoNET model has been replicated by DIT at RCC, Adiyar in Chennai with C-DAC's Mercury Telemedicine Solution. Success of the cancer network in Kerala has been adopted by the Ministry of Health & Family Welfare, Government of India to take major step towards launching National Cancer Care Network.

Also projects on setting up of telemedicine facilities at two referral hospitals and four District hospitals using West Bengal State Wide area network of 2 Mbps, and setting up Telemedicine and Tele-education (continuing Medical Education ) facilities in Kerala connecting Regional Cancer Center (RCC), Sri Chitra Thirunal Institute of Medical Sciences(SCTIMST), Medical College Hospital (MCH) and Trivandrum Medical College (TMC). Trivandrum with four hospitals at Taluk and District level using ISDN connectivity is implemented with C-DAC's Mercury Telemedicine Solution.

Several state level Telemedicine network like Kerala state Telemedicine Network, Tamilnadu state Telemedicine Network, Haryana & Panjab state Telemedicine Network, etc. are coming up as pilot project and have shown promising results.

In addition, three state capital district level hospitals in north eastern states of India are getting connected with super- specialty hospitals, one at Kohima, Nagaland already being operational. Another one linking one each state level hospital in Sikkim and Mizoram with Indraprastha Apollo Hospital is example of Public-Private Telemedicine Network in place and under effective use.

In a short span of time, some significant progress has been achieved in the field of Telemedicine in India. However, there is still a long way to go. While there are over 20,000 PHC's providing primary care services in the rural areas, and about 500 district hospitals, Telemedicine has reached to about 100 centers and more 50% of them are in the urban centers only.

If we were to look at a five- year horizon for Telemedicine in India, efforts would be considered successful only if we have Telemedicine reaching out to at least all district and Taluk level hospitals throughout the country. But for this to be a reality, we need a major thrust not from the Government and Private Sector but also help from International agencies, which will go a long way in achieving this objective.

One of the key factors to success of Telemedicine in India is going to be the reliability of telecommunication link. In this context, it is of considerable significance the commitment made by ISRO Chairman to provide free bandwidth for the purpose of Telemedicine and Tele-education. ISRO has been deploying satellite based telemedicine nodes in collaboration with state governments. So far it has deployed around 250 nodes across the country.

Ministry of Health and Family Welfare has set up a National Task Force to address various issues to promote telemedicine in the country and has launched a major country wide network of district hospitals and medical colleges under the Integrated Disease Surveillance Project. National Cancer Care Network and Medical colleges network are going to be implemented in the near future.

In view of a number of laudable but disparate efforts and initiatives, need for an over arching architecture/ framework for the country covering 3 levels, namely, PHC to District, District to referral/ Super-specialty hospitals and also covering hardware/software requirements, bandwidth and connectivity issues has been felt. This paves the way for introduction of integrated telemedicine network in India. Fiber optic network across the country has been laid down by both the governments / public sector and private telecommunication service providers paving the way for availability of high bandwidth terrestrial connectivity to build ubiquitous health network for telemedicine country wide with competing price. What started as application of science and technology in the field of telemedicine by the Ministry, it has now got a significant attention as an important national programme.

## **5.2 Telecommunication Infrastructure**

### **5.2.1 Broadband in India**

Today, a country's stage of development is measured by the Telecom, PC and Internet penetration it has. India has been focusing on establishing itself as a knowledge-based society and has seen rapid growth in telecom penetration all across the country; yet the Internet and broadband penetration is significantly low. For a knowledge-based society to grow quickly and for various economic opportunities to become a reality, the spread of Internet and broadband is now being given top priority.

India has embraced the Internet with a degree of ambivalence. There is tremendous enthusiasm among the dial-up users and an estimated 60 percent of users regularly access the Internet through cybercafés. However, when it comes to high-speed broadband access, there is reluctance, and the rate of adoption has been slow. By the end of 2006, there were 2.1 million broadband subscribers – a penetration of less than 0.2 percent.

After the Broadband policy was unveiled in 2004, customers have realized that there are alternatives to the copper infrastructure of Bharat Sanchar Nigam Ltd (BSNL) and Mahanagar Telephone Nigam Ltd (MTNL). Operators such as VSNL Broadband Limited and Reliance Communications Limited have built a strong fiber optic backbone, and depending on the availability they offer multiple last mile choices to the end user. Unbundling of local loop could become meaningless in this current scenario. However, it is still required to promote a higher growth rate. The biggest problem is reaching the customer's premises from the Point of Presence (PoP) and laying down fresh infrastructure, which can turn out to be an expensive proposition.

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The preferred mode of delivering broadband has been through DSL (Digital Subscriber Line). Operators that had basic telephony over copper loops such as BSNL, MTNL, and Bharti are offering DSL connectivity. Though these operators have a huge subscriber base (around 40 million), most of these basic telephony connections are not yet broadband enabled. However, for independent Internet service providers (ISPs) such as Sify Ltd and other small cable operators, access to the incumbent's local loop for the last-mile has been denied. Private operators are therefore taking Ethernet/cable or fiber route to reach the end user. With almost eight lakh route kilometers (~ 0.8 million) of fiber having been laid in India, the backbone of all the ISPs is typically on fiber optics.

Given the geographical diversity of India, last-mile connectivity has always been a challenge for telecom operators. In the case of business centers, laying down fiber and wiring up old buildings may cause delays. This, coupled with the time required for paperwork for digging and laying down fiber/copper, makes it difficult to provide high-bandwidth and reliable connectivity. Further, after the broadband policy failed to unbundle the copper loops of BSNL/MTNL, private operators have been aggressively pursuing the fiber/wireless route to deliver high-speed connectivity.

<b>Bandwidth price per hour in INR</b>				
<b>Dedicated Bandwidth</b>	<b>Satellite</b>	<b>ISDN</b>	<b>Dial-up</b>	<b>Leased Line</b>
56 kbps	12	NA	120	NA
64 kbps	14	86	NA	9
128 kbps	26	171	NA	17
384 kbps	79	437	NA	NA
1 Mbps	201	NA	NA	90
2 Mbps	402	NA	NA	179
4 Mbps	804	NA	NA	358

## Rural

The majority of semi-urban and rural areas do not have appropriate wire line network for data connectivity. Setting up a wired communication network across the country would not be feasible, as it would require huge Capex and a considerable amount of time. The most feasible way to provide broadband access would be through wireless technologies. Affordable connectivity to empower rural consumers is critical for the country's economic growth.

The real challenge in rural broadband lies in increasing the PC penetration. The Government should promote vendors to look at sub INR 10,000 PCs in a big way. This along with an attractive financial package and basic IT education (the computer and its application familiarity) would make PC affordable for rural India. Another challenge for rural broadband would be substantial and relevant content for the diversified Indian population, without which the possibility of success for broadband in rural areas is very low. The Government should play a leading role in developing and deploying applications (e-governance, e-education, agricultural services, healthcare services, etc) that could be used by the masses, especially, in rural areas. Apart from this, service providers should also be encouraged develop rich local content the same way they are encouraged for rural telecom expansion (fixed line, mobile and broadband) through the USO fund.

Various government projects and corporate initiatives is drive the requirement of broadband in rural India. Some of such projects/initiatives are:

- ITC E-choupal to connect 10 Million farmers in 100,000 villages
- HUL Project i-Shakti (7,500 villages)
- Project Saksham :Microsoft India project to set-up kiosks in around 200,000 villages
- Golden quadrilateral project to create need for access kiosks
- Around 200 e-government projects in various states
- VICTERS (Virtual classroom on EDUSAT for rural schools)
- Microfinance invigorates rural credit
- HughesNet Fusion centers: Hughes is setting up 1,000 rural ICT kiosks
- Kisan Soochna Kendras: Jai Kisan (an NGO set up to introduce rural IT technology in Uttaranchal) to put up over 3,000 kiosks
- State Bank of India planning to set up 5,000 to 6,000 kiosks; has started a new rural initiative to encourage banking habits among the rural masses

Such projects by the Government as well as corporate would lead to higher adoption of broadband in rural India and generate huge employment opportunities in terms of running and maintaining these kiosks (on an average each kiosk provides employment to 3 persons), new opportunities through e-

commerce, Rural BPO, etc. There are around 600,000 villages with an average of 250 to 300 households per village. A kiosk in each such village would lead to direct employment of around 1.8 million as kiosk operators and greater indirect employment by presenting new business opportunities.

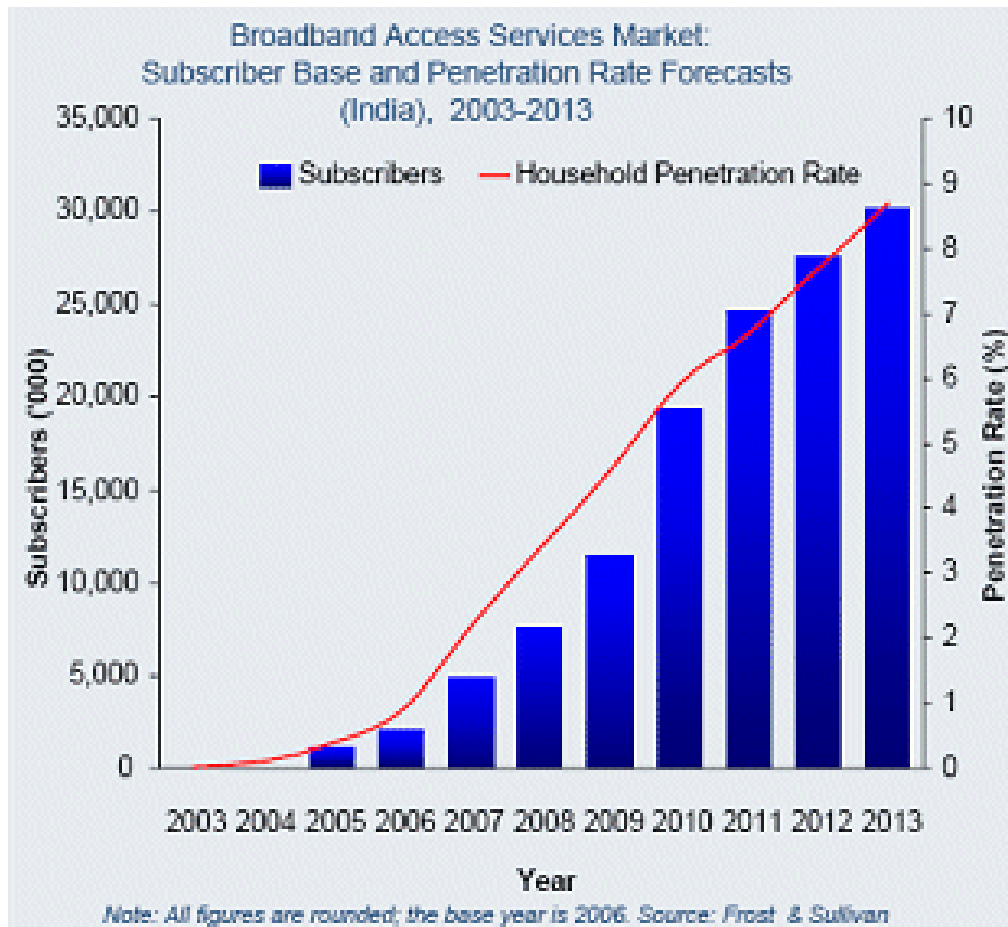
WiMax is being promoted by the Government (DoT) for affordable rural broadband connectivity, as this technology can be deployed in a short time and the Capex requirement is much less as compared to the wired network.

### **5.2.2 Subscriber Base and Penetration**

The Indian broadband services market is still at a nascent stage. By the end of 2006, the subscriber base had touched 2.1 million with a household penetration of less than 1 percent. The current subscriber is way off from the target (3 million, 9 million and 20 million for 2005, 2007 and 2010 respectively) set by the DoT.

In Asia, India has one of the lowest broadband subscriber penetration rates. However, with various policy measures and Government initiatives to promote broadband, the market is expected to increase to 30.1 million subscribers by the end of 2013 (household penetration rate is expected to reach around 8.9 percent by 2013) and come close to the goal set by the Government.

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### 5.3 Tele-density in India

The teledensity of India has marked 272.88 million at the end of December. In December, 2007 India has added 8.17 million telecom subscribers according to the data released by telecom regulator Telecom Regulatory Authority of India (TRAI).

The overall teledensity of India stood at 23.89% at the end of December 2007, against 23.21% in November. The country has added 8.2 million subscribers in November and total subscribers stood at 264.77 million at the end of the month. The wireless segment has added around 8.17 million subscribers in the month of December, 2007 against 8.32 million in November, 2007. The total wireless subscriber base, including GSM, CDMA & WLL (fixed), stood at 233.63 million at the end of December 2007. While wireline segment saw fall in total number of subscribers. The subscriber base decreased from 39.31 million subscribers in November 2007 to 39.25 million in December 2007.

#### Overall Tele-density in India

Year	2004	2005	2006	2007
Tele-density (%)	8.6	11.5	12.8	23.89

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**State/Circle wise Tele-Density in Rural and Urban Areas of India (2004/2005)**

State/Circle	Urban	Rural	Overall	Difference (Urban-Rural)
Andaman & Nicobar Island	19.12	9.07	12.63	10.05
Andhra Pradesh	28.53	2.39	9.48	26.14
Assam	16.75	0.63	2.79	16.12
Bihar	17.63	0.57	2.36	17.06
Chhatisgarh	6.5	0.54	1.8	5.96
Gujarat	28.88	2.63	12.73	26.25
Haryana	28.78	2.8	10.83	25.98
Himachal Pradesh	68.36	6.79	13.12	61.57
Jammu & Kashmir	17.58	0.76	5.09	16.82
Jharkhand	8.42	0.5	2.3	7.92
Karnataka	29.98	2.49	12.19	27.49
Kerala	44.74	9.74	18.77	35
Madhya Pradesh	17.36	0.66	5.21	16.7
Maharashtra(-) Mumbai	25.23	2.56	9.96	22.67
North East-I	14.63	1.22	4.33	13.41
North East-II	12.83	1.2	3.66	11.63
Orissa	19.68	1.04	3.96	18.64
Punjab	49.21	5.33	21.94	43.88
Rajasthan	21.27	1.44	6.12	19.83
Tamil Nadu(-) Chennai	22.96	2.73	11.21	20.23
Uttaranchal	17.08	1.63	5.74	15.45
Uttar Pradesh	17.15	0.52	4.06	16.63
West Bengal (-) Kolkata	14.85	1.04	2.98	13.81
Kolkata	24.22	0	24.22	24.22
Chennai	47.56	0	47.56	47.56
Delhi	50.94	0	50.94	50.94
Mumbai	45.43	0	45.43	45.43
<b>Total</b>	<b>26.88</b>	<b>1.73</b>	<b>8.95</b>	<b>25.15</b>



## 5.4 VSAT in India

VSAT (very small Aperture Terminal) has turned out to be the efficient for mobile units in telemedicine segment. As of 2007, there has been 25,000 VSAT's installed and growing at a rate of 30%. As of today there are 11 efficient service providers for VSAT.

### 5.4.1 VSAT Service Providers in India:

- Essel Shyam Communications Ltd.
- HCL Comet Systems and Services Ltd.
- Comsat Max Ltd.
- TVC India pvt. Ltd.
- Bharti Televentures Ltd.
- Hughes Escorts Communications Ltd.
- Gujarat Narmada Valley Fertilizers Ltd.
- IIT Ltd.
- Tata Services Ltd. (TSL)
- Software Technology Park of India (STPI)
- Infinium India Ltd.

## 6 TELEMEDICINE SCENARIO INDIA

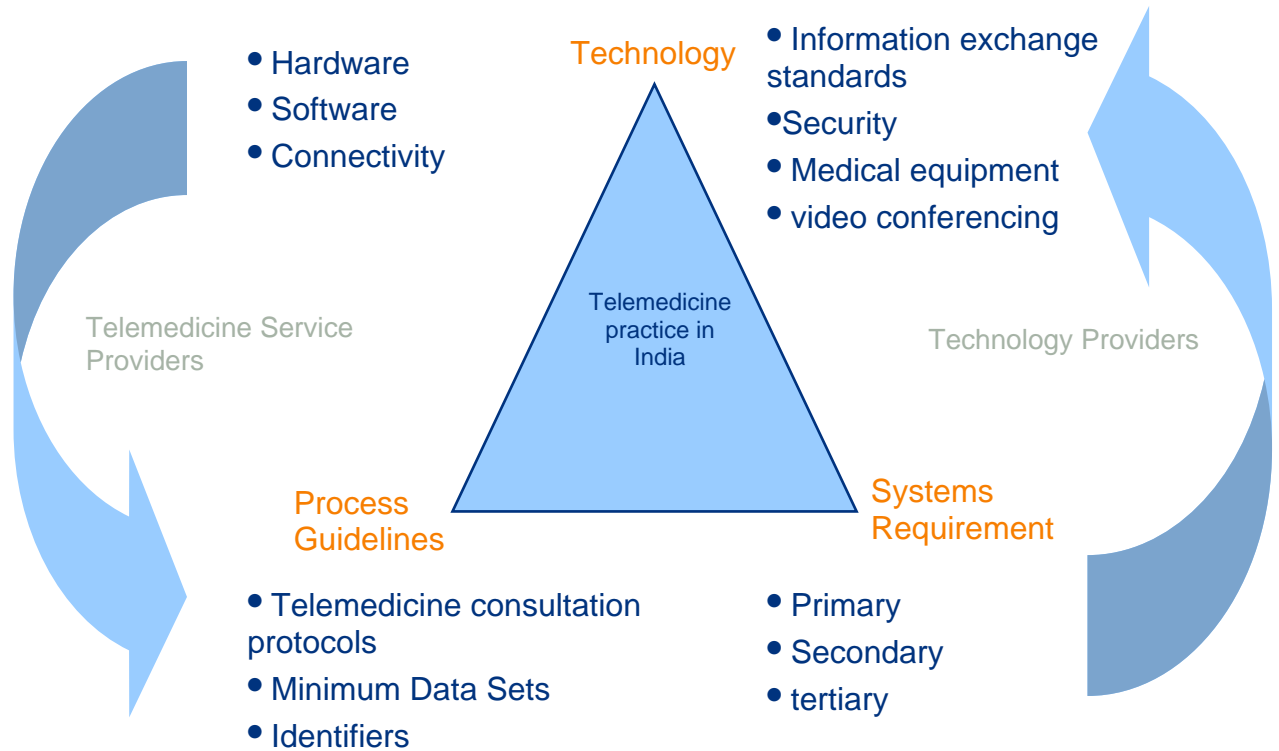
### 6.1 National e-Governance Action Plan (NeGP)

The department of Information technology has taken NeGP initiatives with 100,000 common Service Centers and 80 service centers including the following fields:

- Vaccination Schedule
- Maternity Care
- Family Planning
- Medicines
- Ambulance Services and Transportation
- Hospital / Primary Health Centers information
- Blood Bank
- Life Saving Drugs
- Doctor's Database
- Appointment with Doctors
- E-Diagnostics
- Materials Management System (Medicines)

Further on, Department of Information technology has taken initiatives in the formulating the framework on telemedicine guidelines and standards for practice in India.

## Recommended Guidelines and Standards for practice in Telemedicine India



### 6.2 ISRO Initiatives

ISRO's Telemedicine initiative has been broadly divided into the following areas:

- Providing Telemedicine Technology & Connectivity between remote/rural hospital and Super Speciality Hospital for Teleconsultation & Treatment and Training of doctors & paramedics.
- Providing the Technology & Connectivity for Continuing Medical Education (CME) between Medical Colleges & Post Graduate Medical Institutions/Hospitals.
- Providing Technology & Connectivity for Mobile Telemedicine units for rural health camps especially in the areas of ophthalmology and community health.
- Providing Technology and Connectivity for Disaster Management Support and Relief.

ISRO's Telemedicine pilot project was started in the year 2001 with the aim of introducing the Telemedicine facility to the grass root level population as a part of 'proof of concept technology demonstration' programme. The Telemedicine facility connects the District Hospitals/Health Centres with Super Speciality Hospitals for providing expert consultation to the needy and underserved population.

Telemedicine system consists of customized medical software integrated with computer hardware, along with medical diagnostic instruments connected to the commercial VSAT (Very Small Aperture Terminal) at each location. Generally, the medical record/history of the patient is sent to the Specialist Doctors, who will in-turn study and provide diagnosis and treatment during video-conference with the patient's end.

### 6.2.1 ISRO Telemedicine Networks

Presently ISRO's Telemedicine Network consists of 221 Hospitals - 181 Remote/Rural/District Hospitals/Health Centers connected to 40 Super Speciality Hospitals located in the major cities with the following highlights:

- 9 Hospitals in the State of Jammu & Kashmir including 3 Medical College Hospitals connected to All India Institute of Medical Sciences, Delhi; Apollo Hospitals, Delhi & Amritha Institute of Medical Sciences, Kochi.
- Islands of Lakshadweep connected to Amritha Institute of Medical Sciences, Kochi.
- 10 Remote/field/Base Hospitals for Indian Army connected to Research & Referral (R & R) Hospital at New Delhi.
- 10 hospitals of North Eastern States - connected to Asia Heart Foundation, Kolkata / Amrita Institute, Kochi / AIIMS, New Delhi / Apollo, New Delhi.
- Tata Memorial Cancer Centre Mumbai, connected to B B Barua Cancer Centre, Guwahati and WalWaker Cancer Unit at Chiplun, Maharashtra.
- Temporary Telemedicine facility for 2 months every year at Pampa at the foothills of Sabarimala shrine in Kerala.
- Mobile Telemedicine - Mobile Teleophthalmology facility provided to Shankara Netralaya, Chennai and Aravind Eye Hospital, Madurai, Tamilnadu.
- Three Medical College Hospitals of Orissa connected to Sanjay Gandhi Post Graduate Institute of Medical Sciences (SGPGI), Lucknow.
- 3 District Hospitals of Karaikal (Tamilnadu), Mahe (Kerala) and Yanam (Andhra Pradesh) of the UT of Pondicherry connected to General Hospital & JIPMER, Pondicherry.
- 3 District Hospitals of West Bengal connected to SSKM and Ramakrishna Prathisthan Hospital, Kolkata.

## 6.3 Telemedicine in Karnataka

### 6.3.1 Government Telemedicine Projects and Plans in Karnataka since 2003:

Telemedicine project is a joint program of Health & Family Welfare department, ISRO and Specialty Hospitals. Telemedicine centers have been established in 26 centers in the State in 3 Taluk Hospitals

and 23 District hospitals and 7 hubs super specialty hospitals. The Karnataka Telemedicine Trust has been registered under the Register of Society to manage all these Telemedicine Centers. Doctors, staff, nurses and laboratory technicians from all these centers have been trained for this projects. INR 8.00 Crores was earmarked for this project of which INR 340.00 Lakhs has been spent for providing the upgrading the facilities. A sum of INR 141.00 Lakhs has been kept as Corpus for the Trust. Under National Rural Telemedicine network which in-corporate consulting Doctors and Super Specialty Consultants at both recipient and referral hospital which include PHC, CHC (village unit) district hospitals, state hospital super specialty hospitals and Mobile Telemedicine unit.

### **6.3.2 Private Hospital Participation in Karnataka**

#### **Narayana Hrudayalaya, Bangalore**

This cardiology specialized hospital has telemedicine networks in India and abroad, sponsored by ISRO. Telemedicine Network runs through 26 locations in India and abroad, offering video consultation round-the-clock, primarily for heart patients from remote areas. NH has provided treatment for 12,000 patients in the last two years, entirely free of cost. Through the ECG Network using ordinary telephone lines, a large number of 'family physicians' are networked with NH for early diagnosis of heart attacks. NH is mainly focused on telecardiology.

## 6.4 Telemedicine in Tamil Nadu

### 6.4.1 Government participation in Tamil Nadu

Tamil Nadu government is keen on taking the benefits of telemedicine to the poor rural and suburban areas of state. The government has sanctioned INR 87 lakhs to implement pilot project in telemedicine in Government General Hospitals. Further on, the government is launching another project with Government Royapettah hospital, linking 6 government headquarters hospital at Kancheepuram, Thiruvallur, Thiruvannamalai, Krishnagiri, Udhamandalam (Ooty) and Rameswaram.

The government has signed a (MoU) with Intel technology Pvt. Ltd. for implementing the project at Tindivanam. It is remarkable, that 100 of the 500 institutions using telemedicine in India are located in Tamil Nadu. With this, Tamil Nadu has become the Asia's largest Telemedicine service provider. Apollo Hospitals has been the incubator in Telemedicine

### 6.4.2 Private Hospital Participation in Tamil Nadu

#### Apollo Hospitals, Chennai

Teleconsultations achieved by Apollo hospitals till date 27900. Total no of Telemedicine centers through Apollo network in India is 105. Apollo offers free consultation for patients from places like Aragonda, Karimnagar, Sriharikota etc. On an average in one day at Chennai center there are between 20 – 25 consultations. Telemedicine caters to nearly all specialties. Topping the list is Dermatology, Neurology and Psychiatry

There is Disha project in Apollo Madurai with state of the art Multi specialty Satellite van to reach the rural villages. State of the art Telemedicine Software called Medintegra has been developed in-house by Apollo for transfer and storage of patient's data. Apollo Telemedicine has all the three modes of connectivity which can be used for teleconferencing namely ISDN(Integrated Services Digital Network), VSAT (Very Small Aperture Terminal or Satellite link), IP (Internet Protocol or Broad Band).

#### Shankara Nethralaya, Chennai

They operate remote and rural location via mobile units and are specialized in tele ophthalmology & Mammography. Shankara Nethralaya is providing Teleophthalmic Seven districts surrounding Chennai - Kanchipuram, Tiruvallur, Tiruvannamalai, Vellore (all T.N) Nellore, Chittoor and Cuddapah(all AP)

#### Arvind Eyecare Hospital, Madurai

They operate via four satellite hospitals at Theni, Tirunelveli, Coimbatore and Pondicherry are connected to the main Hospitals at Madurai and Theni. Other vision

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centers and Kiosks are connected through n-lounge and public internet. They are specialized teleophthalmology. Till September 2007 their consultation via vision care centers 16206, eye talk case 1900 and Mobile Van 4996.

Arvind eyecare Hospitals has all the three modes of connectivity which can be used for teleconferencing namely ISDN(Integrated Services Digital Network), VSAT (Very Small Aperture Terminal or Satellite link), IP (Internet Protocol or Broad Band)

## 6.5 Telemedicine Software & Hardware developers

Telemedicine has transformed the Indian health care scenario to a different level. As the telecommunication has played a vital role in Telemedicine and in the information technology, the companies have come out with a dedicated software development for the Telemedicine as the information has to be more precise.

The list of telemedicine software vendors:

1. Center of Development of Advanced Computing
2. Apollo Telemedicine Network Foundation
3. Online Telemedicine Research Institute
4. Televital India
5. Vepro India

## 7 SUMMARY

India needs at least 750,000 extra beds to meet the demand for inpatient treatment by 2012-opportunity in tertiary healthcare facilities. In the personnel side, India needs at least 1 million more qualified nurses and 500,000 more doctors by 2012 as compared to existing number. To raise this infrastructure, total additional investment to the tune of US\$ 25-30 billion is needed by 2012. Government and international agencies will only be able to gear up US\$ 7 billion and the rest of investment has to come from private sector.

Karnataka has relatively better health infrastructure in terms of number of sub centers, PHCs and CHCs in proportion to the population, as per the norms prescribed by the central government. But the mere existence of a health Institution does not ensure its satisfactory functioning and utility to the common man. Many of them lack basic facilities like electricity, water, telephone, vehicle and staff quarters.

One common complaint against the public health system in India is the lack of medicines mainly due to pilferages and irregular supply. Drugs supposed to be given to the patients free of cost were sold out or charged and bribes became a normal thing in the day-to-day functioning of government hospitals.

We have compared Karnataka and Tamil Nadu with the Indian averages in the tables below. In most figures, both states rank higher than average.

### Demographic Profile

	Total population	Decadal growth in population	Sex Ratio (females per 1000 males)	Urban population	Decadal growth in urban population
<b>Karnataka</b>	52,850,562	17.51%	965	34%	28.8%
<b>Tamil Nadu</b>	62,405,679	11.72%	987	44%	42.4%
<b>India</b>	1,028,610,328	21.54%	933	28%	31.2%

*Source: Census 2001*

### Socio-Economic Profile

	Population below poverty line	Schedule Caste population	Schedule Tribe population	Female Literacy Rate	Male Literacy Rate
<b>Karnataka</b>	20.04%	16.2% (8.56 million)	6.6% (3.46 million)	56.9%	76.1%
<b>Tamil</b>	21.12%	19.0% (11.86 million)	1.0% (0.65 million)	64.4%	82.4%



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<b>Nadu</b>		million)	million)		
<b>India</b>	26.10%	16.2% (166.64 million)	8.2% (84.33 million)	54.2%	75.9%

*Source: Census 2001*

### Health Profile

	<b>Crude Birth Rate</b>	<b>Crude Death Rate</b>	<b>Total Fertility Rate</b>	<b>Infant Mortality Rate</b>	<b>Maternal Mortality Ratio</b>
<b>Karnataka</b>	20.9 (SRS 06)	6.9 (SRS 06)	2.2 (SRS 04)	49 (SRS 06)	228 (SRS 01-03)
<b>Tamil Nadu</b>	17.1 (SRS 06)	7.5 (SRS 06)	1.7 (SRS 04)	41 (SRS 06)	134 (SRS 01-03)
<b>India</b>	24.1 (SRS 06)	7.5 (SRS 06)	2.9 (SRS 04)	58 (SRS 06)	301 (SRS 01-03)

*Source: Ministry of Health and Family Welfare, Government of India (Sample Registration System SRS)*

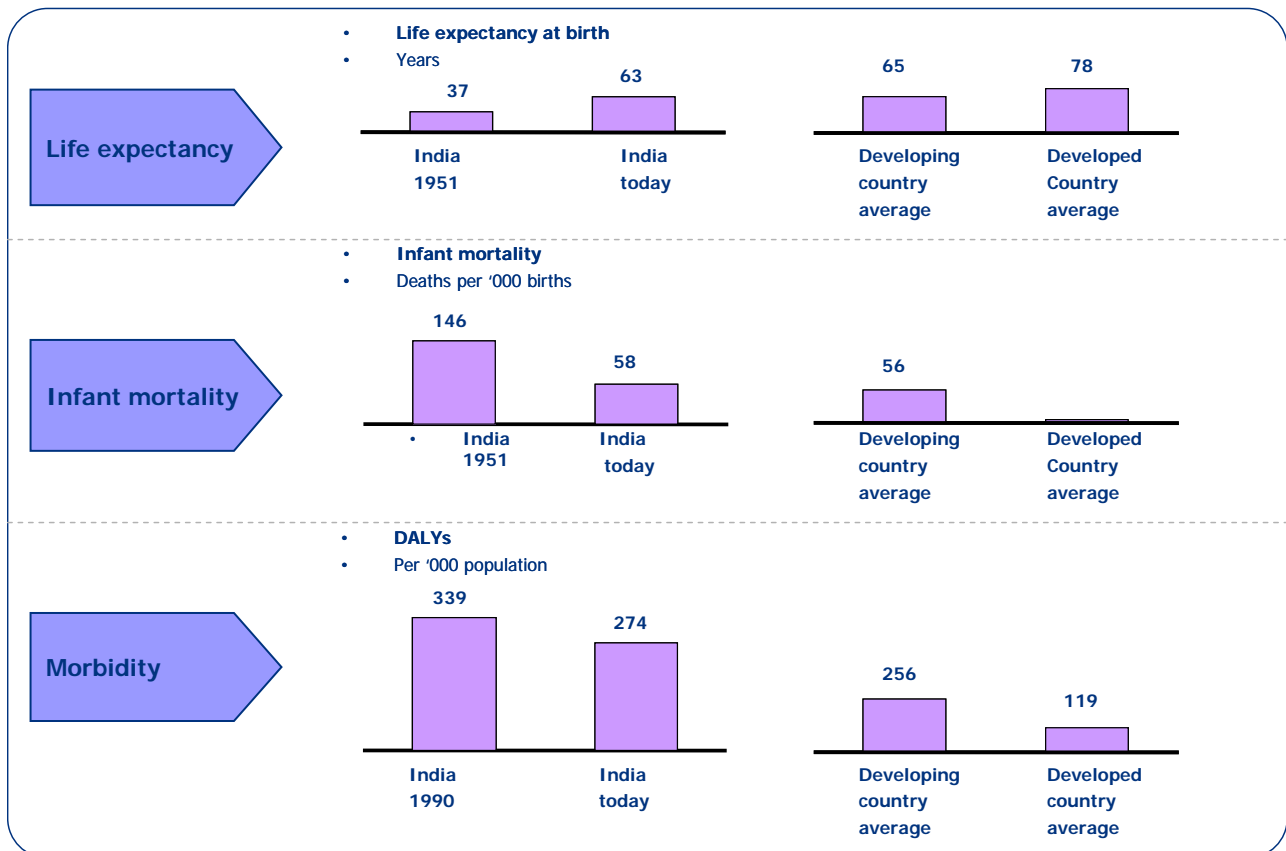
Telemedicine is already widely in use in India and there are several development projects on-going as well as on preparation both on national and state level. Generally hardware and software are available. Availability of trained personnel is crucial for utilization. There are efforts on setting up standards and IT enabled health care infrastructure to the whole country. Currently the connectivity is far from targets set by government. Biggest challenge are rural areas. Majority of semi-urban and rural areas do not have appropriate wire network for data connectivity. Last-mile connectivity is a problem for telecom operators in geographically diverse country. Private operators have been pursuing fiber/wireless route to deliver high-speed connectivity.

In the consumer end, real challenge is the user penetration. By the end of 2006 data connection service subscriber base was less than one percent of the households. In the end, broad band connectivity lies in PC penetration.

## 8 CONCLUSIONS AND RECOMMENDATIONS:

Population of India will keep on growing in the years to come. What is characteristic for India is, that also the level of education and the proportion of the middle income class people are increasing rapidly. Changing lifestyles as result of urbanization and elevated consumption power bring new challenges to the health care in form of rising number of lifestyle related non-communicable diseases.

India has performed well in order to reach the millennium health goals. Despite the good development in India and especially in Karnataka and Tamil Nadu, India is still behind the developing country average, let alone developed countries average. There is still a lot to do, in order to reach millennium development goals. There are several on-going projects both state and national level. Especially the World Bank funded projects should be studied more carefully to tap the cooperation opportunities.



Comparison between 1990 to 2006 and India compared to developing country average and developed country average.

On the governmental side, we see main cooperation opportunities in the fields of mother and child health care as well as in the prevention and care of non-communicable diseases. Finnish maternity health center and child health center model could be applied to Indian environment. In the sector of prevention and care of non-communicable diseases.

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Private health care is growing at a rapid speed. Private sector also being quick and transparent in decision making, this sector seems prominent cooperation partner especially for the medical technology sector. We see opportunities especially in cardiac and dental sectors. However, a local distributor is needed.

Telemedicine is seen as suitable tool, which could be utilized much more. For the full utilization of telemedicine, investments to infrastructure and skills and personnel are needed. Currently the major scopes are under telemedicine are teleconsultation, telediagnosis and teletreatment. In these cases, the link is most often between hospital-hospital, hospital-health clinic meaning doctor-doctor or in most cases doctor-health worker. The big challenge is to reach the patients and even healthy consumers in the case of preventive care. New tools and applications for reaching this level could be helpful and bring telemedicine in India into next stage. We recommend the Finnish companies to approach the local governments as group proposing pilot projects in conjunction with the existing development projects. Finnish excellence and solutions should be adjusted to suit the local environment and culture.

## 9 APPENDISES

### Appendix 1: Development of the health system

#### Health policies and strategies

Anaemia and malnutrition among women and children respectively has led to serious problems of macro and micro nutrition capacities. Moreover, the public health expenditure over the years has been less in India due to which out-of-pocket expenditure is more. As a result of all this, a realistic strategy was planned before making the NHP of 2002 according to the current needs of the people. The main goal of NHP 2002 is to evolve a policy structure to reduce the inequalities and to see that public health services are acceptable to the disadvantaged sections of the people

The main objective of this policy is to achieve an acceptable standard of good health among the general population of the country. The approach would be to increase access to the decentralized public health system by establishing new infrastructure in deficient areas, and by upgrading the infrastructure in the existing institutions. Overriding importance would be given to ensuring a more equitable access to health services across the social and geographical expanse of the country. Emphasis will be given to increasing the aggregate public health investment through a substantially increased contribution by the Central Government.

Emphasis will be laid on rational use of drugs within the allopathic system. Increased access to tried and tested systems of traditional medicine will be ensured. Within these broad objectives NHP 2002 shall achieve the goals of eradicating Polio and Yaws by 2005, eliminate leprosy by 2005, eliminate kala azar by 2010, eliminate lymphatic filariasis by 2015, achieve a zero level growth of HIV/AIDS by 2007, reduce mortality on account of TB, Malaria and other vector borne diseases by 2010, reduce prevalence of blindness by 0.5 percent by 2010, reduce infant mortality rate (IMR) to 30/1000 and maternal mortality rate (MMR) to 100/100,000 by 2010, increase utilization of public health facilities from less than 20 to more than 75 percent by 2010, and establish an integrated system of surveillance.

The public health administration at the State level is to render effective service delivery. The contribution of the private sector in providing health services would be much enhanced, particularly for the population group, which can afford to pay for services. Priority will be given to preventive and first-line curative initiatives at the primary health level through increased sectoral share of allocation.

National health Accounts and Health statistics by 2005 show increase in the expenditure by government as a percentage of GDP from the existing 0.9 percent to 2 percent by 2010, increase share of central grant to constitute at least 25 percent of total spending by 2010, increase State sector health spending from 5.5 percent to 7 percent of the budget by 2005 and further increase it by 8 percent by 2010. The policy places great reliance on the strengthening of primary health structure for the attaining of improved public health outcomes on an equitable basis.

## **Appendix 2: Organization of the health system**

The healthcare services' organization in India extends from the national level to village level. From the total organization structure, we can slice the structure of healthcare system at national, state, district, community, PHC and sub-centre levels.

**National level** – The organization at the national level consists of the Union Ministry of Health and Family Welfare. The Ministry has three departments, viz. – Health, Family Welfare, and Indian System of Medicine and Homeopathy, headed by two Secretaries, one for Health and Family Welfare and the other for ISM and H. The department of Health is supported by a technical wing, the Directorate General of Health Services, headed by Director General of Health Services (DGHS).

**State level** - The organization at State level is under the State Department of Health and Family Welfare in each State headed by Minister and with a Secretariat under the charge of Secretary/Commissioner (Health and Family Welfare) belonging to the cadre of Indian Administrative Service (IAS). By and large, the organizational structure adopted by the State is in conformity with the pattern of the Central Government. The State Directorate of Health Services, as the technical wing, is an attached office of the State Department of Health and Family Welfare and is headed by a Director of Health Services. However, the organizational structure of the State Directorate of Health Services is not uniform throughout the country. For example, in some states, the Programme Officers below the rank of Director of Health Services are called Additional Director of Health Services, while in other states they are called Joint/Deputy Director, Health Services. But regardless of the job title, each programme officer below the Director of Health Services deals with one or more subject(s). Every State Directorate has supportive categories comprising of both technical and administrative staff.

The area of medical education which was integrated with the Directorate of Health Services at the State, has once again shown a tendency of maintaining a separate identity as Directorate of Medical Education and Research. This Directorate is under the charge of Director of Medical Education, who is answerable directly to the Health Secretary/Commissioner of the State. Some states have created the posts of Director (Ayurveda) and Director (Homeopathy). These officers enjoy a larger autonomy in day-to-day work, although sometimes they still fall under the Directorate of Health Services of the State.

**Regional level** – In the state of Bihar, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh, Karnataka and others, zonal or regional or divisional set-ups have been created between the State Directorate of Health Services and District Health Administration. Each regional/zonal set-up covers three to five districts and acts under authority delegated by the State Directorate of Health Services. The status of officers/in-charge of such regional/zonal organizations differs, but they are known as Additional/Joint/Deputy Directors of Health Services in different States.

**District level** - In the recent past, states have reorganized their health services structures in order to bring all healthcare programmes in a district under unified control. The district level structure of health services is a middle level management organisation and it is a link between the State as well as regional structure on one side and the peripheral level structures such as PHC as well as sub-centre on the other side. It receives information from the State level and transmits the same to the periphery by suitable modifications to meet the local needs. In doing so, it adopts the functions of a manager and brings out various issues of general, organizational and administrative types in relation to the management of health services. The district officer with the overall control is designated as the Chief Medical and Health Officer (CM & HO) or as the District Medical and Health Officer (DM & HO). These officers

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are popularly known as DMOs or CMOs, and are overall in-charge of the health and family welfare programmes in the district. They are responsible for implementing the programmes according to policies laid down and finalized at higher levels, i.e. State and Centre. These DMOs/CMOs are assisted by Dy. CMOs and programme officers. The number of such officers, their specialization, and status in the cadre of State Civil Medical Services differ from the State to State. Due to this, the span of control and hierarchy of reporting of these programme officers vary from state to state.

**Sub-divisional/Taluka level** – At the Taluka level, healthcare services are rendered through the office of Assistant District Health and Family Welfare Officer (ADHO). Some specialties are made available at the taluka hospital. The ADHO is assisted by Medical Officers of Health, Lady Medical Officers and Medical Officers of general hospital. These hospitals are being gradually converted into Community Health Centres (CHCs).

**Community level** – For a successful primary healthcare programme, effective referral support is to be provided. For this purpose one Community Health Centre (CHC) has been established for every 80,000 to 1, 20,000 population, and this centre provides the basic specialty services in general medicine, pediatrics, surgery, obstetrics and gynecology. The CHCs are established by upgrading the sub-district/taluka hospitals or some of the block level Primary Health Centres (PHCs) or by creating a new centre wherever absolutely needed. Indian Public Health Standards (IPHS) <sup>6</sup>upgrades the CHC to be manned by 6 Medical Specialists including Anaesthetics and an eye surgeon (for 5 CHCs) supported by 24 paramedical and other staff with inclusion of two nurse midwives in the present system of seven nurse midwives. At present, 3910 CHCs are functioning in the country.

**PHC level** – At present there is one Primary Health Centre covering about 30,000 (20,000 in hilly, desert and difficult terrains) or more population. Many rural dispensaries have been upgraded to create these PHCs. PHC is the first contact point between village community and the Medical Officer. Each PHC has one medical officer, two health assistants – one male and one female, and the health workers and supporting staff. For strengthening preventive and promotive aspects of healthcare, a post of Community Health Officer (CHO) was proposed to be provided at each new PHC, but most states did not take it up. PHC acts as a referral Unit for 6 Sub-Centres and has 4-6 beds for patients. It performs curative, preventive, promotive and Family Welfare services. There are 22669 PHCs functioning in the country.

**Sub-centre level** – Sub-Centre is the first peripheral contact point between Primary Health Care system and the community. The most peripheral health institutional facility is the sub-centre manned by one Female Auxiliary Nurse Midwife (ANM) and one Male Health Worker and one Lady Health Visitor (LHV) for six such Sub-Centres. Sub-centres are assigned task relating to maternal and child health, family welfare, nutrition, immunization, diarrhea control and control of communicable diseases programmes and provided with basic drugs for minor ailments needed for taking care for essential health need for women and children. At present, in most places there is one sub-centre for about 5,000

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<sup>6</sup> Indian Public Health Standards (IPHS), which would detail the specifications of standards to which these institutions would have to be raised to so that the citizen is confident of getting public health services in the hospital that can be measured to be of acceptable standards. Indian Public Health Standards (IPHS) for Community Health Centres have been prepared and are under preparation for Primary Health Centres, Sub-centres, Sub-divisional Hospitals and District Hospitals to lay down standards not only for personnel and physical infrastructure, but also for delivery of services, and management. The same has been circulated to all State/UTs. A system of performance bench marks would be introduced to concurrently assess the adherence of public hospitals to IPHS, in a transparent manner.

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populations (3,000 in hilly and desert areas and in difficult terrain). The number of subcentres functioning in the country as on March, 2006 is 144988.

The 73rd and 74th constitutional amendments have given the powers to the local bodies in some states of India. In the process, different states have adopted different stakeholders for the benefit of health services, with the help of community participation, which gives stress on safe drinking water and sanitation at village level. The Panchayats are given the power to look after the welfare of the people.

### **Appendix 3: Medically Certified Deaths**

A death certificate is a permanent record of facts about the deceased. It provides important information about the individual such as age, sex, race, date of death, his or her parents, name of spouse if married, information about circumstances and cause of death, and the date and place of interment. This data is used in the application for insurance benefits, settlement of pension claims, transfer of title for real and personal property, and other general legal uses. The certificate is also used as evidence when a question about a death arises. Statistical information from these certificates helps define problems and the data obtained is a necessary foundation on which to base effective public health programs.

In India at national level only about 46 per cent of the deaths are being covered by the registration machinery with large interstate variations as is the case of registration of births. The Registration of Births and Deaths is compulsory at the place of occurrence in the State as per the Registration of Birth and Death Act 18 of 1969 that requires a death to be reported to the local authorities within a specified period of time (e.g. within 72 hours, varies by state). The body must be disposed within that time frame and at specified places in order to receive a death certificate.

### **Appendix 4: Reproductive and Child Health**

The concept of 'Reproductive and Child Health' (RCH) emerged through a global consensus at the International Conference of Population and Development (ICPD) held in Cairo in 1994.

RCH focuses on empowerment of women and recognizes their right to reproductive choice. It concentrates on enhancing the health status of women and children.

RCH priorities:

- Reduction of infant and maternal mortality and morbidity.
- Reduction and management of reproductive tract infections (RTI) and sexually transmitted infections (STI)
- A life cycle approach to women's health from conception and birth through adolescence and child bearing to post menopausal and geriatric care.
- Child health, especially reduction of under-five mortality and morbidity rates and elimination of micronutrient and vitamin A deficiencies.



## **Appendix 5: Castes**

Castes, which were the elite of the Indian society, were classified as high castes. The other communities were classified as lower castes or lower classes. The lower classes were listed in three categories.

The first category is called Scheduled Castes. This category includes in it communities who were untouchables. The untouchables call themselves Dalit, meaning depressed. Until the late 1980s they were called Harijan, meaning children of God. This title was given to them by Mahatma Gandhi who wanted the society to accept untouchables within them.

The second category is Scheduled Tribes. This category includes in it those communities who did not accept the caste system and preferred to reside deep in the jungles, forests and mountains of India, away from the main population. The Scheduled Tribes are also called Adivasi, meaning aboriginals.

The third category is called sometimes Other Backward Classes or Backward Classes. This category includes in it castes who belong to Sudra Varna and also former untouchables who converted from Hinduism to other religions. This category also includes in it nomads and tribes who made a living from criminal acts.

According to the central government policy these three categories are entitled for positive discrimination. Adequate preventive, promotive and curative services and all National Health Programmes are being implemented through the network of Primary Health Centre/Health Sub Centre in the Tribal Sub Plan area for the welfare of Tribals.

## Appendix 6.

April 07, 2008 <http://www.rediff.com/money/2008/apr/07panel.htm>

### India needs 600,000 more doctors: Plan Panel

There is a requirement of at least 600,000 more doctors according to the Planning Commission. The situation is particularly bad in the public healthcare sector. The public healthcare has been on a serious decline during the last two or three decades because of non-availability of medical and paramedical staff, diagnostic services and medicines. The situation in availability of specialist manpower in Community Health Centres is particularly bad as against the sanctioned posts. About 59.4 per cent surgeons, 45 per cent obstetricians and gynecologists, 61 per cent physicians and 53 per cent paediatricians were not in position, the report said.

The number of doctors registered by different state councils stood at 6,68,131 during the year 2006 giving a doctor to population ratio of 60:100000. The state wide distribution of doctors was also highly skewed with certain states like Karnataka and Union Territories such as Delhi and Goa having a favourable ratio and other states like Haryana, Bihar and Uttar Pradesh being under-served, the group said.

If the targeted doctor population norm is taken as 1:1000, there is a requirement of at least 600,000 doctors. The group also drew attention to the acute shortage of dental surgeons in India. The number of dental surgeons registered in India stood at 73,271 against the requirement of 282,130 in 2007, it said. There is a similar shortage of nurses. While the ideal population of nurses should have been 2,188,890 in 2007, currently only 1,156,372 nurses were available.

Asserting that the overriding requirement in the country is for increasing the supply of human resources at all levels, from specialists to paramedical personnel and to improve their quality, the group headed by commission member Anwarul Hoda said it would be accomplished by opening the medical education sector completely for private sector participation.

Private companies should be allowed to establish medical and dental colleges just as they have been allowed to open nursing colleges, it said. Other entry barriers such as land and built-up space should be lowered to realistic levels. The recommendations, submitted by the group to Prime Minister Dr Manmohan Singh, also asked the government to fill up vacant posts in order to improve quality of teaching in government medical colleges and to enable these colleges provide higher incentives. The paramedical council for regulatory purposes and the proposed institute of Paramedical Sciences should be established at the earliest to cope with the shortage of paramedical staff, it said.

## 10 ABBREVIATIONS

ANC = Antenatal Care

ANM = Auxiliary Nurse Midwife

BPL = below poverty line

CBR= Crude Birth Rate

CHC = Community Health Centre

CHI= Community Health Insurance

DIT= Department of Information Technology

DSL= Digital Subscriber Line

ESI = Employee State Insurance

FRU = First Referral Unit

IFA = Iron and Folid Acid

IIT= India Institute of Technology

IMR = Infant Mortality Rate

ISM&H = Indian Systems of Medicine & Homoeopathy

ISRO= India Space Research Organization

JSY = Janani Suraksha Yojana

LHV = Lady Health Visitor

MMR = Maternal Mortality Rate

MPW = Multi-Purpose Health Workers

NFHS = National Family Health Surveys

PHC = Primary Health Centre

PPP= Public Private Partnership

PSU = Public Sector Undertaking

RPC = Reproductive and Child Health

SC = Scheduled Caste

SRS = Sample Registration Scheme/System

ST = Scheduled Tribe

TBA = trained birth attendant

TT = Tetanus Toxoid