

Final Report-Volume I

Study on Health Infrastructure in NCR

December 2015

National Capital Region Planning Board

Mott MacDonald

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Content

Tables

Figures

ABBREVIATIONS

ABBREVIATIONS	FULL FORM
AFMC	Armed Forces Medical College
AIIMS	All India Institute of Medical Sciences
ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy
BDS	Bachelor of Dental Surgery
BMS	Basic Minimum Services Programme
CCU	Critical Care Unit
CGHS	Central Government Health Services
CHC	Community Health Centres
CMHO	Chief Medical and Health officer
CMO	Chief Medical Officer
CRC	Complaints Resolution Committee
CSSD	Central Sterile Services Department
CTV	Cardio-Thoracic Vascular
DH	District Hospital
DLHS	District Level Health Survey
DTC	Delhi Transport Corporation
ECG	Electro Cardiogram
ENT	Ear Nose and Throat
ESIC	Employees' state Insurance Corporation
ESRI	Environmental Systems Research Institute
FHW	Female Health Worker
GIS	Geographic information system
GOI	Government of India
GPS	Global Positioning System
HQ	Head Quarter
ICU	Intensive Care Unit
IPD	Indoor Patient Department
IPHS	Indian Public Health Standards
J&K	Jammu and Kashmir
JJ	JJ Clusters
LHV	Lady Health Visitor
MBBS	Bachelor of Medicine, Bachelor of Surgery
MCD	Municipal Corporation of Delhi

ABBREVIATIONS	FULL FORM
MD	Doctor of Medicine
MDS	Master of Dental Surgery
MNP	Minimum Needs Programme
MPW	Multi-Purpose Worker
MRI	Magnetic resonance imaging
NCR	National Capital Region
NCRPB	National Capital Region Planning Board
NCT	National Capital Territory
NDMC	New Delhi Municipal Council
NGO	Non-Government Organization
NIC	National Informatics Centre
NICU	Neonatal Intensive Care Unit
NRHM	National Rural Health Mission
O&G	Obstetrics and Gynaecology
O&M	Operations & Maintenance
ONCO	Oncology
OPD	Outdoor Patient Department
OT	Operation Theatre
PGI	Post Graduate Institute
PHC	Primary Health Centres
PPP	Public Private Partnership
RSBY	Rashtriya Swasthya Bima Yojana
SCs	Sub-centres
SPSS	Statistical Package for the Social Sciences
TB	Tuberculosis
U.T	Union Territory
UDPFI	Urban Development Plans Formulation and Implementation
UP	Uttar Pradesh
USG	Ultrasound Sonography Test
WHO	World Health Organisation

Acknowledgement

Mott MacDonald is extremely thankful to the National Capital Region Planning Board (NCRPB) for assigning this important and prestigious Study.

We particularly express our profound gratitude to Shri B K Tripathi, IAS, Member Secretary, NCRPB; Shri Rajeev Malhotra, Chief Regional Planner, NCRPB; other officers of NCRPB; members of the Consultancy Review Committee for their kind co-operation and encouragement.
We acknowledge gratitude, the active participation and constant support of NCRPB during the project, enabling the widespread consultations with the State & National Institutions like Ministry of Health & Family Welfare, Department of Health & Family Welfare in NCR participating States (Rajasthan, Uttar Pradesh, Haryana), Directorate of Health for NCT Delhi, Medical Associations and Management of Private Multi Specialty Hospitals.

We express our sincere thanks to the Chief Medical & Health Officers of various districts of NCR Participating States, Medical Officers of Community Health Centers & Primary Health Centers, Management of private hospitals, patients and all other stakeholders who provided their inputs for the study. The output, in the form of report, is the result of the widespread consultation and participation of various stakeholders. We are grateful to each one of them.

We are extremely confident that this Report would go a long way in helping the NCR Participating State in their effort for improving the Health infrastructure in NCR. The report would also be helpful to academicians and researchers in understanding the Health related issues in NCR.

Executive Summary

Health Infrastructure is an important indicator to understand the healthcare delivery provisions and mechanisms in a country. National Capital Territory (NCT) Delhi is an area of relatively better availability of health infrastructure in comparison to rest of National Capital Region, which is another reason why (in addition to employment opportunities) population continues to be attracted towards Delhi.

Health care delivery in India is structured in three levels namely primary, secondary and tertiary based on population norms and it is same in most of the States except Delhi and some UTs like Chandigarh. When compared within NCR states, Delhi has a well-developed health infrastructure. The Delhi Government and the MCD form the backbone of the public health service delivery system in the city providing most of the health services in the public sector. Private health providers are also the key players in the NCT.

Delhi has been experiencing phenomenal growth of population since 1951 recording decennial growth rate of 52.44%, 52.93%, 53.00%, 51.45%, 47.02%, 20.96% during 1951-61, 1961-71, 1971-81, 1981-91, 1991-2001 and 2001-2011 decades respectively. One of the main causes for this spurt in the growth of population is migration into the city not only from the adjacent states but also from others such as Bihar. The growth of population of Delhi has contributed to increasing congestion and shortages of civic amenities. It has been felt that as Delhi grows, its problems of land, housing, transportation and management of essential infrastructure like water supply and sewerage would become more acute. It was with this concern that the need for planning Delhi in the regional context was felt.

The **National Capital Region** (NCR) in India is a name for the conurbation or metropolitan area which encompasses the entire National Capital Territory of Delhi as well as urban areas ringing it in neighbouring states of Haryana, Uttar Pradesh and Rajasthan. With a total area of about 33,578 sq. km, it is the world's largest urban agglomeration, can be divided into following;

- National Capital Territory of Delhi (1,483 sq kms). This accounts for 4.41% of the total area of NCR.
- Haryana Sub-region comprising Faridabad, Gurgaon, Rohtak, Sonepat, Rewari, Jhajjar, Mewat, Panipat and Palwal districts. This accounts for 30.33% (13,413 sq kms) of the area of the State and 39.95% of the area of NCR.
- Rajasthan Sub-region comprises Alwar district. The area is 2.29% (7,829 sq kms) of the total area of the State and 23.32% of the area of NCR.
- Uttar Pradesh Sub-region comprising five districts namely, Meerut, Ghaziabad including Hapur, Gautam Budhnagar, Bulandshahar and Baghpat. This accounts for 4.50% (10,853 sq kms) of the area of the State and 32.32% of the area of NCR.

Study Objective

To study the existing Health Infrastructure in National Capital Region with a view to perceive and incorporate a strategic plan of action for taking up the development of the same. The study would benefit in strengthening the population absorbing capacity of the NCR towns and improve the quality of life. The Plan would take into account the development of the social infrastructure with special focus on the health infrastructure in the regional development process. The study would enhance self-dependency and sustainability of individual settlements. It would also benefit in less dependency on the large settlements for health infrastructure and in turn would improvise the

social infrastructure at the grass-root level. Thus, the study gives an overall assessment of the health infrastructure at all levels.

Study Area

The study area covered 15 districts and the NCT of Delhi of the National Capital Region, as given below;

- National Capital Territory of Delhi (Walled City, North, South, East and West)
- Haryana (Panipat, Sonepat, Rohtak, Jhajjar, Gurgaon, Faridabad, Rewari, Mewat, Palwal)
- Uttar Pradesh (Baghpat, Meerut, Ghaziabad(including Hapur), Bulandshahar, Gautam Budhnagar)
- Rajasthan (Alwar)

Approach and Methodology

Secondary Research

Mott MacDonald Researchers carried out a thorough desk research of the available secondary data/ information relevant to the study and contacted a few key contacts from where secondary information was sourced including the Health Directorates of a few districts of NCR.

Review of secondary documents enabled us to have better understanding of the present health scenario and structure in NCR. We had also collected the available list of registered hospitals (Government and private) in the study area. Our team visited all the districts, conducted in-depth interviews with the Chief Medical Officers and validated the compiled data on available health infrastructure in the districts including government and private facilities. The validated list was further used for mapping of health infrastructure having inpatient facility in NCR.

Primary Research

The primary research through in-depth interviews with the District Health Officials and semi-structured interviews with hospital administrators, Doctors and Patients was undertaken in this Task.

A part of the study involved mapping of health infrastructure that has inpatient facilities in NCR. At this phase, the entire available health infrastructure having inpatient facility was visited and information was collected regarding the available facilities like beds, doctors, operation theatres etc. After mapping, the infrastructure has been categorised in different hierarchical levels in government sector like primary health centre, community health centre, sub-divisional / district hospital etc. and non-Government sector, like nursing homes, hospitals and referral facilities in both government and private sector.

Data Analysis & Tabulation

All the filled-in questionnaires from the field visit have been used for quantitative analysis. We had developed a holistic data analysis and tabulation plan, which was presented in the Interim Report-II stage for discussion. Final quantitative tables have been collated and analysed using Cardiff Teleform software and output tables have been generated in SPSS Software.

Assessment of Existing Health Infrastructure

About 32 percent of the government facilities are located in Haryana sub-region. Rajasthan sub-region has about 15 percent of the government facilities.

NCT Delhi has eight Primary Health Centres (PHCs), no Community Health Centres (CHCs) and 134 tertiary care hospitals, which includes general as well as speciality, super and multi-speciality hospitals. Apart from that there are 33 dispensaries (have also been mapped) which do not have any inpatient facility but only observation beds.

Analysis of the data collected shows that 1488 private hospitals are present in NCR sub-regions and NCT Delhi. Apart from NCT Delhi, multi and super-specialty private hospitals are present in Faridabad, Gurgaon, Panipat & Sonepat districts of Haryana sub-region and Gautam Budhnagar & Ghaziabad (including Hapur) districts of Uttar Pradesh sub-region.

Districts like Jhajjar, Mewat, Palwal, Rohtak and Baghpat have limited number of private health facilities as compared to others. NCT Delhi comprises 57 percent of the private health facilities, while NCR Haryana has nearly 24 percent.

The ratio of government to private health facilities in the NCR is 3:7. Haryana and Uttar Pradesh sub-regions comprise 24 and 17 percent of the private facilities respectively. NCR Rajasthan has only 2 percent of the private facilities.

Primary care government facilities constitute 17 percent of the total while tertiary level hospitals comprise 8 percent and 4.5 percent secondary care health facilities.

About 40 percent of the total facilities are private general hospitals and 26 percent are limited bedded nursing homes. The private multi and super specialty hospitals comprise only one percent of the total facilities. 2.5 percent of the facilities in private sector are charitable facilities.

Number of Doctors available in the surveyed facility

A total of 4535 general physicians and 1990 general surgeons are available in NCR sub-regions. Availability of doctors is highest in NCT Delhi.

On an average two general physicians are available in health facilities except in NCR Rajasthan, where the number of doctors is less. On the other hand availability of general surgeon is far less; except in Delhi, where on an average one general surgeon per health facility is available. Moreover, availability of general surgeon is more in private facilities than in government health centres. It is because most of the primary health centres do not have a general surgeon available.

On an average 1 to 2 gynaecologists are available in Private facilities and in government facilities of Delhi and Uttar Pradesh sub-region. However, the number is lower in government facilities of Haryana and alarmingly lower in NCR Rajasthan (Alwar district).

The availability of cardiologists is low especially in government sector. Only the cardiac centres and specialty hospitals have Cardio-Thoracic Vascular (CTV) Surgeons. Availability of Cardiologists and CTV Surgeons are concentrated in Delhi and also in selected districts of other sub-regions like Faridabad, Gurgaon, Ghaziabad (including Hapur) and also in Gautam Budhnagar, Panipat and Bulandshahar.

Private sector has higher availability of specialists like urologist and nephrologists. Sub-region wise availability of these medical specialists is higher in Delhi followed by NCR Uttar Pradesh.

Only 13 nephrologists and 17 Urologists are available in Government facilities. In NCR Rajasthan Government facilities neither of these specialists is available. Most of these specialists are available in private hospitals.

The availability of the Gastroenterologists (GE specialist) is less in Government sector. Out of total available 298 doctors in NCR, 195 are available in Delhi and out which 157 are in private facilities. Gurgaon in Haryana sub-region and Ghaziabad including Hapur in Uttar Pradesh sub-region of NCR have considerable number of Gastroenterologists followed by in Delhi.

A total of 438 neurologists and 184 neurosurgeons are available in NCR. 75 percent of the neurologists and nearly 65 percent of the neurosurgeons are based in Delhi followed by Ghaziabad including Hapur, Gautambudhnagar and Faridabad.

The average number of Oncologists is highest in Government facilities of Delhi, a total of 50 oncologists are available in Government hospitals of Delhi while 130 oncologists are available in private hospitals. Apart from Delhi, Oncologists are available in Government facilities only in Meerut. 70 percent of the total oncologists in NCR are available in Delhi, followed by Gurgaon, Ghaziabad, Meerut and Faridabad.The data indicates that except in Delhi, endocrinologists are available only in Private health facilities. 75 percent of the Specialists are available in Delhi followed by Ghaziabad, Gurgaon and Meerut.

One anaesthetist is available on an average per government hospital located in Delhi. 5 to 7 private hospitals and nursing homes out of 10 have anaesthetists in various NCR sub-regions except Rajasthan where only 10 anaesthetists are working, 3 in government facilities and 7 in private hospitals. Private hospitals of Delhi and Gurgaon have high number of anaesthetists, followed by in Ghaziabad, Hapur and Gautam Budhnagar.

Among different categories of AYUSH medical facilities, Ayurveda is most common. A total of 226 Ayurveda specialists are providing consultations to the patients in various NCR sub-regions. Out of them, 200 are available in Government facilities. Majority of them are available in health facilities of Delhi and NCR Uttar Pradesh. The Government facilities in Alwar District of NCR Rajasthan have about 40 Ayurveda specialists.

The next popular AYUSH category is Homeopathy. There are a total of 123 homeopaths in NCR out of which 68% are in Delhi. Also in Delhi, private and government health facilities have equal number of homeopaths. There are 11 Yoga, 1 Siddha and 85 Unani specialists in NCR, of which majority are available in Delhi.

Number of Paramedical staff available in the surveyed facility

There is a total of 35980 Paramedical staff available in NCR regions, out of which 15242 are available in Government health facilities.

On an average, 57 paramedical staff are available in government health facilities of Delhi while in private facilities of Delhi the average is 14 to 15 paramedics per facility. The private hospital and nursing homes of NCR Rajasthan have on an average 19 staff, while in government sector the average is only 10. In NCR Uttar Pradesh and Haryana, the average number of paramedics per facility in government sector is 6 to 8 while in private sector, the average is 15 to 16 in NCR UP while in Haryana it is 10.

Need Assessment & Gap Analysis

Availability and accessibility of health infrastructure is not merely the presence of physical infrastructure like healthcare centres, dispensaries, or hospitals but it needs to be manned by well trained staff with a service perspective. Thus, while assessing the gap in present health infrastructure in NCR we have included the gap in the human resources, viz, medical and paramedical staff in urban as well as rural health infrastructure.

Gaps in Health System

During interactions with the district health authorities Chief Medical Officer /Chief Medical and Health Officer (CMOs/CMHOs) and Civil Surgeons they opined that the three-tier in rural and two-tier in urban health are not functioning properly. The reasons for non-functionality are different for both the rural and urban regions. In rural areas the quality of services are sparse. Apart from this, most of the primary and secondary health care units in government are lacking basic health infrastructure thus, are unable to provide basic health care facilities and as a result lose trust of patients/community. The reason in urban area is different; in urban areas patients have access to tertiary care hospitals and rarely access the lower level.

Apart from the above, the availability of human resource is a huge gap in critical government healthcare institutions particularly in rural areas, which provide healthcare to the poorer segments of population. A large number of vacant posts of both ANMs and doctors are reported at the primary level in government hospitals. Other constraints include the low priority given to in-service training, inadequate staffing of training institutions, quality of trainers and inadequate facilities in training institutions. Gaps are mostly due to various reasons like;

- Vacant posts of medical and paramedical staff
- In addition to the shortage of service providers, the system is plagued by poor involvement and participation of those who are employed.
- There is a significant problem with the adequacy of working facilities (supplies and equipment) within these centres,
- There is lack of adequate access to the facilities that exist.
- Lack of effective monitoring and evaluation mechanism.
- Overburdening of tertiary care.
- It is observed that rural marginalised poor population is moving towards government tertiary care and well to do population is moving towards high end private hospitals. Thus, it is not true that patients of NCR are only moving towards NCT but it is poor patients who are moving towards NCT in search of better health services within their affordability.

Need assessment of Hospital Beds in NCR

As per IPHS norms for District Hospital, there should be 3.33 beds per 1000 population. Data also reveals that NCR has 65803 beds available in year 2011 against a requirement of 153411 beds which is only about 43 percent of the total requirement. Looking into sub region wise need it could be concluded that the gap in availability of beds is more in sub region Uttar Pradesh which is currently having only 20 percent of its required beds strength followed by Rajasthan having 22 percent of required beds and Haryana about 30 percent.

Our analysis shows that to fulfil current needs, the NCR requires about 2.3 fold increase in its present bed strength which will go up to five fold increase for 2036 (at current levels). Looking into sub region wise distribution of required beds, the sub region Uttar Pradesh needs the highest i.e about 5 fold increase in present situation which will increase to 7.5 times if considered for 2036.

Gap in Hospital Bed Population Ratio

A total 65803 beds is available in NCR out of which 42467 is in NCT Delhi. NCT Delhi has about 65 percent of the total available beds in NCR against about 36 percent of the total population of the NCR. Delhi is followed by sub region Haryana with 10,886 beds, Uttar Pradesh with 9,789 beds and Rajasthan with 2661 beds (Alwar is the only NCR district). The analysis of bed population ratio has been done using IPHS norms for District Hospital i.e.3.33 beds per 1000

population. The available bed-population ratio is 1.43 in NCR, 2.53 in NCT Delhi, 0.99 in Haryana, 0.72 Rajasthan and 0.67 Uttar Pradesh.

Need assessment in Number of Government Health Facility

Out of the total 170 government tertiary care facilities available in NCR, 79 percent is in NCT Delhi followed by about 12 percent in Haryana (catering to 24 percent of the NCR population), 9 percent in Uttar Pradesh (catering to 32 percent of NCR population) and 0.6 percent in Rajasthan (catering to 8 percent of the NCR population). Moreover it is apparent from the study that Delhi patients do not have secondary health care services as they are not available which is causing extra burden to the tertiary care services in NCR. Further, the sub region Haryana has better availability of tertiary care facility (54.1%), Rajasthan has better secondary health facility available (77.4%) and primary (59%) in comparison to other sub region excluding NCT Delhi.

Gap in number of Government Health Facility

Assessment of the data indicates that NCR excluding NCT Delhi has a gap of about 78 percent so far tertiary care is concerned followed by 60 percent in secondary health care facilities and 64 percent in primary health care facilities.

NCT Delhi lacks government supported secondary health care services and this is overburdening the tertiary care facilities (91.7%) of this region. While analysing this sub region wise, we can see that the gap in tertiary care is maximum in sub region Rajasthan followed by Uttar Pradesh (69.4%) and then Haryana (45.9%).

Analysis of Available Medical Colleges

Availability of appropriate and adequately trained human resources is an essential concomitant of Rural Health Infrastructure. Medical education infrastructure in the country has shown rapid growth during the last 20 years. The country has 314 medical colleges, 289 Colleges for Bachelor of Dental Surgery (BDS) courses and 140 colleges for Master of Dental Surgery (MDS) courses with total admission of 29,263 (in 256 Medical Colleges), 21547 and 2,783 respectively during 2010-11.There are 2028 Institutions for General Nurse Midwives with admission capacity of 80332 and 608 colleges for Pharmacy (diploma) with an intake capacity of 36115 as on 31st March, 2010.

NCR has 16 medical colleges out of which 37.5 percent is in Uttar Pradesh and Delhi each and remaining 25 percent in Haryana. The total student intake is 1930 in 16 medical colleges of NCR.

Constraints

Based on the data analysis and interactions/ discussions with the health facilities at various level of care in NCR, it is evident that the health system and infrastructure of NCR has constraints/gaps. These gaps, in turn, need interventions.

- **Non-functionality of the 3-tier health system**

The three tier system (PHC-CHC-DH) is not fully functional/ effective as per the NRHM stipulations/ guidelines. The reasons for non-functionality are similar for the rural and urban regions i.e. non-availability of adequate number of health facilities (Primary/Secondary/Tertiary care) and poor quality of services due to lack of manpower. The gap is more prominent when looked at sub region level; status of Uttar Pradesh is poor as the sub region is not able to provide primary health facility to about three-fourth of its population, followed by Haryana sub region

which is about three-fifth and Rajasthan where two-fifth of the population remain underserved so far primary health care services are concerned.

In rural areas the quality of services are further sparse for example most of the primary and secondary Government health care units (in Uttar Pradesh and Haryana) lack basic health infrastructure, thus they have lost the trust of patients/community. Thus, patients prefer to visit the tertiary care for even minor problems. This tendency is creating unnecessary load on the tertiary care health services and less utilisation of lower health care services. Due to this, the tertiary care units are not able to provide adequate care to the referral patients who visit the facility for getting specialised services.

- **Inadequate availability of human resources**

NCR has a gap of about 57 percent so far as availability in number physicians is concerned, the gap becomes wider when analysed for respective sub regions. The gap is maximum in Rajasthan (79.2%) followed by Uttar Pradesh (71.6%), Haryana (54.1%) and Delhi (41.7%).

However, the gap in availability of paramedical staff is a serious concern which needs immediate attention as NCR has a gap of about 64 percent which becomes more severe when analysed for sub regions, gap is maximum in Uttar Pradesh (80.7%) followed by Rajasthan (78%), Haryana (77.9%) and Delhi (31%).

- **Improper spread of Health Infrastructures in NCR Sub Region**

It is evident from the spatial analysis that tertiary health care facilities are concentrated in the District Centres and on Delhi border for other NCR sub regions. Looking into sub region wise spatial gap, one can see that in all districts of Haryana Sub Region (except Rohtak district), health facilities are located either near district centre or towards Delhi Border (e.g in Bahadurgarh for Jhajjhar) leaving the remaining part of the region underserved.

The condition is same for sub region Uttar Pradesh. Out of five districts of UP falling in NCR, except for Baghpat, Bulandshaher and Meerut the dispersion of medical health facilities is not proper. Also, the number of tertiary and speciality health facilities is very less in Uttar Pradesh, failing the uniform access to health facilities.

- **Augmentation needs of Infrastructure and related projects**

The data analysis indicates that there is a general lack of health facilities (CHC/PHC/Sub-DH) across NCR, which includes

- Less number of health facilities as per IPHS norms
- Less number of functional beds within each facility

There is also non-availability of required medical equipments in Government health facilities, the reasons being

- Non procurement of equipments due to lack of staff(to operate them) or infrastructure /building (to house them)
- The equipments that have been procured are non functional due to lack of proper maintenance.

- **Gaps in specialised services**

Some specialised services are not available in Government facilities like: Oncology, Paediatric Surgery, Cardiology, Neurology etc.

- **Lack of clear policy on Public Private Partnership Related Projects**

The sophisticated medical equipments that offer treatment using advanced technology are quite expensive and hence are available in only selective Government Health institutions. In order that these are available in Government Hospitals and that there is regular Operation and Maintenance (O&M) of the same, the private sector can be encouraged. However, in order that the private players are encouraged to participate in PPP, they have to be given incentives and accordingly certain policy directives need to be put in place.

Action plan

The major constraints that analysed were the shortage of physical health infrastructure and shortage of adequate and skilled manpower. Our recommendations for overcoming the shortfall have been detailed as follows:

Strengthening and Effective functioning of the 2 and 3 tier Health system

It was observed that the tier-system of Health services is not functioning effectively thereby leading to overburdening of higher level of health care facility i.e. Tertiary care. The failure of the public delivery system through the tier-system is an outcome of systematic breakdown of accountability within the institutional framework. The institutional framework of entire health system should be strengthened by introducing systematic monitoring which was also thought of in NRHM, but not implemented in proper mechanism. For strengthening the system, the following action can be taken:

Strengthening the institutional framework by establishing specialized units

Dedicated separate and specialized units within the system should be set up immediately which will look at the four activities: A) Planning B) Implementation C) Monitoring D) Financial Management. This activity will definitely enable to strengthen the existing institutional framework for efficient service delivery.

Strengthening the Monitoring & Evaluation System

The Monitoring unit would need to take up specific action including: A) Strengthening HMIS by developing software & reporting formats B) Conducting frequent Review Meetings preferably on monthly basis C) Physical verification of hospitals to verify the quality and efficiency of services provided to the patients.

Ensure adequate availability of human resources

Our analysis reveals that there is huge gap in human resources. It is natural that it cannot be met at a go and it requires a long term dedicated and systematic intervention. However, effective management and recent techniques can add value to the interventions and can provide a spurt to it. Apart from this, certain systematic actions such as improvement in remuneration (incentive based system) and promotion to the deserving and committed individuals (disregarding seniority) should be taken up on priority basis. Moreover, rural public health facilities across the country are unable to attract and retain trained medical professionals, hence policy level directives like “MUST PLACEMENT” for all medical doctors should be enforced.

Ensuring Adequate Spread of Health Infrastructure

This study has enabled to map the health facilities in the NCR. It is recommended that in future as State Governments provide approvals to the private sector for setting up of new health infrastructure, the spatial spread is taken into consideration. Some state specific incentives (preferably in select districts lacking the basic health infrastructure) may be offered to the private sector for them to be encouraged to make the investment in the backward districts.

Augmentation of the Infrastructure and related projects

It was observed during gap analysis that adequate number of health infrastructure is not available in NCR and that more health facilities are required. It was observed that private sector is filling in the requirements to an extent and their role is rapidly expanding. Today, the private sector health care provision in urban areas is *greater* than that of the public sector. But the private health care network is not present in remote and far flung habitations and in the absence of adequate penetration by public sector health centres, these areas remain unserved. The following actions need to be taken up systematically and on immediate basis.

Establishment of PHCs, CHC, sub divisional & District hospitals adhering to IPHS norms

The study indicates the requirement of 69 tertiary care, 287 secondary care and 627 primary care units in the NCR region. Looking into sub region wise gap, there is a huge gap in Uttar Pradesh as compared to the other sub regions followed by Haryana. Thus, construction of new health facilities as per the IPHS norms should be created without delay. The total cost of establishment of new health infrastructure in NCR will cost around INR 4643 Crores. Out of this, INR 1902 Crores is required for Uttar Pradesh sub-region followed by Haryana (INR 1097 Crores).

Ensuring specialisation in Government as well as in private facilities

Gap in specialised services is also a major concern and augmentation of specialised services requires huge funds thus, such services could be made available following suggestions as mentioned below;

- Creating new hospital in PPP mode at district level with all required specialisation.
- Upgrading district hospital to a multi-speciality hospital with some services outsourced in PPP and hiring specialist doctors on consultant basis
- By Building Public Private Partnership – Empaneling doctors

Extending Telemedicine

Information Technology can be used for making health care provision accessible to remote areas. As mentioned above many doctors are not willing to serve in the rural areas due to lack of facilities even if they are paid high salaries. However, as telecom network is spreading swiftly and the Government is keen to provide broadband connectivity to all parts of the country, information technology can effectively be harnessed to improve the delivery of health services.

Tele-Preventive Medicine can also be used, the term ‘tele-preventive medicine’ is defined as the use of the internet to collect information from large number of people (both healthy and sick) to prevent outbreak of disease. Though health concerns are increasingly crossing geographical boundaries (bird flu, HIV and so on), training of students in epidemiology/prevention is still a very local phenomenon and should be taken up which can be further clubbed with the facility of telemedicine.

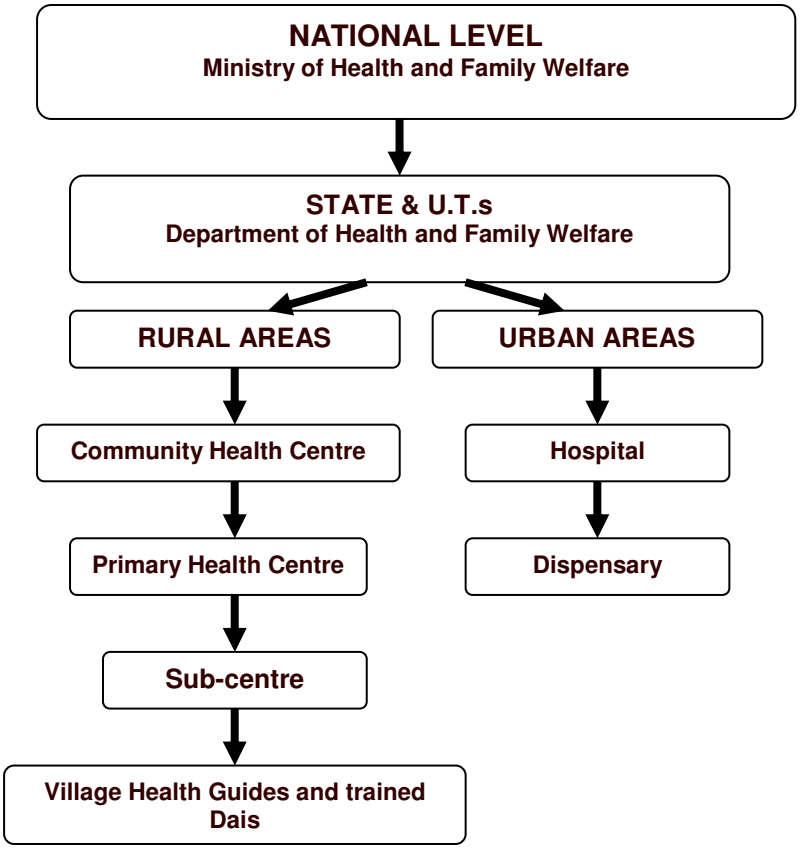
1. Introduction

Health Infrastructure is an important indicator to understand the healthcare delivery provisions and mechanisms in a country. National Capital Territory (NCT) Delhi is an area of relatively better availability of health infrastructure in comparison to rest of National Capital Region, which is another reason why (in addition to employment opportunities) population continues to be attracted towards Delhi. This sector thus requires immediate attention and prompt action so that adequate steps could be taken to rectify the situation. Acknowledging the importance of this sector National Capital Regional Planning Board has commissioned the present study to Mott MacDonald so that health infrastructure gaps can be identified.

1.1 Health System in India

Health in India is the responsibility of the State Governments under the policy framework and guidelines of the National Health Policy. The Central Council of Health and Family Welfare formulate the various health care projects and Health Department reform policies. The administration of health industry in India as well as the technical needs of the health sector is the responsibility of the Ministry of Health and Family Welfare, Government of India. Health care in India has many forms, viz, the allopathic, the ayurvedic medicine practice, Unani or Galenic Herbal Care, Homeopathy, Yoga, and many more. Each different healthcare form has its own treatment system and practice patterns.

Figure 1.1: The Health System Infrastructure in India



Source: Based on various health guidelines

Health care delivery in India is structured in three levels namely primary, secondary and tertiary based on population norms and it is same in most of the States except Delhi and some UTs like Chandigarh. The common structure of Health system in India is mentioned in Figure 1.1.

Primary Health Care - First level of care to the population is called primary level, Sub Centre and Primary Health Centre falls in this level

Secondary Health Care- Second level of care to population is called Secondary health care, District Hospital and Community Health Centre falls in this level

Tertiary Health Care -Third and higher level of health care is called Tertiary Health Care, Nursing homes, speciality and super-speciality hospitals falls in this level.

District Hospital- District hospital is an essential component of the district health system and functions as the secondary level of health care which provides curative, preventive and promotive healthcare services to the people in the district.

Every district is expected to have a district hospital linked with the public hospitals/health centres down below in the district (Sub-district/Sub-divisional hospitals, Community Health Centres, Primary Health Centers and Sub-centres). As per the available secondary information, there are 609 districts in the country having about 615 district hospitals. In some cases, the medical college hospitals or a sub-divisional hospital serves as a district hospital where a district hospital as such (particularly in case of newly created districts) has not been established. Some districts have also more than one district hospitals. Various specialists like surgeon, physicians, obstetricians and gynaecologists, paediatrics, orthopaedic surgeon, ophthalmologists, anaesthetists, Ear Nose and Throat (ENT) specialists and dentists have been placed in the district hospitals.

The district hospitals cater to the people living in urban (district headquarter towns and adjoining areas) and the rural people in the district. The District hospitals are required to work not only as curative centres but also as interface with the institutions external to it including those controlled by non-government and private voluntary health organization. The current functioning of the most of the public district hospitals are not up to the expectation especially in relation to availability, accessibility and quality. The staff strength, bed strength, equipment supply and service availability and population coverage are not uniform among all the district hospitals.

Community Health Centres (CHCs)-The secondary level of health care system includes Community Health Centres (CHCs), constituting the First Referral Units (FRUs). The CHCs were designed to provide referral health care for cases from the Primary level and for cases in need of specialist care approaching the centre directly. In all, 4 PHCs are included under each CHC, thus catering to approximately 80,000 populations in tribal / hilly areas and 1,20,000 population in plain areas. CHC is a 30-bedded hospital providing specialist care in Medicine, Obstetrics and Gynaecology, Surgery and Paediatrics.

Primary Health Centers (PHCs)- These are the cornerstone of rural health services in India- the first point of call of a qualified doctor of the public sector in rural areas for the sick and those who directly report or are referred from Sub-centres for curative, preventive and promotive health care. It acts as a referral unit for 6 sub -centres and refer out cases to Community Health Centres (CHCs) and higher order public hospitals at sub -district and district levels. It has 4-6 indoor beds for patients. The nomenclature of a PHC varies from State to State- may include a Block level PHCs (located at block Head Quarter (HQ) and covering about 100,000 population and with varying number of indoor beds) and additional PHCs/New PHCs covering a population of 20,000-30,000 etc. The standards prescribed in National Rural Health Mission Document say that a PHC is supposed to be covering 20,000 to 30,000 populations and should have 6 beds.

The PHCs are established and maintained by the State Governments under the Minimum Needs Programme (MNP)/ Basic Minimum Services Programme (BMS). As per minimum requirement, a PHC is to be manned by a Medical Officer supported by 14 paramedical and other staff.

Sub-centre (SCs)- Sub-centre is the most peripheral and first contact point between the primary health care system and the community. It is set up based on the population norms- one Sub-centre is established for every 5000 population in plain areas and for every 3000 population in hilly/tribal/desert areas. It is the lowest rung of a three-tier set up with referral linkage to the Primary Health Centre (PHC). A Sub-centre provides interface with the community at the grass-root level, providing all the primary health care services of particular importance -the package of services such as immunization, antenatal, natal and postnatal care, prevention of malnutrition and common childhood diseases, family planning services and counselling.

Currently a Sub-centre is staffed by one Female Health Worker commonly known as Auxiliary Nurse Midwife (ANM) and one Male Health Worker commonly known as Multi-Purpose Worker (Male). One Health Assistant (Female) commonly known as Lady Health Visitor (LHV) and one Health Assistant (Male) located at the PHC level are entrusted with the task of supervision of all the Sub-centres (generally six sub-centres) under a PHC. Sub-centres provide elementary drugs for minor ailments such as ARI, diarrhoea, fever, worm infestation etc. and carryout community needs assessment. Besides the above, the Government implements several National Health and Family Welfare programmes which are delivered through the frontline workers responsible for smooth operations of the sub-centres.

1.2 Health Infrastructure in Delhi

Delhi has Super Speciality Hospitals, District Hospitals, Mother and Child Welfare Centres, Dispensaries but no functional PHCs, CHCs and Sub-centers. The hierarchal levels of health care infrastructure is different as all the primary units are directly under Delhi State Government or the Department looking after like Municipal Corporation of Delhi (MCD), Indian Population Project (IPP) VIII, Delhi Government, Delhi Transport Corporation, State Bank of India, Delhi Jal board, CGHS etc. The NRHM fund is, however, being routed through Delhi Government and goes directly to the respective facility.

When compared to other states, Delhi has a well developed health infrastructure. The Delhi Government and the MCD form the backbone of the public health service delivery system in the city providing most of the health services in the public sector. Private health providers are also the key players in the NCT.

At the primary health care level, Delhi has a wide network of dispensaries providing primary health care through Delhi Government, the MCD, the NDMC, the Cantonment Board, CGHS, ESIC, Railways etc. Besides there are a number of supplementary health services available like the School Health Clinics, Mobile Dispensaries etc. In order to improve access of health services to the urban poor, the World Bank initiated the India Population Project -VIII (IPP-VIII). Delhi was one of the cities in which this project was being implemented since August 1994. Under this project, the MCD has opened Maternity Homes, Health Centres and Health Posts to improve maternal and child health care, as well as family planning services. The funding for this project from the World Bank has ceased and the facilities created under the programme are being managed by the MCD.

Though the situation of health services in Delhi is much better than in other states but there are certain areas which require attention- these include provision of health services to the large and rapidly growing urban poor habitations in the city which include 'Jhugi Jhopri' (JJ) clusters, unauthorized colonies, resettlement colonies and pavement dwellers. The hospitals in Delhi also cater to a large number of patients form other states. It is estimated that nearly 33% of the load in secondary facilities in Delhi is from neighbouring states *(Source: Economic Survey 2007-08,*

Government of the National Capital Territory of Delhi). This leads to further strain on the existing infrastructure in the city. Also, while some facilities and schemes are managed by the Government of Delhi, some are managed by the MCD and NDMC.

1.3 Study Background

Delhi has been experiencing phenomenal growth of population since 1951 recording decennial growth rate of 52.44%, 52.91%, 52.98%, 51.45% and 47.03% during 1951-61, 1961-71, 1971-81, 1981-91 and 1991-01 decades respectively. One of the main causes for this spurt in the growth of population is migration into the city not only from the adjacent states but also from others such as Bihar. The growth of population of Delhi has contributed to increasing congestion and shortages of civic amenities. It has been felt that as Delhi grows, its problems of land, housing, transportation and management of essential infrastructure like water supply and sewerage would become more acute. It was with this concern that the need for planning Delhi in the regional context was felt.

The **National Capital Region** (NCR) in India is a name for the conurbation or metropolitan area which encompasses the entire National Capital Territory of Delhi as well as urban areas ringing it in neighbouring states of Haryana, Uttar Pradesh and Rajasthan. With a total area of about 33,578 sq. km, it is the world's largest urban agglomeration, can be divided into following;

- National Capital Territory of Delhi (1,483 sq kms). This accounts for 4.41% of the total area of NCR.
- Haryana Sub-region comprising Faridabad, Gurgaon, Rohtak, Sonepat, Rewari, Jhajjar, Mewat, Panipat and Palwal districts. This accounts for 30.33% (13,413 sq kms) of the area of the State and 39.95% of the area of NCR.
- Rajasthan Sub-region comprises Alwar district. The area is 2.29% (7,829 sq kms) of the total area of the State and 23.32% of the area of NCR.
- Uttar Pradesh Sub-region comprising five districts namely, Meerut, Ghaziabad including Hapur, Gautam Buddha Nagar, Bulandshahr and Baghpat. This accounts for 4.50% (10,853 sq kms) of the area of the State and 32.32% of the area of NCR.

The concept of National Capital Region was mooted in first master plan of Delhi notified way back in 1962. The aim of the concept was to develop a metropolitan area around Delhi, so as to divert increasing pressure of population from the region. The concept was essential in order to protect Delhi's infrastructure from excessive pressure and a planned development of the region.

The Regional Plan-2021 for National Capital Region was prepared and notified by NCR Planning Board in September 2005 as per provisions of the NCRPB Act 1985. The Regional Plan-2021 aims *"to promote growth and balanced development of the National Capital Region"* as per Section 10, Sub-section (2) of the Act, 1985. The Regional Plan-2021 proposes "to harness the spread of the developmental impulse and agglomeration economies generated by Delhi for harmonized, balanced and environmentally sustainable spatio-economic development of the NCR with effective cooperation of the participating States".

The Regional Plan-2021 for NCR also recognizes the need to adopt integrated approach for the entire NCR in social infrastructure development (which includes medical facilities) to avoid the problems arising out of disparities in standards of these facilities and the jurisdiction. The solution to the problem lies in making provision for quality social infrastructure including medical facilities in the towns falling outside Delhi in NCR. If good institutions are established in the surrounding areas, the people would definitely like to move out of Delhi, thus helping in decongestion.

1.4 Study Objective

To study the existing Health Infrastructure in National Capital Region with a view to perceive and incorporate a strategic plan of action for taking up the development of the same. The study would

benefit in strengthening the population absorbing capacity of the NCR towns and improve the quality of life. The Plan would take into account the development of the social infrastructure with special focus on the health infrastructure in the regional development process. The study would enhance self-dependency and sustainability of individual settlements. It would also benefit in less dependency on the large settlements for health infrastructure and in turn would improvise the social infrastructure at the grass-root level. Thus, the study would give an overall assessment of the health infrastructure at all levels.

1.5 Need for the Study

The Regional Plan 2021 aims to promote growth and balanced development of the NCR by providing suitable economic base and adequate infrastructure facilities in urban and rural settlements outside NCT Delhi. The Plan has specifically recognised the growth stimulating and sustainable role of social infrastructure including health infrastructure in the regional development process. Physical infrastructure improves the connectivity of the region and builds the base to undertake economic and development activities, however the sustainability of the growth process is dependent on the availability of the social infrastructure including the health infrastructure for the human resources to effectively utilise the physical infrastructure.

The effectiveness of health infrastructure in achieving the objectives of the Regional Plan 2021 would depend upon its capacity to contribute to:

- Population absorbing capacity of settlements
- Improvement in the quality of life
- Enhanced self-dependency and sustainability of individual settlements
- Creation of liveable and inclusive settlements, where social and economic benefits also accrue to the poor and other marginalised groups
- Promotion of less dependence on large settlements for health infrastructure

Promotion of a sense of belonging with the town/ settlement seems to be lacking due to inadequate provision and non-up gradation of social infrastructure.

NCT Delhi is an area of relatively better availability of health infrastructure while rest of NCR, especially rural areas are generally deficient in these facilities. A large chunk of people continue to be attracted towards Delhi for employment opportunities. This leads to huge flow of patients to the health facilities in Delhi. This sector thus requires an immediate attention and prompt action so that adequate steps could be taken to rectify the situation. This calls for a need assessment of the quantity and quality of health infrastructure facilities available in the region especially outside NCT Delhi and identify the demand and supply gap. Such an assessment would lead to normative analysis against well-established parameters such as beds per 1000 population or distance to the nearest medical facility. It will help in formulating remedial policies for this sector, identification of projects, formulation of an investment plan and examination of the possibility of private sector participation to a larger extent. Accordingly, the study on existing health Infrastructure in the NCR has been commissioned by NCRPB to Mott MacDonald.

1.6 Study Area

The study area covers 15 districts and the NCT of Delhi of the National Capital Region, as shown in the map and detailed below;

- National Capital Territory of Delhi
- Haryana (Panipat, Sonepat, Rohtak, Jhajjar, Gurgaon, Faridabad, Rewari, Mewat, and Palwal)
- Uttar Pradesh (Baghpat, Meerut, Ghaziabad including Hapur, Bulandshahr, and Gautam Budh Nagar)
- Rajasthan (Alwar)

Figure 1.2: National Capital Region

Source: NCRPB

1.7 Scope of Work

The scope of work of the study includes:

- Literature survey – a brief discussion of previous works related to various aspects of health infrastructure in NCR
- Assessment of existing infrastructure facilities as per level of care (primary, secondary, tertiary including super-speciality) at different hierarchical levels in government sector, like sub centre, primary health centre, community health centre, govt hospital, sub-divisional hospital, and non-govt sector, like dispensary, nursing home, clinic, hospital and referral facilities in both government and private sector. The information to be provided on a Geographic information system (GIS) map.
- Assessment of health care related services such as ambulance, no. of beds, etc.
- Primary survey in major referral hospital to assess the number of patients, types of diseases, no. of patients referred to hospitals from outside NCR/ by location.
- Indian systems of medicine (AYUSH) in NCR – facilities available, relevance, etc. Needs assessment and study of population characteristics and assessment of current & future needs on the basis of population projection (demand-supply gap).
- Study of norms and policies of WHO, IPHS norms, Government of India and constituent states of NCR i.e. beds/population ratio, doctor/population ratio (i.e. population norms), accessibility norms, etc. and prepare a comparative and accordingly recommend optimum norms for NCR for urban and rural areas.
- Identification of sub-region wise & district-wise issues, problems and future health infrastructure requirements to meet likely demand.
- Preparation of action plan, identification of projects in different Sub-regions/districts of NCR and possibility of public-private partnership for provision of new facilities.
- Conducting a workshop (about 100 participants) with the participating States and concerned stakeholders before finalizing the report.

1.8 Approach and Methodology

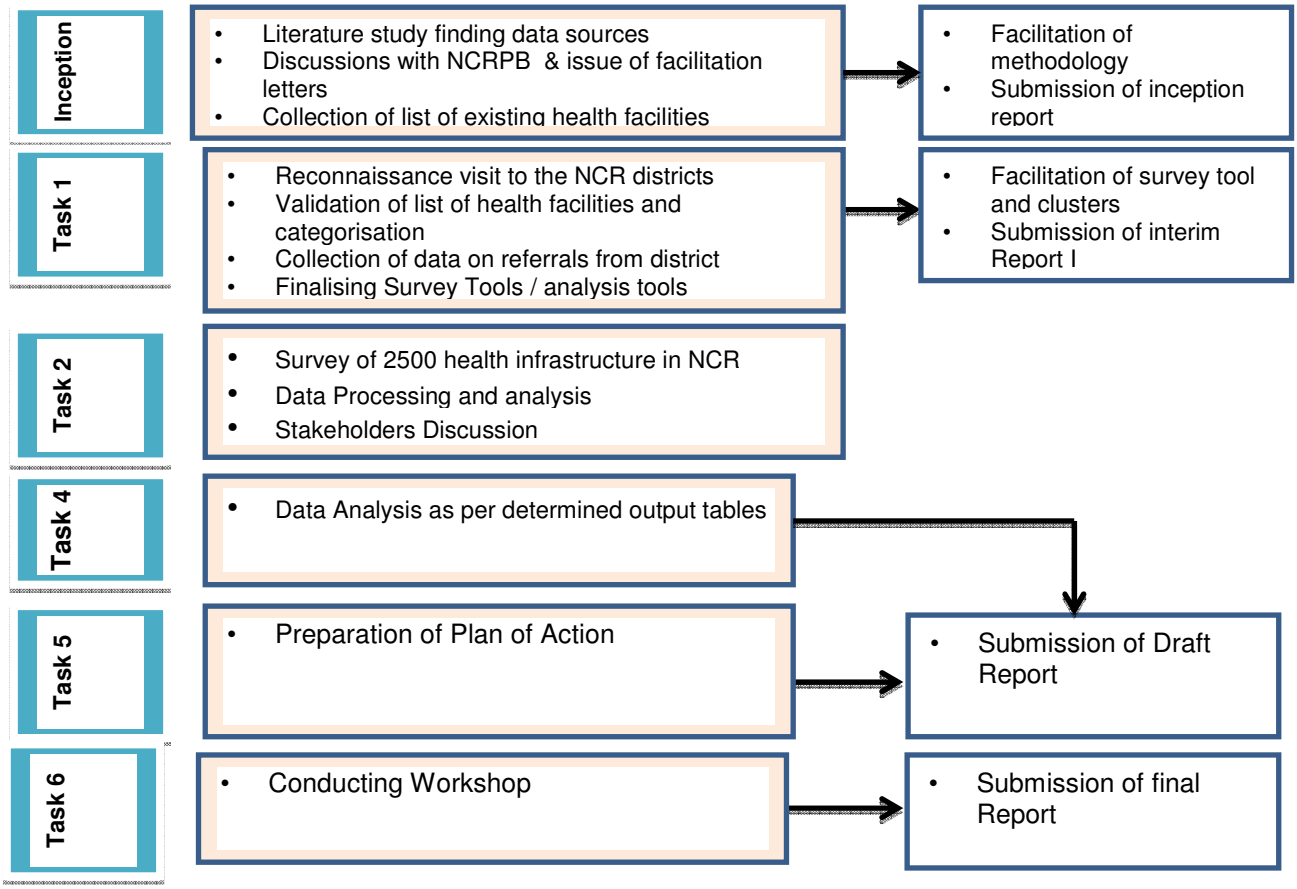
Our Approach and Methodology for undertaking the above tasks have been presented earlier in the Inception Report and Interim Report I and finalised during discussions held during the earlier Presentation Meeting dated 29.07.2010. Scope vis-à-vis conducted activities under the study are mentioned in Appendix K. The finalised approach & methodology and activities undertaken are briefly described below.

1.8.1 Task 0: Secondary Research

Mott MacDonald Researchers carried out a thorough desk research of the available secondary data/ information relevant to the study and contacted a few key contacts from where secondary information was sourced including the Health Directorates of a few districts of NCR. The documents referred are as follows;

- District Level Health Survey (DLHS)-III of relevant districts,
- Annual Report of Ministry for the Health & Family Welfare, Government of India
- Health Infrastructure related data from District National Informatics Centre (NICs)
- Health Infrastructure related data collected from Medical Associations at District levels
- District Statistical Handbook
- Various guideline and norms studied from National Rural Health Mission (NRHM) Document, District level Project Implementation Plans were also accessed for calculation of block cost
- Indian Public Health Standards for different health care structures

Figure 1.3: Approach and Methodology



Source: Study Methodology

Review of above mentioned documents enabled us to have better understanding of the present health scenario and structure in NCR. We have also collected the available list of registered hospitals (Government and private) in the study area.

Task 1: Reconnaissance Visit to the NCR districts

As part of this task, our team had visited all the districts in NCR and collected data on available health infrastructure (Government & private) from the respective authorities for following:

1.8.1.1 Activity A: Validation of Collected Secondary data

As mentioned above we had visited all the districts, conducted in-depth interviews with the Chief Medical Officers (interview schedule attached as Appendix D) and also collected data on available health infrastructure in the districts including government and private facilities and referral hospitals. This activity had two sub activities:

- **Activity A1: Validation of the compiled list of health Infrastructure:** our team visited all the districts, conducted in-depth interviews with the Chief Medical Officers and validated the compiled data on available health infrastructures in the districts including government and private facilities. The validated list was further used for mapping of health infrastructure having inpatient facility in NCR.
- **Activity A2: Collecting data on Referral Hospitals and selection of Referral Hospitals for Primary Research:** During this, we had collected data on referral hospitals. *(Any hospital, including a district hospital/CHC/PHC, receiving referrals from lower levels of care is categorised as Referral Hospital.*

District authorities were also asked about the hospital in their district, which get most of the referrals. Almost all the CMOs told us that they only refer patients to the next level of government hospitals thus; no private referrals are done by any of the government facility. However, they have provided us names of few hospitals which are visited by patients who need to consult some higher level and get some specialised services. List of referrals for each of the districts (NCR including Delhi) is provided in Table 1.1.

Table 1.1: Referal Hospitals in NCR (based on data as provided by Health Officials of each District)

Sl. No	Name of District	Referral Hospital (Government/Private)
1	Mewat	District Hospital, Alwar
		Govt Hospital Gurgaon
2	Jhajjar	Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak
3	Rohtak	Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak
		PGI, Chandigarh
4	Rewadi	Vardhaman Mahavir Safdarjung Hospital, Delhi
		RML, Delhi
		All India Institute of Medical Science, Delhi
5	Sonepat	Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak
		All India Institute of Medical Science, Delhi
		St.Stephens Hospital
6	Panipat	Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak
		All India Institute of Medical Science, Delhi
		St.Stephens Hospital
7	Faridabad	Vardhaman Mahavir Safdarjung Hospital, Delhi
		Sarvodaya Hospital
		Escorts Hospital and Research Centre
8	Palwal	Vardhaman Mahavir Safdarjung Hospital, Delhi
		District Hospital Faridabad
9	Gurgaon	Vardhaman Mahavir Safdarjung Hospital, Delhi
		Umkal Hospital and M. P. Heart Research Institute
		Artemis Health Institute
10	Baghpat	Guru Teg Bahadur Hospital, Dilshad Garden, Delhi
		Narinder Mohan Hospital
11	Gautam Budha Nagar	Guru Teg Bahadur Hospital, Dilshad Garden, Delhi
		Kailash Hospital & Research Centre
		Fortis Hospital
12	Ghaziabad including Hapur	Guru Teg Bahadur Hospital, Dilshad Garden, Delhi
		Narinder Mohan Hospital
13	Meerut	District Hospital Meerut
		Subharathi Medical College
		Lockpriya Hospital
14	Bulandshahr	Medical College
		All India Institute of Medical Science, Delhi
15	Alwar	PGI, Jaipur
		All India Institute of Medical Science, Delhi
16	North Delhi	Aruna Asaf Ali Hospital, Delhi.
		Hinu Rao, Delhi
		Vardhaman Mahavir Safdarjung Hospital, Delhi
		All India Institute of Medical Science, Delhi
17	North- East Delhi	St.Stephens Hospital
		Guru Teg Bahadur Hospital, Dilshad Garden, Delhi
18	North-West Delhi	Dr. Ambedkar Hospital, Rohini, Sector-6

Sl. No	Name of District	Referral Hospital (Government/Private)
		Sant Parmanand Hospital
		Jaipur Golden Hospital
		Rajiv Gandhi Cancer Institute and Research Centre
		Sanjay Gandhi Hospital, Mangolpuri
		G.B.Pant Hospital, Delhi
		Guru Teg Bahadur Hospital, Dilshad Garden, Delhi
19	East Delhi	Dharamshila Hospital, Vashundhara, Delhi
		Lok Nayak Hospital, Delhi
		G.B.Pant Hospital, Delhi
		Sir Ganga Ram Hospital
		Dr.Shroff's Charity Eye Hospital
20	Central & New Delhi	Guru Nanak Eye Centre, Delhi
		Vardhaman Mahavir Safdarjung Hospital, Delhi
		G. M. Modi Hospital & Research Centre
		All India Institute Of Medical Science, Delhi
21	South Delhi	Indraprastha Apollo Hospital
22	South-West Delhi	Moolchand K R Hospital
		Sufdarjung, Delhi
		Moolchand K R Hospital
23	West Delhi	Vardhaman Mahavir Safdarjung Hospital, Delhi
		Action Medical Institute

Source: Study Sample

Based on information furnished by the District Health Officials, we sampled 11 tertiary referral hospitals in NCR for conducting in-depth interviews with the prime stakeholders like hospital administrative staff, patients and doctors in due consultation with NCRPB. These referral hospitals as presented in Table 1.2 were approved by NCRPB in the Interim Report 1 stage.

Table 1.2: Referal Hospitals in NCR selected for Primary Research

SL.No.	Referral Hospitals	Location
1.	Govind Ballabh Pant Hospital	Delhi
2.	Guru Teg Bahadur Hospital	
3.	St. Stephens Hospital	
4.	Vardhaman Mahavir Safdarjung Hospital	
5.	Dharamshila Hospital, Vasundhara	
6.	All India Institute Of Medical Science*	
7.	Fortis Escorts Hospital, Faridabad	Haryana
8.	Medanta The Medicity, Gurgaon	
9.	Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak	
10.	Kailash Hospital, Noida	Uttar Pradesh
11.	Narinder Mohan Hospital, Ghaziabad	

Source: Study Sample

1.8.1.2 Task 2: Primary Research

The primary research through in-depth interviews with the District Health Officials and semi-structured interviews with hospital administrators, Doctors and Patients was undertaken in this Task. The checklists, which were designed and finalised during inception phase and approved by NCRPB have been used for data collection. The activities under this task are as follows:

1.8.1.3 Activity B: Actual Mapping of Health Infrastructure

This part of the study involved mapping of health infrastructures that has inpatient facilities in NCR, categorising them as per level of care and then putting them in the GIS map. At this phase, all the available health infrastructure having inpatient facility was visited and information was collected regarding the available facilities like beds, doctors, operation theatres etc (interview schedule attached as Appendix D) After mapping, the infrastructure has been categorised in different hierarchical levels in government sector like primary health centre, community health centre, sub-divisional / district hospital etc. and non-Government sector, like nursing homes, hospitals and referral facilities in both government and private sector.

Under this activity, we have collected the details of available health infrastructure in a simple format (approved by NCRPB in the Inception Stage), information regarding the available facilities like beds, doctors, operation theatres etc. and have also collected Global Positioning System (GPS) points of each infrastructure based on which they have been plotted in GIS maps (in the map provided by NCRPB) as per the category of facilities like public, private, primary, secondary and tertiary units.

1.8.1.4 Activity C: Orientation for Field Work

The dedicated team comprising two groups - one of core researchers and the other of team members and supervisors were involved in visiting the study sites and collecting relevant information from the stakeholders of the study. The core research team was also involved in monitoring/supervising the field work regularly for quality inputs.

A two-day orientation programme was organised for the team members and supervisors who are involved in the study. The Team Leader/Project Manager of Mott MacDonald had imparted training and the interviewers were briefed about the study, its objectives, interviewing techniques, filling up questions, coding, skip pattern, field procedures etc. Field Supervisors had received additional training to learn how to conduct consistency checks and assess data accuracy, monitoring procedures and back checks in the field. During data collection, the researchers moved with their teams in order to facilitate monitoring and to adhere to the overall time schedule of the survey.

1.8.1.5 Activity D: Contacting Referral Hospitals

The respondents for this phase were the following:

- Hospital Administration
- Doctors
- Patients

As part of this activity of the study, the Hospital Administration of each selected hospital was contacted initially for collecting information in pre-designed formats and also to get permission for further interviews with patients and doctors. Hospital Administration had provided us exact information on existing scenario regarding the common illness/reasons (e.g. accidents, abuse) for which majority of the patients arrive, the region they belong to, as well as the affordability scenario.

Next, the doctors were contacted and they provided us insights on the gravity of the problem with which the patients come, their severity and the consequences of delay in diagnosis/treatment etc.

Thereafter we had contacted the patients to collect data on their health care seeking behaviour, their apprehensions and challenges in accessing appropriate health care system, reasons for visiting a medical facility in the NCR (if coming from outside NCR), etc.

We have contacted all the referral hospitals except All India Institute of Medical Sciences (AIIMS) wherein they has refused to allow us the primary survey despite requests made by NCRPB and Ministry of Health & Family Welfare, Government of India (GOI). An alternative methodology was suggested by NCRPB during the presentation meeting of the Interim Report II for AIIMS i.e contacting the patients /relatives of the patients of AIIMS by visiting the localities in the vicinity of AIIMS. Though it was difficult to identify such patients/ families and elicit information from them, but this activity has been undertaken subsequent to the submission of the Interim Report II (interview schedule is attached as Appendix D).

1.8.2 Task 3: Data Analysis & Tabulation

All the filled-in questionnaires from the field visit have been used for quantitative analysis (after scrutinising the entered data by our office editors). We had developed a holistic data analysis and tabulation plan, which was presented in the Interim Report-II stage for discussion. Final quantitative tables have been collated and analysed using Cardiff Teleform software and output tables have been generated in Statistical Package for the Social Sciences (SPSS) Software. Our in-house team has handled the data processing and data analysis. Based on the analysis from both qualitative and quantitative inputs, the report has been prepared and is being submitted to the client.

1.8.3 Task 4: Preparation of Action Plan

The collected data has been collated, analysed and compared with the Indian Public Health Standard norms to assess the level of care available in existing health facilities. The assessment of gaps as per the population of 2011 has been undertaken thereby estimating decadal growth rate for assessing requirements for 2036.

The Action Plan has been drafted based on findings considering Indian Public Health Standard norms for constructing or upgrading health facilities for population in 2036. The Action Plan covers the interventions required to be taken up by the states in the NCR, the implementation agencies and the desired timeline (WHAT/ WHO/ WHEN). The action plan also contains the key identified projects in different Sub-regions/districts of NCR, block cost estimates of the same and possibility of public-private partnership for provision of new facilities.

1.8.4 Task 5: Conducting Brainstorming Workshop

A brainstorming workshop was organised on 13th August 2015, wherein study findings and Action Plans were disseminated to concerned stakeholders (policy level officials and decision making authorities) of NCR participating States. The report has been finalised incorporating suggestions received from participants during the workshop and the subsequent CRC meeting held on 19th November 2015. .

1.9 Study Team

As already outlined in our proposal and subsequent interactions, the study team which had undertaken the study is detailed in the table below.

Table 1.3: Team Composition for the Study

Core team members		
S. No.	**Name**	**Responsibility**
1.	Ms Shoma Majumdar	Project Director- Advisory and supervisory role in project delivery
2	Mr. Anisur Rahman	Team Leader- Drafting assessment framework, designing study tools, report compiling

Core team members		
S. No.	**Name**	**Responsibility**
3	Dr Ruchi Bhargava	Team Member, Health sector expert- Responsible for formative phase, designing of the study, and later on to draft the instrument, oversee the data analysis and report writing activities in the study.
4	Dr. Nabaneeta Rudra	Project Manager, Statistician- secondary and primary research, Drafting assessment framework, designing study tools, analysis of research results and report writing.
5	Ms. Madhurima Waghmare	Team Member, Urban Planner- on advisory role for GIS mapping.
Supporting team members		
1	Ms. Moumita Biswas	Team Member- secondary and primary research, preparation of the various presentations and report writing.
2	Ms Sanghamitra Sinharay	Team Member- secondary and primary research, preparation of the various presentations and report writing.
2	Mr Raghunath Nair	Coordinating with team members for the project outputs/deliverables; Carrying out the field work of the study, GIS mapping exercise
3	Mr. Rajnish Kumar	Coordinating with team members for the project outputs/deliverables; Carrying out the field work of the study, GIS mapping exercise
4	Mr Madhu Nair	Coordinating with team members for the project outputs/deliverables; Carrying out the field work of the study, GIS mapping exercise
5	Mr Pankaj Lal	Coordinating with team members for the project outputs/deliverables; Carrying out the field work of the study, GIS mapping exercise

Source: Study Team

1.10 Limitations

While the study was undertaken there were many impediments and issues due to which a lot of rework had to be done, leading to time overrun on the project. These limitations include:

- The list provided by the Chief Medical Officer/ Chief Medical & Health Official/ Chief District Medical Officer was not updated in terms of total number of health facilities; hence the data could not be solely relied upon and counter checks had to be done during the field visit.
- The addresses of about 20% of the private health facilities collected during initial listing were either shifted or closed.
- Few health facilities which were reported to have Inpatient Department (IPD) were running with Outpatient Department (OPD) only.
- There was discrepancy in the data provided on in-patient facility by the State Government nodal body at the start of the survey and the number stated in the report based on actual data collected from the survey. Thus, the total list of health facilities with in-patient facilities in NCR is not totalling to 2500.
- Though the primary survey and the draft report were prepared in 2010-11 but analysis has been updated based on 2011 census during finalisation.

2. Assessment of Existing Health Infrastructure

As a part of primary research, the study team has collected basic information regarding number and type of outpatient departments (OPDs), availability of beds, doctors and other medical facilities like pathological test, operation facilities etc. On the basis of this data, an assessment of existing health infrastructure in NCR sub-regions and NCT Delhi has been carried out.

Apart from this, the information is also the basis for analysis of gaps in existing health infrastructure and need assessment for further intervention to improve the existing facility in compliance with standard health norms, which have been discussed in the subsequent chapters.

2.1 Number of Health facility available in NCR

A total of 803 government health facilities (including 260 facilities located in Delhi, which do not have IPD facility) are available in NCR sub-regions and NCT Delhi as given in Table 2.1.

Table 2.1: Number of health facility-Goverment

Name of district	District / SD Hospital	CHC	PHC	ESI Hospital & Dispensaries	Others	Total
Faridabad	1	2	12	1	1[1]	17
Gurgaon	1	3	12	1		17
Jhajjar	3	5	24			32
Mewat	1	3	12			16
Palwal	1	5	8			14
Panipat	1	3	17			21
Rewari	2	4	12			18
Rohtak	3	5	22		1[2]	31
Sonepat	3	7	32			42
Sub Region-Haryana	**16**	**37**	**151**	**2**	**2**	**208**
Baghpat		6	22			28
Bulandshaher	2	17	55		6[3]	75
Gautam Budhnagar	1	4	3			8
Ghaziabad including Hapur	2	5	6			13
Meerut	2	5	40		2[4]	49
Sub Region-UP	**7**	**37**	**126**	**0**	**8**	**178**
Alwar	1	24	72			97
Sub Region-Rajasthan	**1**	**24**	**72**			**97**
Delhi	134[5]	0	8	15	260[6]	417[6]
Sub Region-Delhi	**134**[5]	**0**	**8**	**15**	**260**[6]	417[6]
Total	**158**	**98**	**357**	**17**	**280**[6]	**803**[6]

Source: Based on Data collected from Chief Medical Officers at respective districts & Directorate of Health Services, Delhi

[1] Includes ESI Hospital and Dispensary [2] Includes PGIMS, Rohtak

[3] Includes Rajkiya Saukat Chikitsalay, Mother & Child Health Centre (PPC), Police Hospital & Jail Hospital

[4] Includes LLRM Medical College and Govt Ayurvedic Hospital

[5] Includes all Government Hospitals with IPD

[6] Includes Government Dispensaries without IPD

32 percent of the government facilities are located in Haryana sub-region. Rajasthan sub-region has about 15 percent of the government facilities. The balance is almost equally distributed among Delhi and Uttar Pradesh Sub-regions. In NCR (UP), Baghpat district does not have a District Hospital (DH), Gautam Buddhnagar has one DH while Bulandshaher, Ghaziabad including Hapur and Meerut has one male and one female district level hospital. In NCR (Haryana) Jhajjar, Rewari, Rohtak and Sonipat have sub-division (SD) level hospitals apart from district hospitals.

NCT Delhi has eight public health centres (PHCs), no community health centres (CHCs) and 134 tertiary care hospitals, which includes both general as well as speciality, super and multi-speciality hospitals. Apart from that there are 260 dispensaries which do not have any inpatient facility but only observation beds.

Analysis of the data collected and tabulated in Table 2.2 shows that 1488 private hospitals are present in NCR sub-regions and NCT Delhi. Apart from NCT Delhi, multi and super-specialty private hospitals are present in Faridabad, Gurgaon, Panipat & Sonepat districts of Haryana sub-region and Gautambudhnagar & Ghaziabad including Hapur districts of UP sub-region.

Table 2.2: Number of health facility-Private

Name of district	Multi Sp. / Speciality Hospital	General Hospital	Nursing Home	Others *	Total
Faridabad	2	31	13		46
Gurgaon	1	37	5	12	55
Jhajjar		7	8		15
Mewat		2	8		10
Palwal		4	7		11
Panipat	1	55	25	1	82
Rewari		36	12		48
Rohtak		2	9	1	12
Sonepat	1	53	14	6	74
Sub Region-Haryana	**5**	**227**	**101**	**20**	**353**
Baghpat		4	2		6
Bulandshaher		43	25	15	83
Gautam Budhnagar	1	18	17		36
Ghaziabad including Hapur	5	60	45		110
Meerut		21	4		25
Sub Region-UP	**6**	**146**	**93**	**15**	**260**
Alwar		33	1		34
Sub Region-Rajasthan		**33**	**1**		**34**
Delhi	14	448	362	17	841
Sub Region-Delhi	**14**	**448**	**362**	**17**	**841**
Total	**25**	**854**	**557**	**52**	**1488**

Source: Analysis Based on Data collected from Chief Medical Officers at respective districts & Directorate of Health Services, Delhii

* others include charitable hospitals and private clinics

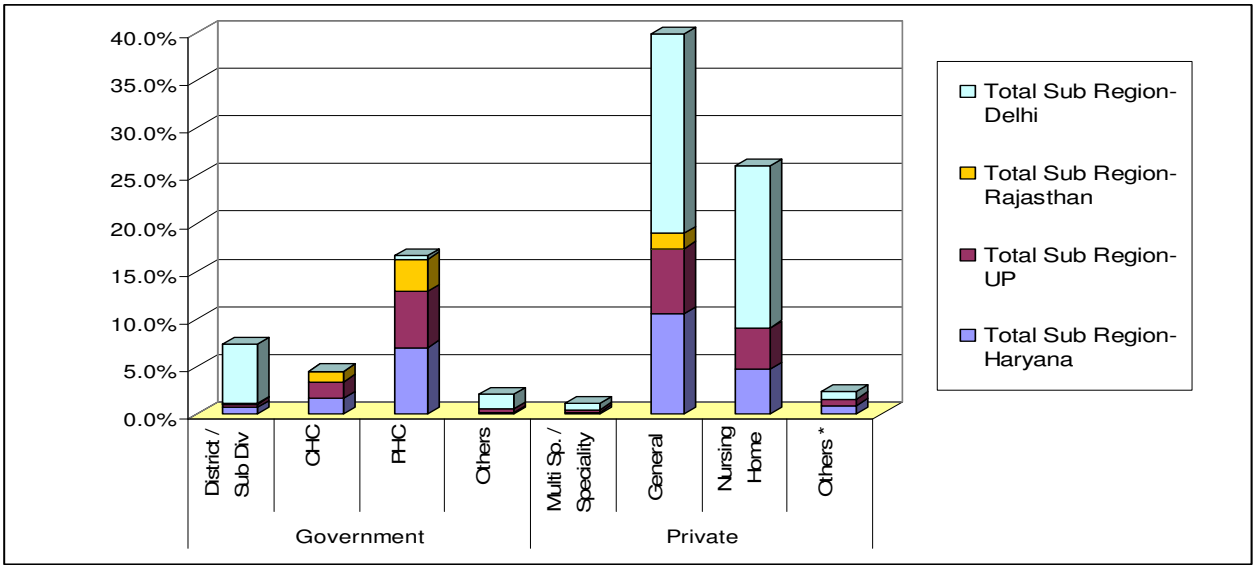
The private health facilities include a total of 25 super and multi-specialty hospitals, 854 general care private hospitals, 557 limited bedded private nursing homes and 52 charitable hospitals and private clinics.

Districts like Jhajjar, Mewat, Palwal, Rohtak and Baghpat have limited number of private health facilities as compared to others. NCT Delhi comprises 57 percent of the private health facilities, while NCR Haryana has nearly 24 percent.

The ratio of government to private health facilities in the NCR is 3:7 (the analysis considered health facilities having Inpatient Department only). The following figure shows more than half of the private facilities are located in Delhi. Haryana and Uttar Pradesh sub-regions comprise 24 and 17 percent of the private facilities respectively. NCR Rajasthan has only 2 percent of the private facilities. Primary care government facilities constitute 17 percent of the total while 8 percent constitutes tertiary level hospitals and 4.5 percent secondary care health facilities.

40 percent of the total facilities are private general hospitals and 26 percent are limited bedded nursing homes. The percentage of private multi and super specialty hospitals comprises only one percent of the total facilities. 2.5 percent of the facilities in private sector are charitable facilities.

Figure 2.1: Percentage distribution of health facility



Source: Based on Data collected from Chief Medical Officers at respective districts & Directorate of Health Services, Delhi

Table 2.3: Distribution of health facility

	Government								Private							
	District / SD Hospital		CHC		PHC		Others		Multi Sp. / Speciality Hospital		General Hospital		Nursing Home		Others *	
	In Number	In %	In Number	In %	In Number	In %	In Number	In %	In Number	In %	In Number	In %	In Number	In %	In Number	In %
Sub Region-Haryana	16	0.7	37	1.7	151	7.0	4	0.2	5	0.2	227	10.6	101	4.7	20	0.9
Sub Region-UP	7	0.3	37	1.7	126	5.9	8	0.4	6	0.3	146	6.8	93	4.3	15	0.7
Sub Region-Rajasthan	1	0.0	24	1.1	72	3.4	0	0.0	0	0.0	33	1.5	1	0.0	0	0.0
Sub Region-Delhi	134	6.2	0	0.0	8	0.4	33	1.5	14	0.7	448	20.9	362	16.9	17	0.8
N= 2146																
Source: Analysis Based on Data collected from Chief Medical Officers at respective districts & Directorate of Health Services, Delhii																

2.2 Number of beds available in NCR

Table 2.4 shows that a total of 31677 inpatient beds are available in government facilities of NCR sub-regions including NCT Delhi and the average occupancy rate is 61 percent. Similarly Table 2.5 shows that total 34126 in-patient beds are available in private facilities of NCR sub-regions and the average occupancy rate is 46. It has been observed that overall average bed utilization in NCR is higher in government sector, i.e. 61 percent as against 46 percent in private sector. Furthermore in Government sector, tertiary care hospitals have higher bed utilization than secondary or primary care facilities. While making the sub-region wise comparison in terms of utilization of beds in government sector, Delhi facilities were preferred by more number of patients.

The bed utilization, especially in government health facilities is linked to the functionality of the health infrastructure. Lack of manpower and required infrastructure especially in primary and secondary care facilities deters patients to come and use the facilities, thereby hindering optimal utilization of available services. Hence the bed utilization is sub-optimal in most of the health facilities, while some hospitals are becoming overcrowded. The primary reason behind this overcrowding in the hospitals is the patient's trust & belief on tertiary health care service which has been further discussed later in gap analysis chapter.

Table 2.4: Number of beds available -Goverment Hospitals

Name of district	District Hospital		CHC		PHC		Others		Total	
	Number of beds available	Average bed utilisation (%)	Number of beds available	Average bed utilisation (%)	Number of beds available	Average bed utilisation (%)	Number of beds available	Average bed utilisation (%)	Number of beds available	Average bed utilisation (%)
Faridabad	200	30	36	60	36	63	150	30	422	58
Gurgaon	200	90	64	77	48	27	200	80	512	40
Jhajjar	140	78	67	72	83	44	0		290	52
Mewat	50	40	42	60	50	29	0		142	36
Palwal	50	70	112	70	36	44	0		198	55
Panipat	100	40	60	45	66	44	0		226	44
Rewari	156	55	88	53	63	41	0		307	45
Rohtak	150	10	150	16	110	53	1601	49	2011	44
Sonepat	160	63	210	30	128	50	0		498	51
Sub Region-Haryana	**1206**	**53**	**829**	**54**	**620**	**44**	**1951**	**53**	**4606**	**47**
Baghpat	0		102	63	83	58			185	59
Bulandshaher	237		510	67	287	64	126		1160	65
Gautam Budhnagar	80	91	120	57	20	43			220	51
Ghaziabad including Hapur	234	88	150	65	30	39	0		414	55
Meerut	366	100	122	69	139	50	750	50	1377	57
Sub Region-UP	**917**	**93**	**1004**	**64**	**559**	**51**	**876**	**50**	**3356**	**57**
Alwar	487	99	666	58	381	50			1534	53
Sub Region-Rajasthan	**487**	**99**	**666**	**58**	**381**	**50**			**1534**	**69**
Delhi	22149	76			32	0			22181	72
Sub Region-Delhi	**22149**	**76**			**32**	**0**			**22181**	**72**
Total	**24759**	**80**	**2499**	**59**	**1592**	**36**	**2827**	**52**	**31677**	**61**

Source: Findings of this study

Further, in case of private hospitals the bed utilization at multi-speciality hospitals located in Delhi was 80 percent. While bed occupancy in private general hospitals and nursing homes varies in between 40 to 60 percent.

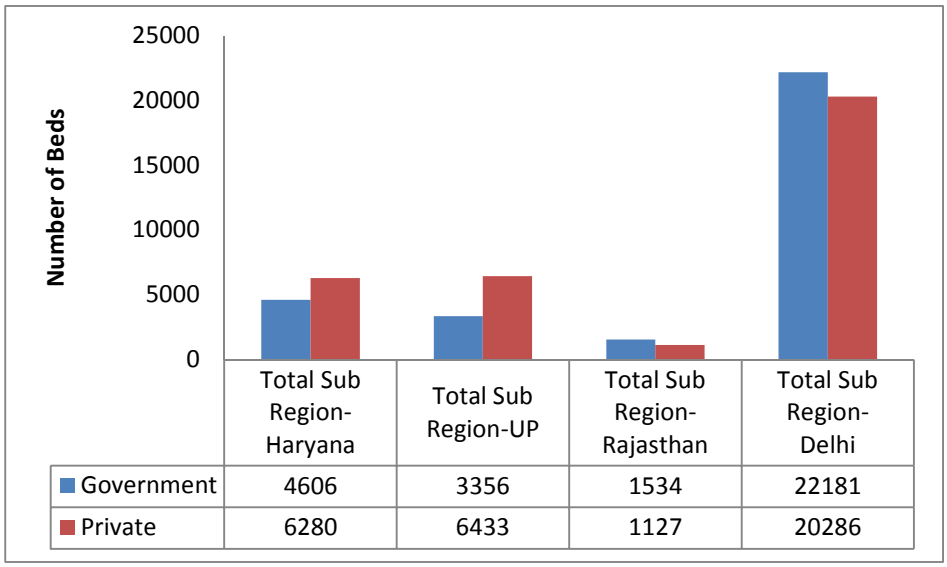
Table 2.5: Number of beds available -Private Hospitals

Name of district	Multi Sp. / Speciality Hospital		General Hospital		Nursing Home		Others		Total	
	Number of beds available	Average bed utilisation (%)	Number of beds available	Average bed utilisation (%)	Number of beds available	Average bed utilisation (%)	Number of beds available	Average bed utilisation (%)	Number of beds available	Average bed utilisation (%)
Faridabad	225	50	683	23	290	33			1198	27
Gurgaon	497	75	1060	22	86	19	120	25	1763	24
Jhajjar	0		370	46	49	33			419	39
Mewat	0		27	55	45	56			72	56
Palwal			180	65	110	51	35		325	56
Panipat	25	50	1083	35	243	51			1351	41
Rewari	0		355	38	62	31			417	36
Rohtak			76	25	82	17			158	18
Sonepat			443	31	134	21	0		577	28
Sub Region-Haryana	**747**	**58**	**4277**	**38**	**1101**	**35**	**155**	**25**	**6280**	**36**
Baghpat			190	45	9	25			199	38
Bulandshaher			564	49	236	56			800	52
Gautam Budhnagar	325	70	586	25	275	25			1186	26
Ghaziabad including Hapur	387	40	1968	39	461	33			2816	36
Meerut			1383	52	49	46			1432	51
Sub Region-UP	**712**	**55**	**4691**	**42**	**1030**	**37**			**6433**	**41**
Alwar			1119	64	8	63			1127	63
Sub Region-Rajasthan			**1119**	**64**	**8**	**63**			**1127**	**62**
Delhi	1023	80	15795	41	3417	46	51	51	20286	45
Sub Region-Delhi	**1023**	**80**	**15795**	**41**	**3417**	**46**	**51**	**51**	**20286**	**45**
Total	**2482**	**64**	**25882**	**46**	**5556**	**45**	**206**	**38**	**34126**	**46**

Source: Findings of this study

At sub-regional level except in Rajasthan sub-region and NCT-Delhi, the proportion of beds are more in private hospitals than government hospitals. Nearly two third of the beds are available in NCT Delhi health facilities while around 15 percent beds are available in each of Haryana and Uttar Pradesh sub-regions. Only 4 percent beds are present in NCR Rajasthan.

Figure 2.2: Distribution of beds available



Source: Findings of this study

Nearly 38 percent of the total bed size is available in tertiary care government hospitals and 39 percent of beds are available in private general hospitals.

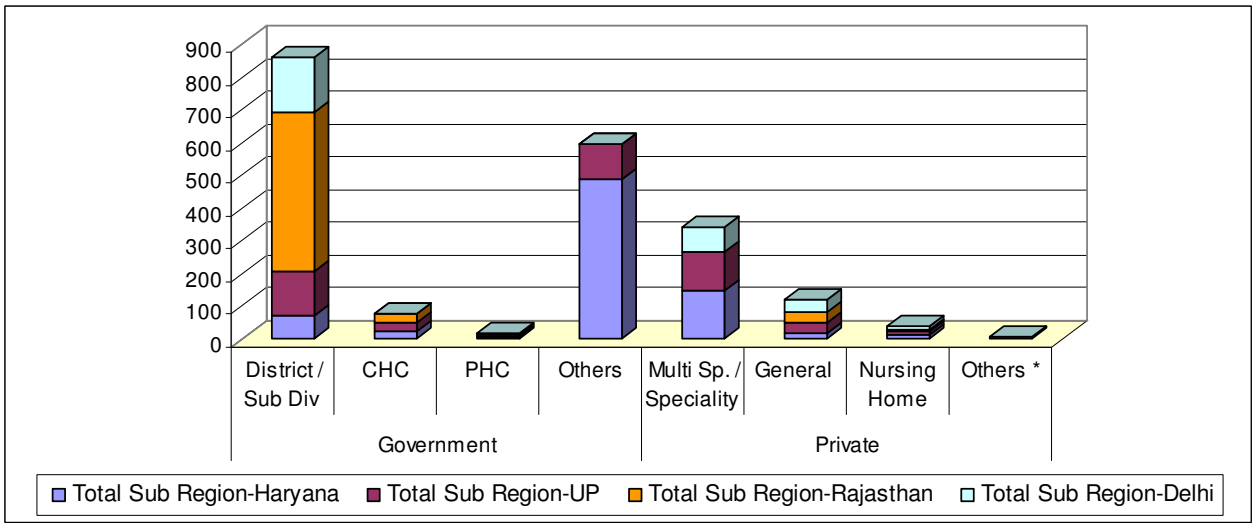
Table 2.6: Distribution of beds available

Parameters	Government								Private							
	District / SD Hospital		CHC		PHC		Others		Multi Sp. / Speciality Hospital		General Hospital		Nursing Home		Others *	
	In Number	In %	In Number	In %	In Number	In %	In Number	In %	In Number	In %	In Number	In %	In Number	In %	In Number	In %
Sub Region-Haryana	1206	1.8	829	1.3	620	0.9	1951	3.0	747	1.1	4277	6.5	1101	1.7	155	0.2
Sub Region-UP	917	1.4	1004	1.5	559	0.8	876	1.3	712	1.1	4691	7.1	1030	1.6	0	0.0
Sub Region-Rajasthan	487	0.7	666	1.0	381	0.6	0	0.0	0	0.0	1119	1.7	8	0.0	0	0.0
Sub Region-Delhi	22149	33.7	0	0.0	32	0.0	0	0.0	1023	1.6	15795	24.0	3417	5.2	51	0.1
Total Number of Beds in NCR is 65803																

Source: Findings of this study

Analysis of average bed available in a facility revels that the bed size of government tertiary care hospital is highest in NCR Rajasthan where only one such facility is available. The average bed size in Delhi government hospital is 165 while in UP and Haryana regions the same is 131 and 75. The bed size of private hospitals ranges between 24 and 33 except in NCR Haryana where the average bed size of private hospitals is only 18. (Figure 2.3)

Figure 2.3: Average Bed size of health facilities



Source: Findings of this study

Table 2.7: Average number of beds available per health facility

Name of Sub Region	Government				Private				Total	
	District / Sub Div	CHC	PHC	Others	Multi Sp. / Speciality	General	Nursing Home	Others	Government	Private
Sub Region-Haryana	75	22	4	488	149	19	11	8	22	18
Sub Region-UP	131	27	4	110	119	32	11	0	19	25
Sub Region-Rajasthan	487	28	5			34	8		16	33
Sub Region-Delhi	165		4	0	73	35	9	3	127	24

Source: Findings of this study

2.3 Inpatient facility available

Table 2.8 shows details the availability of inpatient facility in NCR, almost 94 percent of the government as well as private health facilities are providing inpatient facilities. However, the availability of IPD is more in private sector (70 percent of the total).

Table 2.8: Distribution of Inpatient Facility Available in NCR (Number)

Name of district	Government in number	Private in number	Total
Faridabad	17	46	63
Gurgaon	15	54	69
Jhajjar	24	15	39
Mewat	12	10	22
Palwal	14	9	23
Panipat	21	81	102
Rewari	18	48	66
Rohtak	30	8	38
Sonepat	42	61	103
Sub Region-Haryana	**193**	**332**	**525**
Baghpat	26	6	32
Bulandshaher	79	62	141
Gautam Budhnagar	8	36	44

Name of district	Government in number	Private in number	Total
Ghaziabad including Hapur	13	110	123
Meerut	47	25	72
Sub Region-UP	**173**	**239**	**412**
Alwar	95	29	124
Sub Region-Rajasthan	**95**	**29**	**124**
Delhi	145	810	955
Sub Region-Delhi	**145**	**810**	**955**
Total	**606**	**1410**	**2016**

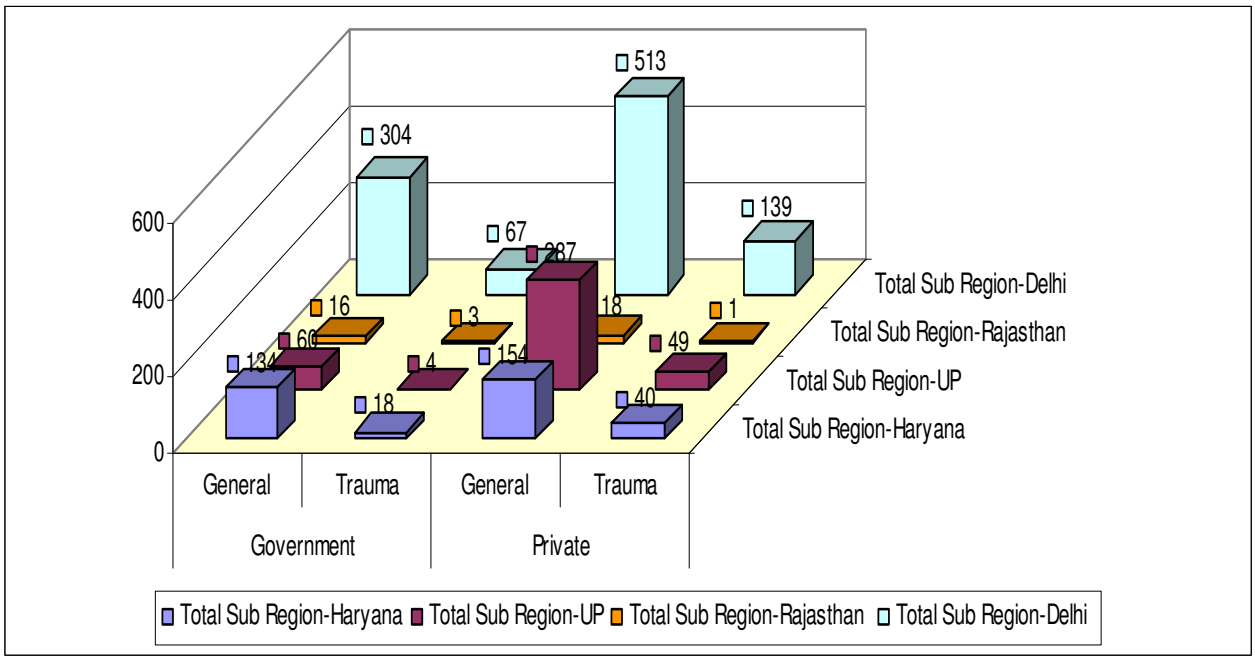
Source: Findings of this study

2.4 Number of Ambulances available

Table 2.9 provides the distribution of ambulances available with various health facilities of NCR sub-regions and NCT Delhi. The average number of ambulances available per health facility (like Hospitals, Health Care Centers, and Nursing Homes etc) is highest (2.1 per health facility) in the government sector in NCT Delhi. Availability of ambulances is poor in the Government sector hospitals, in case of UP Sub Region (0.3 per health facility) and Rajasthan Sub Region (0.2 per health facility).

The information was sought about the type of ambulance as well under the study. More prevalent are the general care ambulances, which are used primarily for patient transport. Those comprise 82 percent of the total ambulances available. Only 18 percent of the ambulances available are trauma ambulances, which are used to transport patients with acute illness or injury (Figure 2.4)

Figure 2.4: Sub reggion wise number of Ambulance available



Source: Findings of this study

Table 2.9: Number of Ambulance available

Name of district	Government in number		Private in number		Total	
	General	Trauma	General	Trauma	General	Trauma
Faridabad	19	7	58	23	77	30
Gurgaon	16	1	25	2	41	3
Jhajjar	19	3	15	7	34	10
Mewat	14	1	0	0	14	1
Palwal	3	0	1	0	4	0
Panipat	11	1	19	4	30	5
Rewari	7	1	25	4	32	5
Rohtak	18	2	2	0	20	2
Sonepat	27	2	9	0	36	2
Sub Region-Haryana	**134**	**18**	**154**	**40**	**288**	**58**
Baghpat	9	2	1	0	10	2
Bulandshaher	16	1	46	0	62	1
Gautam Budhnagar	8	0	67	14	75	14
Ghaziabad including Hapur	9	0	147	33	156	33
Meerut	18	1	26	2	44	3
Sub Region-UP	**60**	**4**	**287**	**49**	**347**	**53**
Alwar	16	3	18	1	34	4
Sub Region-Rajasthan	**16**	**3**	**18**	**1**	**34**	**4**
Delhi	304	67	513	139	817	206
Sub Region-Delhi	**304**	**67**	**513**	**139**	**817**	**206**
Total	**514**	**92**	**972**	**229**	**1486**	**321**

Source: Findings of this study

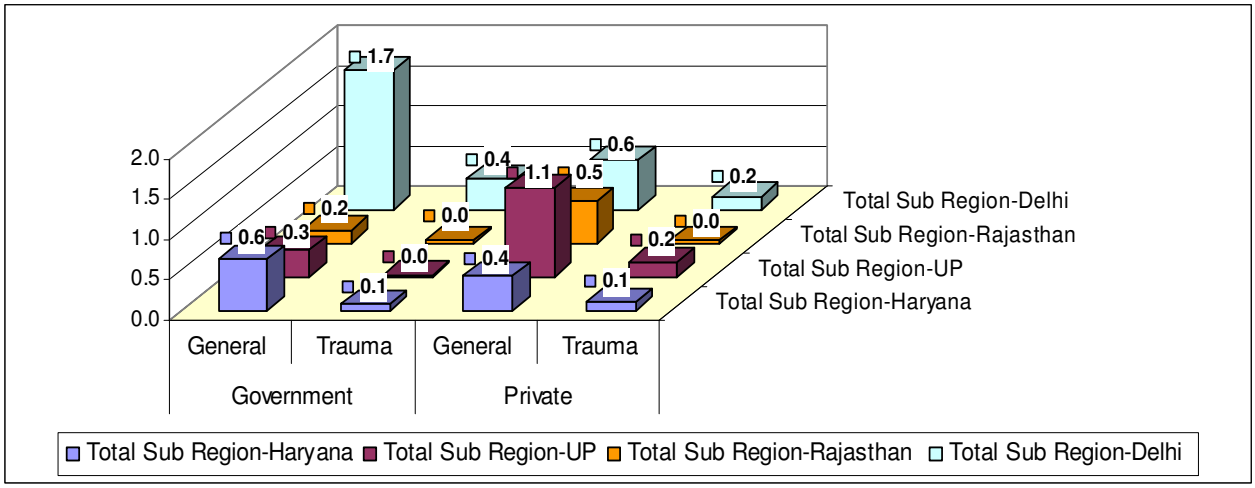
Table 2.10: Sub Region wise number of ambulance

Name of Sub Region	Government		Private		Total	
	General	Trauma	General	Trauma	General	Trauma
Sub Region-Haryana	134	18	154	40	288	58
Sub Region-UP	60	4	287	49	347	53
Sub Region-Rajasthan	16	3	18	1	34	4
Sub Region-Delhi	304	67	513	139	817	206

Source: Findings of this study

Figure 2.5 indicates that, average number of available ambulance per health facility is highest in government sector of NCT Delhi. On the other hand, one general care ambulance is available per private hospital in NCR Uttar Pradesh. The number of trauma ambulances is insignificant in government sector of NCR sub-regions other than NCT Delhi. Availability of ambulances is poor in Government sector hospitals in case of UP and Rajasthan.

Figure 2.5: Average number of ambulance per health facilities



Source: Findings of this study

Table 2.11: Average number of ambulance per health facilities

Name of Sub Region	Government		Private		Total	
	General	Trauma	General	Trauma	General	Trauma
Sub Region-Haryana	0.6	0.1	0.4	0.1	0.5	0.1
Sub Region-UP	0.3	0.0	1.1	0.2	0.8	0.1
Sub Region-Rajasthan	0.2	0.0	0.5	0.0	0.3	0.0
Sub Region-Delhi	1.7	0.4	0.6	0.2	0.8	0.2

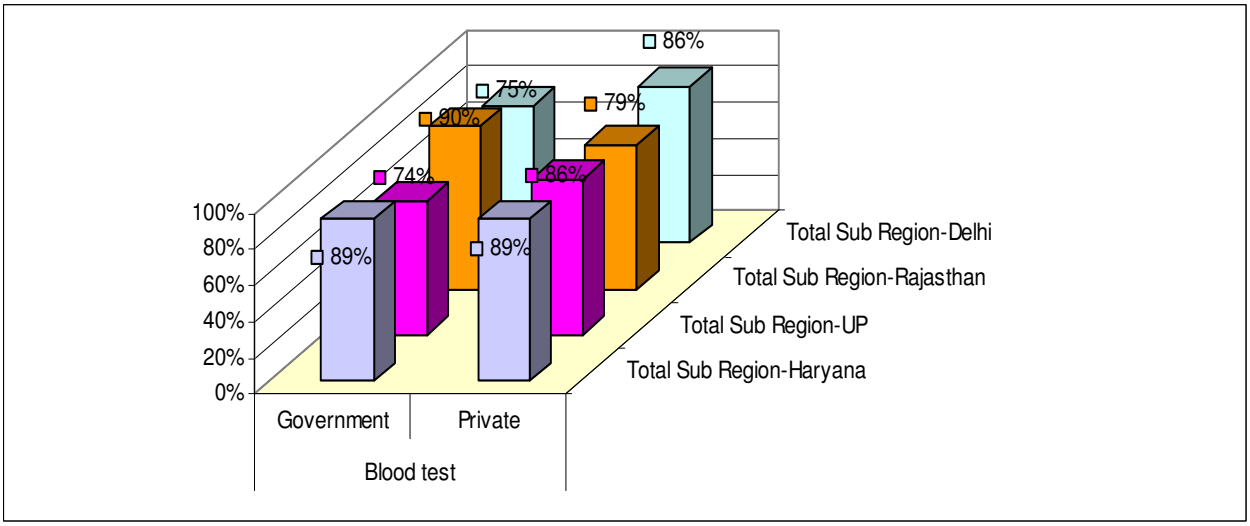
Source: Findings of this study

2.5 Type of facility available

Table 2.20, 2.21 and 2.22 details the number of health facilities with availability of medical services like haemo, patho and radiological tests; operation and blood bank facilities etc. Following figures also deduce the availability of medical services per health facility.

Figure 2.6 shows around 85 percent facilities in Delhi and Uttar Pradesh sub-regions and around 90 percent facilities in Haryana and Rajasthan have blood test facilities.

Figure 2.6: Availability of blood test facility



Source: Findings of this study

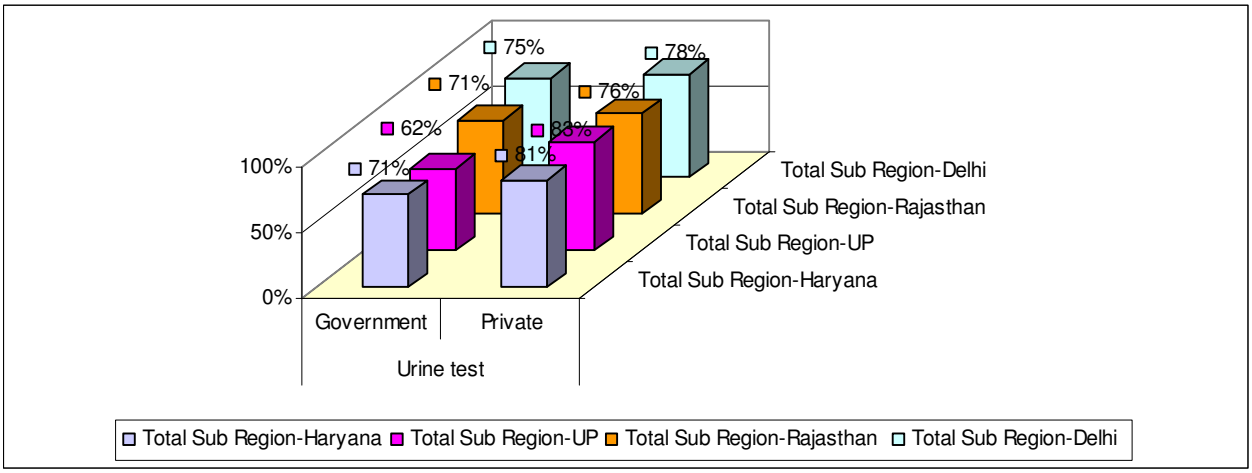
Table 2.12: Sub Region wise number of Blood Test facility available

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %
Sub Region-Haryana	208	186	89	353	315	89
Sub Region-UP	178	132	74	260	224	86
Sub Region-Rajasthan	97	87	90	34	27	79
Sub Region-Delhi	175	132	75	841	725	86
Total	**658**	**537**	**82**	**1488**	**1291**	**87**

Source: Findings of this study

Figure 2.7 shows around 75 percent health centres and hospitals have urine test facilities in all the sub-regions.

Figure 2.7: Availability of urine test facility



Source: Findings of this study

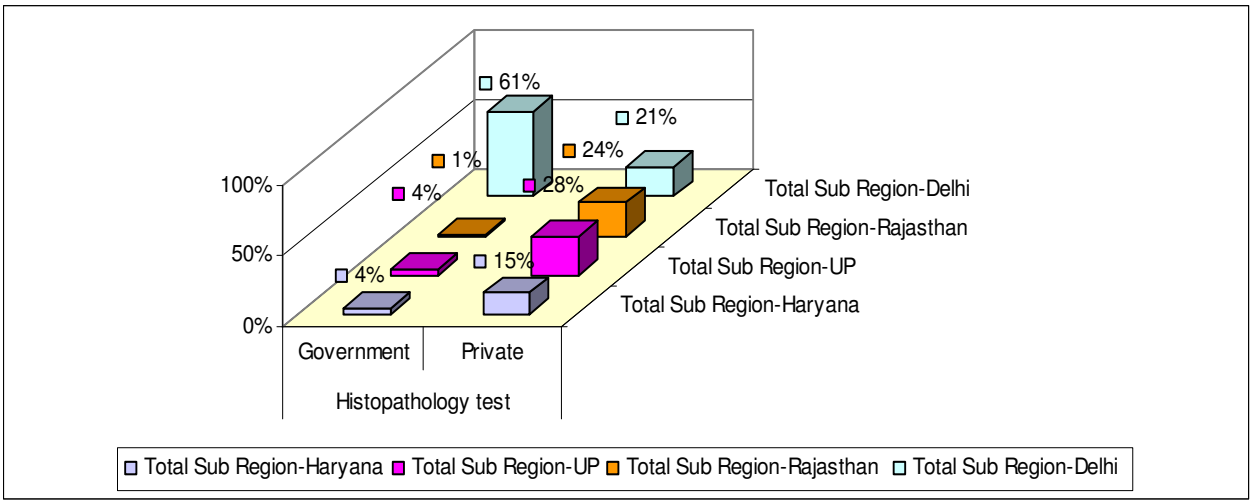
Table 2.13: Sub Region wise number of Urine Test facility available

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %
Sub Region-Haryana	208	147	71	353	287	81
Sub Region-UP	178	119	66	260	215	83
Sub Region-Rajasthan	97	69	71	34	26	76
Sub Region-Delhi	175	132	75	841	660	78
Total	**658**	**467**	**71**	**1488**	**1188**	**80**

Source: Findings of this study

It is evident from Figure 2.8 that availability of histo-pathological testing is only present in about 60 percent of the government hospitals of Delhi majority of which are tertiary care centres.

Figure 2.8: Availability of histopathology test facility



Source: Findings of this study

On the other hand nearly 20 percent of the Delhi private health facilities provide this service. In the other sub-regions more private facilities (15 - 28%) have histo pathological test service than government health centres (only 1 – 5%)

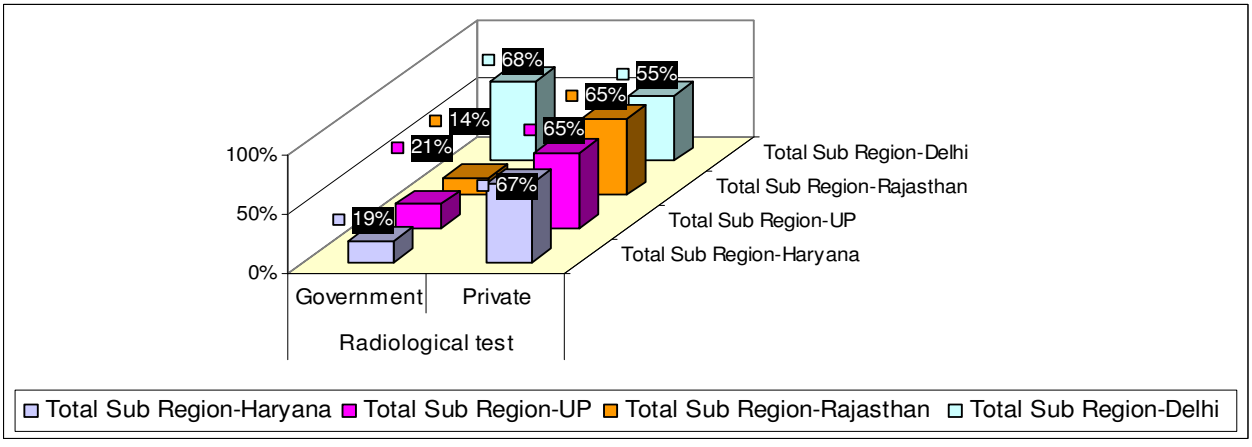
Table 2.14: Sub Region wise number of histopathology test facility available

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %
Sub Region-Haryana	208	8	4	353	54	15
Sub Region-UP	178	8	4	260	72	28
Sub Region-Rajasthan	97	1	1	34	8	24
Sub Region-Delhi	175	106	61	841	180	21
Total	**658**	**123**	**19**	**1488**	**314**	**21**

Source: Findings of this study

Radiological test facilities are available in 68 percent of the government hospitals and 55 percent of the private health facilities in Delhi. In other sub-regions, two third of the private facilities provide the service, while only 14 to 21 percent of the government facilities provide the service outside Delhi. (Figure 2.9)

Figure 2.9: Availability of Radiological test facility



Source: Findings of this study

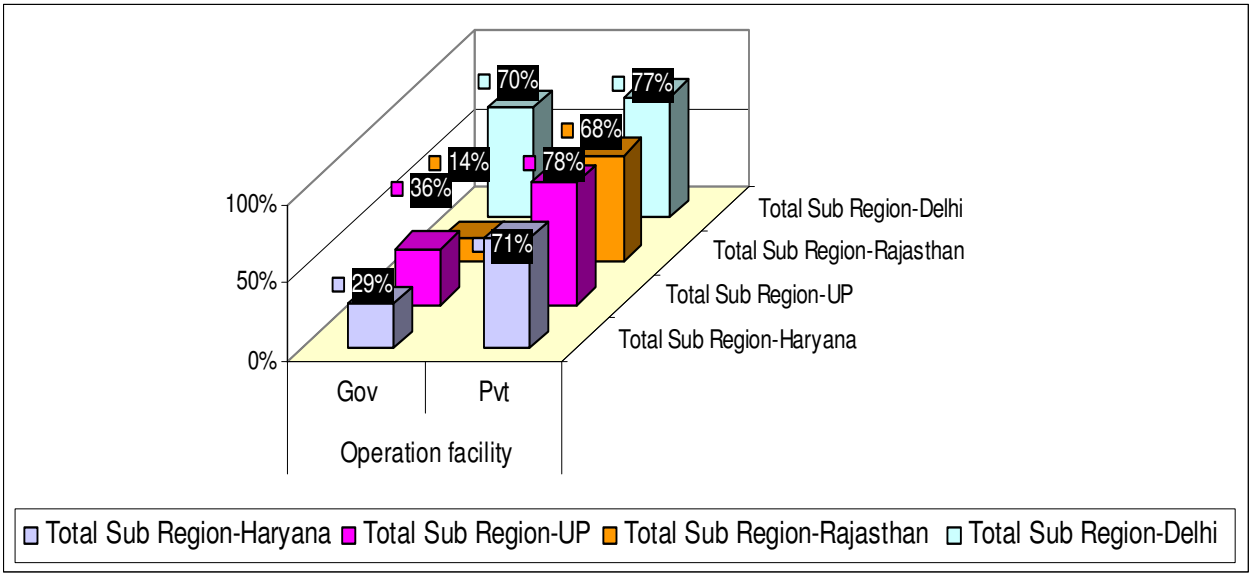
Table 2.15: Sub Region wise number of Radiological test facility Availability

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %
Sub Region-Haryana	208	39	19	353	238	67
Sub Region-UP	178	37	21	260	168	65
Sub Region-Rajasthan	97	14	14	34	22	65
Sub Region-Delhi	175	119	68	841	465	55
Total	658	209	32	1488	893	60

Source: Findings of this study

Figure 2.10 and 2.11 shows operation and emergency care facility is available in more number of private facilities than government as the same is not available at primary level. In case of emergency care, though only half of private facilities provide the service as against two-third of government facilities. On the other hand, the percentage of availability of these facilities is comparatively higher in Delhi as majority of the health facilities provide tertiary care.

Figure 2.10: Availability of Operation facility



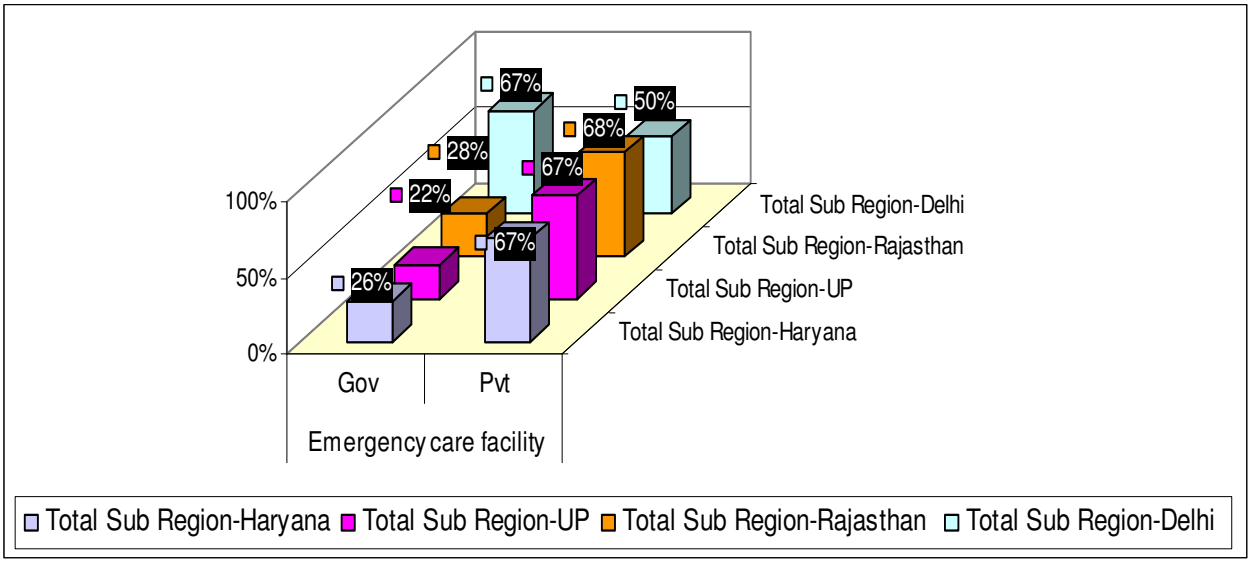
Source: Findings of this study

Table 2.16: Sub Region wise number of Operation facility Availability

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %
Sub Region-Haryana	208	60	29	353	249	71
Sub Region-UP	178	64	36	260	202	78
Sub Region-Rajasthan	97	14	14	34	23	68
Sub Region-Delhi	175	123	70	841	648	77
Total	**658**	**261**	**40**	**1488**	**1122**	**75**

Source: Findings of this study

Figure 2.11: Availability of Emergency care



Source: Findings of this study

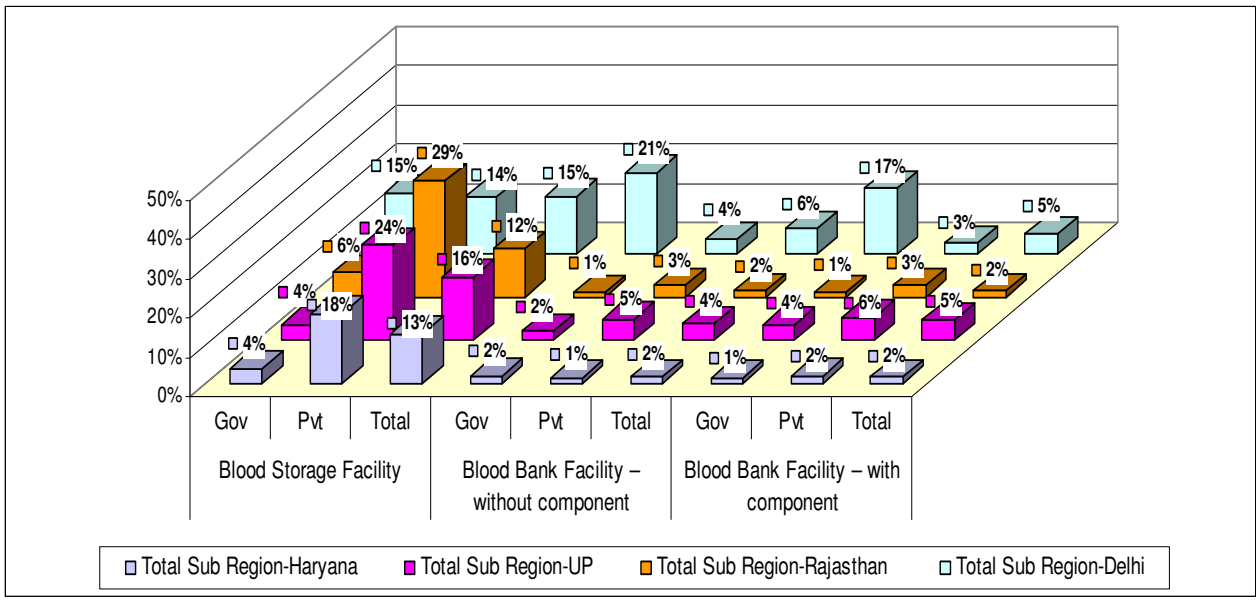
Table 2.17: Sub Region wise number of Emergency care Availability

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %
Sub Region-Haryana	208	55	26	353	237	67
Sub Region-UP	178	40	22	260	175	67
Sub Region-Rajasthan	97	27	28	34	23	68
Sub Region-Delhi	175	118	67	841	421	50
Total	**658**	**240**	**36**	**1488**	**856**	**58**

Source: Findings of this study

It was also evident from the following graph that blood storage facility and blood banks are negligible in number. Blood storage facility is available in 14 to 29 percent facilities in Delhi and in private hospitals of other sub-regions. Blood bank facility is available only in 5 - 10 percent facilities in all the sub-regions. Among the government health facilities in Delhi 21 percent have blood bank service (without component) while17 percent have blood bank service (with component). (Figure 2.12)

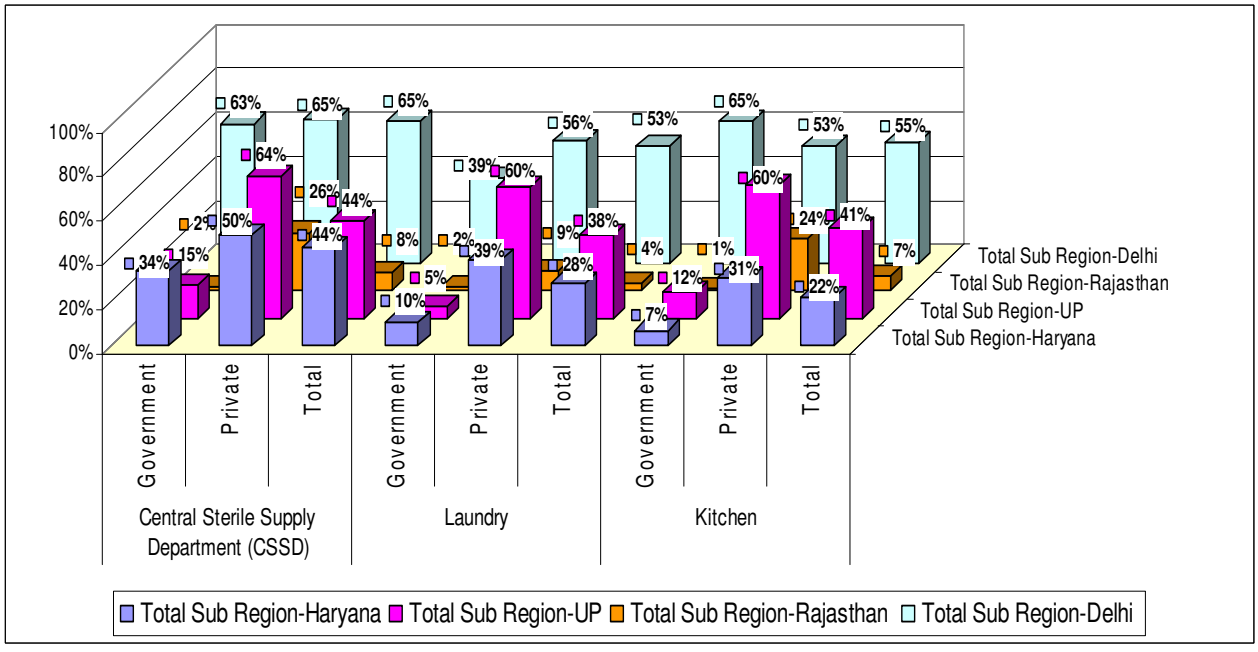
Figure 2.12: Availability of Blood storage and Blood bank facility



Source: Findings of this study

Figure 2.13 shows availability of Services like Central Sterile Supply Department (CSSD), Laundry and Kitchen in health facilities. Except in Delhi NCT, in all other sub-regions higher number of private facilities have these services than government facilities.

Figure 2.13: Availability of Health Services in Visited Health Infrastructures



Source: Findings of this study

Considering both government and private health facilities it was observed that overall availability of these services is much lesser in Rajasthan sub-region (7 to 9 percent) and is highest in Delhi sub-region (53 to 65 percent).

Table 2.18: Sub Region wise number of Blood storage and Blood bank facility Availability

Name of Sub Region	Blood Storage Facility						Blood Bank Facility – without component						Blood Bank Facility – with component					
	Government			Private			Government			Private			Government			Private		
	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %
Sub Region-Haryana	208	8	4	353	63	18	208	4	2	353	5	1	208	3	1	353	7	2
Sub Region-UP	178	7	4	260	63	24	178	4	2	260	14	5	178	7	4	260	15	6
Sub Region-Rajasthan	97	6	6	34	10	29	97	1	1	34	1	3	97	1	1	34	1	3
Sub Region-Delhi	175	27	15	841	121	14	175	36	21	841	30	4	175	29	17	841	23	3
Total	**658**	**48**	**7**	**1488**	**257**	**17**	**658**	**45**	**7**	**1488**	**50**	**3**	**658**	**40**	**6**	**1488**	**46**	**3**

Source: Findings of this study

Table 2.19: Sub Region wise number of Health Services Availability

Name of Sub Region	Central Sterile Supply Department (CSSD)						Laundry						Kitchen					
	Government			Private			Government			Private			Government			Private		
	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %	Total Number of facility	Available In Number	In %
Sub Region-Haryana	208	70	34	353	177	50	208	21	10	353	136	39	208	14	7	353	108	31
Sub Region-UP	1789	27	15	260	167	64	178	9	5	260	155	60	178	21	12	260	157	60
Sub Region-Rajasthan	97	2	2	34	9	26	97	2	2	34	3	9	97	1	1	34	8	24
Sub Region-Delhi	175	111	63	841	549	65	175	68	39	841	470	56	175	113	65	841	447	53
Total	**658**	**210**	**32**	**1488**	**902**	**61**	**658**	**100**	**15**	**1488**	**764**	**51**	**658**	**149**	**23**	**1488**	**720**	**48**

Source: Findings of this study

2.5.1 Medical Testing Facilities

Table 2.20: Availability of Haemo / Patho / Radiological Tests in NCR Hospitals (Figures in numbers)

	Blood test			Urine test			Histopathology test			Radiological test		
Name of district	**Government**	**Private**	**Total**	**Government**	**Private**	**Total**	**Government**	**Private**	**Total**	**Government**	**Private**	**Total**
Faridabad	17	46	63	17	46	63	1	23	24	3	39	42
Gurgaon	15	44	59	5	43	48	1	7	8	4	29	33
Jhajjar	29	15	44	27	15	42	2	3	5	3	10	13
Mewat	14	9	23	14	9	23	0	1	1	5	3	8
Palwal	4	5	9	1	2	3	0	0	0	0	3	3
Panipat	21	81	102	13	60	73	1	12	13	1	48	49
Rewari	17	48	65	18	48	66	1	8	9	5	42	47
Rohtak	27	5	32	10	3	13	2	0	2	7	3	10
Sonepat	42	62	104	42	61	103	0	0	0	11	61	72
Sub Region-Haryana	**186**	**315**	**501**	**147**	**287**	**434**	**8**	**54**	**62**	**39**	**238**	**277**
Baghpat	14	5	19	9	5	14	0	1	1	5	3	8
Bulandshaher	78	55	133	78	47	125	2	1	3	16	10	26
Gautam Budhnagar	8	36	44	8	36	44	1	23	24	7	35	42
Ghaziabad including Hapur	10	109	119		109	109	0	38	38	3	105	108
Meerut	22	19	41	16	18	34	5	9	14	6	15	21
Sub Region-UP	**132**	**224**	**356**	**111**	**215**	**326**	**8**	**72**	**80**	**37**	**168**	**205**
Alwar	87	27	114	69	26	95	1	8	9	14	22	36
Sub Region-Rajasthan	**87**	**27**	**114**	**69**	**26**	**95**	**1**	**8**	**9**	**14**	**22**	**36**
Delhi	132	725	857	132	660	792	106	180	286	119	465	584
Sub Region-Delhi	**132**	**725**	**857**	**132**	**660**	**792**	**106**	**180**	**286**	**119**	**465**	**584**
Total	**537**	**1291**	**1828**	**459**	**1188**	**1647**	**123**	**314**	**437**	**209**	**893**	**1102**

Source: Findings of this study

2.5.2 Medical Facilities Available

Table 2.21: Availability of Medical Facilities in Visited Health Units (Figures in numbers)

Name of district	Operation facility			Emergency care facility			Blood Storage Facility			Blood Bank Facility – without component			Blood Bank Facility – with component		
	Government	Private	Total	Government	Private	Total	Government	Private	Total	Government	Private	Total	Government	Private	Total
Faridabad	5	44	49	3	32	35	0	17	17	0	1	1	0	2	2
Gurgaon	3	28	31	4	17	21	2	1	3	1	1	2	0	3	3
Jhajjar	15	15	30	7	6	13	2	4	6	1	2	3	0	1	1
Mewat	3	4	7	4	2	6	1	0	1	0	0	0	0	0	0
Palwal	0	3	3	0	1	1	0	0	0	0	0	0	0	0	0
Panipat	1	43	44	5	75	80	1	3	4	0	1	1	1	0	1
Rewari	16	48	64	16	43	59	1	6	7	0	0	0	0	1	1
Rohtak	7	3	10	6	0	6	1	0	1	1	0	1	1	0	1
Sonepat	10	61	71	10	61	71	0	32	32	1	0	1	1	0	1
Sub Region-Haryana	**60**	**249**	**309**	**55**	**237**	**292**	**8**	**63**	**71**	**4**	**5**	**9**	**3**	**7**	**10**
Baghpat	12	5	17	15	5	20	0	1	1	0	0	0	0	1	1
Bulandshaher	26	28	54	7	20	27	1	1	2	2	1	3	2	5	7
Gautam Budhnagar	5	36	41	1	31	32	3	17	20	0	1	1	1	1	2
Ghaziabad including Hapur	10	109	119	4	103	107	1	41	42	1	9	10	1	6	7
Meerut	11	24	35	13	16	29	2	3	5	1	3	4	3	2	5
Sub Region-UP	**64**	**202**	**266**	**40**	**175**	**215**	**7**	**63**	**70**	**4**	**14**	**18**	**7**	**15**	**22**
Alwar	14	23	37	27	23	50	6	10	16	1	1	2	1	1	2
Sub Region-Rajasthan	**14**	**23**	**37**	**27**	**23**	**50**	**6**	**10**	**16**	**1**	**1**	**2**	**1**	**1**	**2**
Delhi	123	648	771	118	421	539	27	121	148	36	30	66	29	23	52
Sub Region-Delhi	**123**	**648**	**771**	**118**	**421**	**539**	**27**	**121**	**148**	**36**	**30**	**66**	**29**	**23**	**52**
Total	**261**	**1122**	**1383**	**240**	**856**	**1096**	**48**	**257**	**305**	**45**	**50**	**95**	**40**	**46**	**86**

Source: Findings of this study

2.5.3 Services Available

Table 2.22: Availability of Health Services in Visited Health Units (Figures in number)

	Central Sterile Supply Department (CSSD)			Laundry			Kitchen		
Name of district	**Government**	**Private**	**Total**	**Government**	**Private**	**Total**	**Government**	**Private**	**Total**
Faridabad	3	43	46	3	40	43	3	35	38
Gurgaon	7	15	22	1	15	16	0	16	16
Jhajjar	11	15	26	2	12	14	3	9	12
Mewat	0	1	1	1	0	1	0	0	0
Palwal	0	0	0	0	0	0	0	0	0
Panipat	1	14	15	1	7	8	1	4	5
Rewari	16	48	64	9	38	47	5	20	25
Rohtak	25	0	25	2	0	2	1	0	1
Sonepat	7	41	48	2	24	26	1	24	25
Sub Region-Haryana	**70**	**177**	**247**	**21**	**136**	**157**	**14**	**108**	**122**
Baghpat	8	4	12	2	2	4	1	2	3
Bulandshaher	2	2	4	2	2	4	11	10	21
Gautam Budhnagar	3	35	38	0	33	33	1	31	32
Ghaziabad including Hapur	5	103	108	2	103	105	5	102	107
Meerut	9	23	32	3	15	18	3	12	15
Sub Region-UP	**27**	**167**	**194**	**9**	**155**	**164**	**21**	**157**	**178**
Alwar	2	9	11	2	3	5	1	8	9
Sub Region-Rajasthan	**2**	**9**	**11**	**2**	**3**	**5**	**1**	**8**	**9**
Delhi	111	549	660	68	470	538	113	447	560
Sub Region-Delhi	**111**	**549**	**660**	**68**	**470**	**538**	**113**	**447**	**560**
Total	**210**	**902**	**1112**	**100**	**764**	**864**	**149**	**720**	**869**

Source: Findings of this study

2.6 Number of Doctors available in the surveyed facility

The following tables enumerate the availability of doctors and medical specialists in various districts of NCR sub-regions. Availability of doctors in government and private facilities has been detailed separately. Apart from this, the figures represent average number of such doctors and medical specialists available per health facility in government and private sector.

This may be noted the total number may not be the absolute figure of available doctors as there is chance of repetition in the number. This happens because doctors especially in private sector are not available on full time basis in any facility; rather they attend different facilities for specific timings and are available on call. Hence, one doctor caters to patients in more than one health facility and the reported number thus will have duplication.

2.6.1 General Physicians and General Surgeons

Table 2.23 shows that a total of 4535 general physicians and 1990 general surgeons are available in NCR sub-regions. Availability of doctors is highest in NCT Delhi.

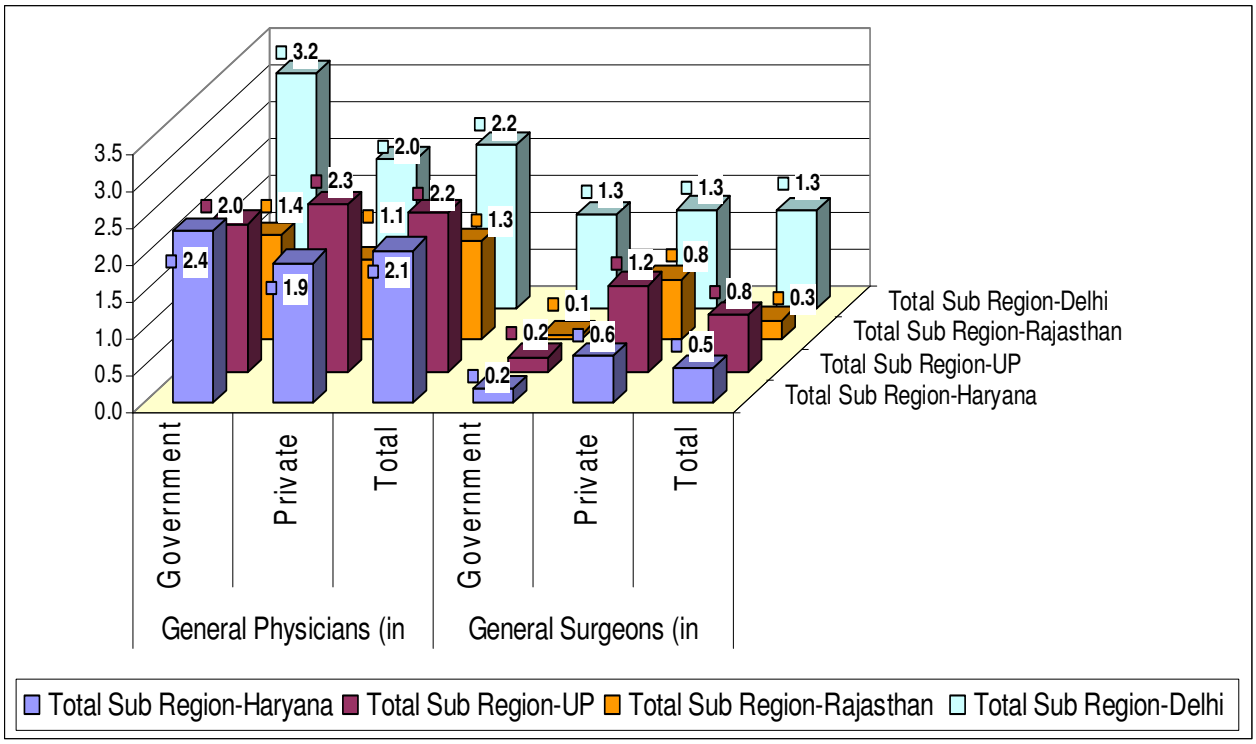
Table 2.23: Availability of General Physicians and General Surgeons (in number)

Name of district	General Physicians (in number)			General Surgeons (in number)		
	Government	Private	Total	Government	Private	Total
Faridabad	44	109	153	4	70	74
Gurgaon	46	91	137	2	27	29
Jhajjar	59	32	91	2	37	39
Mewat	26	10	36	1	2	3
Palwal	41	29	70	0	2	2
Panipat	53	129	182	1	40	41
Rewari	58	111	169	2	25	27
Rohtak	101	37	138	26	0	26
Sonepat	61	127	188	3	25	28
Sub Region-Haryana	**489**	**675**	**1164**	**41**	**228**	**269**
Baghpat	36	6	42	2	4	6
Bulandshaher	215	180	395	7	8	15
Gautam Budhnagar	9	77	86	1	91	92
Ghaziabad including Hapur	32	258	290	7	174	181
Meerut	64	69	133	19	28	47
Sub Region-UP	**356**	**590**	**946**	**36**	**305**	**341**
Alwar	139	37	176	7	28	35
Sub Region-Rajasthan	**139**	**37**	**176**	**7**	**28**	**35**
Delhi	556	1693	2249	221	1124	1345
Sub Region-Delhi	**556**	**1693**	**2249**	**221**	**1124**	**1345**
Total	**1540**	**2995**	**4535**	**305**	**1685**	**1990**

Source: Findings of this study

Figure 2.14 shows that on an average two general physicians are available in health facilities except in NCR Rajasthan, where the number of doctors is less. On the other hand availability of general surgeon is far less; except in Delhi, where on an average one general surgeon per health facility is available. Moreover, availability of general surgeon is more in private facilities than in government health centres. It is because most of the primary health centres do not have a general surgeon available.

Figure 2.14: Average number of General Physicians and General Surgeons per facility



Source: Findings of this study

Table 2.24: Availability of General Physicians and General Surgeons (in Average per facility)

Name of Sub Region	General Physicians						General Surgeons					
	Government			Private			Government			Private		
	Total Number of facility	Available In Number	Average	Total Number of facility	Available In Number	Average	Total Number of facility	Available In Number	Average	Total Number of facility	Available In Number	Average
Sub Region-Haryana	208	489	2.4	353	675	1.9	208	41	0.2	353	228	0.6
Sub Region-UP	179	356	2.0	260	590	2.3	179	36	0.2	260	305	1.2
Sub Region-Rajasthan	97	139	1.4	34	37	1.1	97	7	0.1	34	28	0.8
Sub Region-Delhi	175	556	3.2	841	1693	2.0	175	221	1.3	841	1124	1.3
Total	**659**	**1540**	**2.3 Over all**	**1488**	**2995**	**2.0 Over all**	**659**	**305**	**0.5 Over all**	**1488**	**1685**	**1.1 Over all**

Source: Findings of this study

2.6.2 Obstetrician & Gynaecologists, Paediatrician and Paediatric Surgeon

Table 2.25 details the availability of Obstetrician and Gynaecologist and also Paediatricians and Paediatric surgeon in NCR sub-regions.

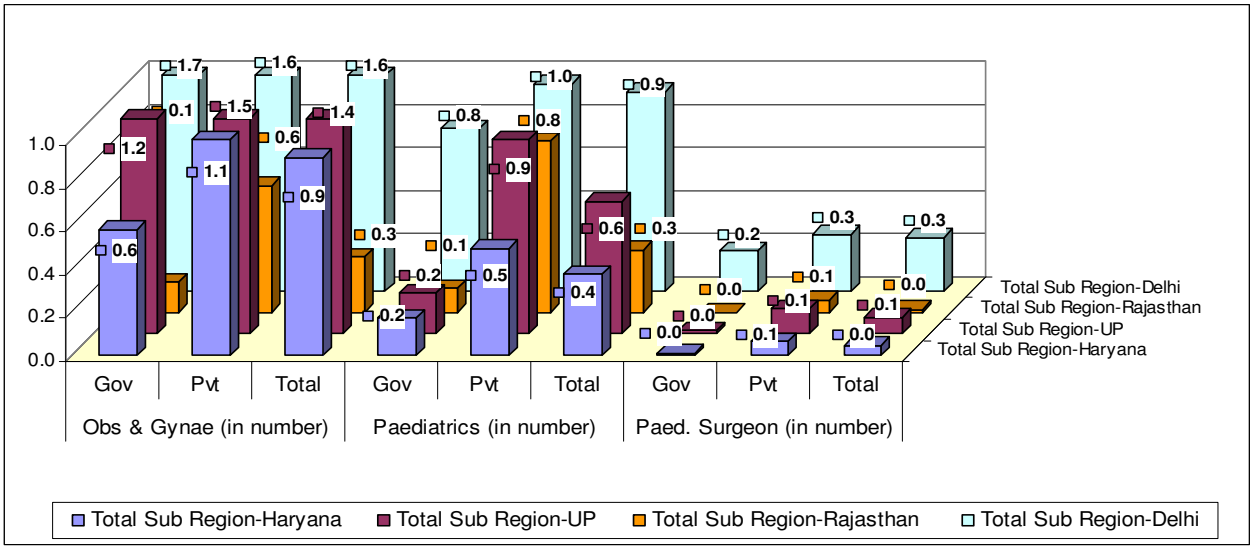
It is clear from Figure 2.15 that on an average 1 to 2 gynaecologists are available in Private facilities and in government facilities of Delhi and Uttar Pradesh sub-region. However, the number is lower in government facilities of Haryana and alarmingly lower in NCR Rajasthan (Alwar district).

Table 2.25: Availability of Obstetrician & Gynaecologists, Paediatrician and Paediatric Surgeons in NCR

Name of district	Obstetrician & Gynaecologists (in number)			Paediatrician (in number)			Paediatric Surgeon (in number)		
	Government	Private	Total	Government	Private	Total	Government	Private	Total
Faridabad	11	77	88	3	54	57	0	7	7
Gurgaon	19	53	72	1	15	16	0	5	5
Jhajjar	6	31	37	2	20	22	0	1	1
Mewat	9	6	15	2	3	5	0	1	1
Palwal	6	10	16	5	5	10	0	0	0
Panipat	5	93	98	3	37	40	0	8	8
Rewari	4	54	58	6	26	32	0	0	0
Rohtak	23	6	29	12	1	13	2	0	2
Sonepat	38	63	101	2	14	16	0	1	1
Sub Region-Haryana	**121**	**393**	**514**	**36**	**175**	**211**	**2**	**23**	**25**
Baghpat	3	5	8	3	2	5	1	1	2
Bulandshaher	126	94	220	12	6	18	1	8	9
Gautam Budhnagar	13	61	74	5	55	60	0	3	3
Ghaziabad including Hapur	17	197	214	5	143	148	1	12	13
Meerut	53	41	94	9	28	37	0	7	7
Sub Region-UP	**212**	**398**	**610**	**34**	**234**	**268**	**3**	**31**	**34**
Alwar	14	20	34	11	27	38	0	2	2
Sub Region-Rajasthan	**14**	**20**	**34**	**11**	**27**	**38**	**0**	**2**	**2**
Delhi	292	1328	1620	132	808	940	33	223	256
Sub Region-Delhi	**292**	**1328**	**1620**	**132**	**808**	**940**	**33**	**223**	**256**
Total	**639**	**2139**	**2778**	**213**	**1244**	**1457**	**38**	**279**	**317**

Source: Findings of this study

Figure 2.15: Obstetrician & Gynaecologists, Paediatrician and Paediatric Surgeon - Average number per facility



Source: Findings of this study

Table 2.26: Availability of Obstetrician & Gynaecologists, Paediatrician and Paediatric Surgeons in NCR (In Average per facility)

Name of Sub Region	Obs & Gynae (in number)						Paediatrics (in number)						Paed. Surgeon (in number)					
	Government			Private			Government			Private			Government			Private		
	Total Number of facility	In Available Number	In Average	Total Number of facility	In Available Number	In Average	Total Number of facility	In Available Number	In Average	Total Number of facility	In Available Number	In Average	Total Number of facility	In Available Number	In Average	Total Number of facility	In Available Number	In Average
Sub Region-Haryana	208	121	0.6	353	393	1.1	208	36	0.2	353	175	0.5	208	2	0.0	353	23	0.1
Sub Region-UP	178	212	1.2	260	398	1.5	178	34	0.2	260	234	0.9	178	3	0.0	260	31	0.1
Sub Region-Rajasthan	97	14	0.1	34	20	0.6	97	11	0.1	34	27	0.8	97	0	0.0	34	2	0.1
Sub Region-Delhi	175	292	1.7	841	1328	1.6	175	132	0.8	841	808	1.0	175	33	0.2	841	223	0.3
Total	**658**	**639**	**1.0 Over all**	**1488**	**2139**	**1.4 Over all**	**658**	**213**	**0.3 Over all**	**1488**	**1244**	**0.8 Over all**	**658**	**38**	**0.1 Over all**	**1488**	**279**	**0.2 Over all**

Source: Findings of this study

2.6.3 Cardiologists and Cardio-Thoracic Vascular Surgeons

Table 2.27 and Figure 2.16 depicts that the availability of cardiologists is low especially in government sector. Only the cardiac centres and specialty hospitals have Cardio-Thoracic Vascular (CTV) Surgeons. Availability of Cardiologists and CTV Surgeons are concentrated in Delhi and also in selected districts of other sub-regions like Faridabad, Gurgaon, Ghaziabad including Hapur and also in Gautambudhnagar, Panipat and Bulandshaher.

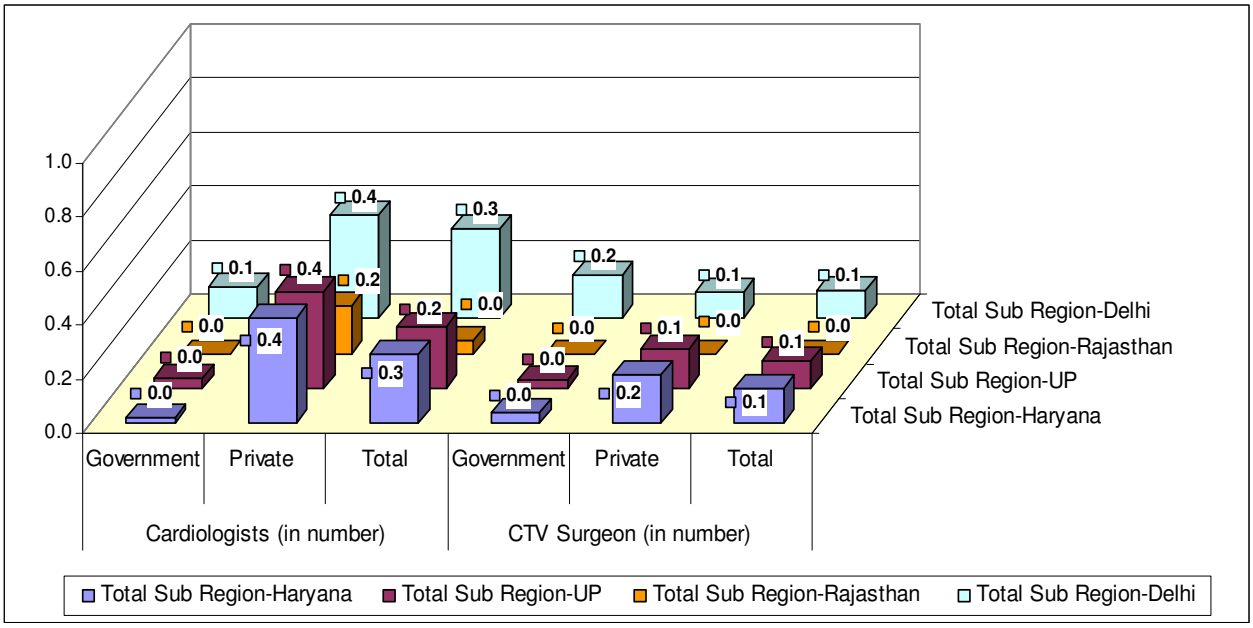
Table 2.27: Availability of Cardiologists and Cardio-Thoracic Vascular Surgeons in NCR

Name of district	Cardiologists (in number)			Cardio-Thoracic Vascular Surgeons (in number)		
	Government	Private	Total	Government	Private	Total
Faridabad	0	26	26	0	22	22
Gurgaon	0	79	79	0	23	23
Jhajjar	0	7	7	0	2	2
Mewat	0	1	1	0	0	0
Palwal	0	0	0	0	0	0

Name of district	Cardiologists (in number)			Cardio-Thoracic Vascular Surgeons (in number)		
	Government	Private	Total	Government	Private	Total
Panipat	0	10	10	0	8	8
Rewari	1	7	8	0	0	0
Rohtak	2	0	2	6	0	6
Sonepat	1	7	8	2	8	10
Sub Region-Haryana	**4**	**137**	**141**	**8**	**63**	**71**
Baghpat	0	1	1	0	1	1
Bulandshaher	1	1	2	2	18	20
Gautam Budhnagar	0	28	28	1	9	10
Ghaziabad including Hapur	2	55	57	2	4	6
Meerut	3	8	11	0	6	6
Sub Region-UP	**6**	**93**	**99**	**5**	**38**	**43**
Alwar	0	6	6	0	0	0
Sub Region-Rajasthan	**0**	**6**	**6**	**0**	**0**	**0**
Delhi	20	321	341	28	80	108
Sub Region-Delhi	**20**	**321**	**341**	**28**	**80**	**108**
Total	**30**	**557**	**587**	**41**	**181**	**222**

Source: Findings of this study

Figure 2.16: Cardiologists and Cardio-Thoracic Vascular Surgeons - Average number per facility



Source: Findings of this study

Table 2.28: Cardiologists and Cardio-Thoracic Vascular Surgeons - Average number per facility

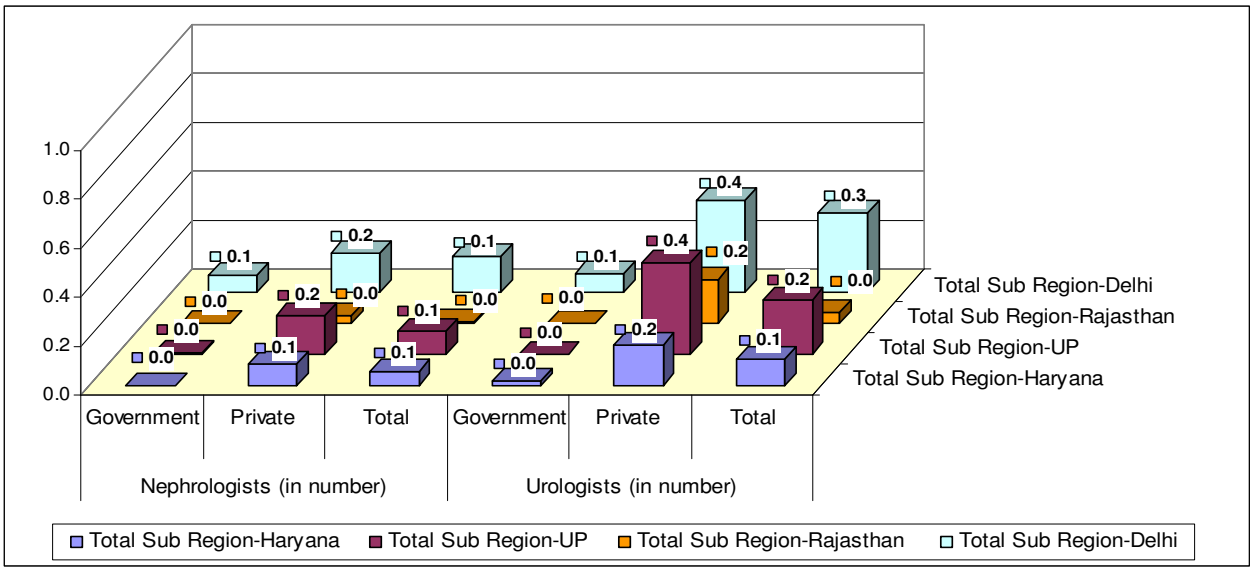
Name of Sub Region	Cardiologists (in number)						CTV Surgeon (in number)					
	Government			Private			Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	4	0.02	353	137	0.39	208	8	0.04	353	63	0.18
Sub Region-UP	178	6	0.03	260	93	0.36	178	5	0.03	260	38	0.15
Sub Region-Rajasthan	97	0	0.00	34	6	0.18	97	0	0.00	34	0	0.00
Sub Region-Delhi	175	20	0.11	841	321	0.38	175	28	0.16	841	80	0.10
Total	**658**	**30**	**0.05 Over all**	**1488**	**557**	**0.37 Over all**	**658**	**41**	**0.06 Over all**	**1488**	**181**	**0.12 Over all**

Source: Findings of this study

2.6.4 Nephrologists and Urologists

Private sector has higher availability of specialists like urologist and nephrologists as can be seen in Figure 2.17. Sub-region wise availability of these medical specialists is higher in Delhi followed by NCR Uttar Pradesh.

Figure 2.17: Nephrologists and Urologists - Average number per facility



Source: Findings of this study

Table 2.29: Nephrologists and Urologists - Average number per facility

Name of Sub Region	Nephrologists (in number)						Urologists (in number)					
	Government			Private			Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	0	0.00	353	33	0.09	208	4	0.02	353	59	0.17
Sub Region-UP	178	1	0.01	260	41	0.16	178	0	0.00	260	98	0.38
Sub Region-Rajasthan	97	0	0.00	34	1	0.03	97	0	0.00	34	6	0.18
Sub Region-Delhi	175	12	0.07	841	133	0.16	175	13	0.07	841	314	0.37
Total	**658**	**13**	**0.02 Over all**	**1488**	**208**	**0.14 Over all**	**658**	**17**	**0.03 Over all**	**1488**	**477**	**0.32 Over all**

Source: Findings of this study

As can be seen in Table 2.30, only 13 nephrologists and 17 Urologists are available in Government facilities and in NCR Rajasthan Government facilities neither of these specialists is available. Most of these specialists are available in private hospitals.

Table 2.30: Availability of Nephrologists and Urologists in NCR

Name of district	Nephrologists (in number)			Urologists (in number)		
	Government	Private	Total	Government	Private	Total
Faridabad	0	7	7	1	24	25
Gurgaon	0	15	15	0	14	14
Jhajjar	0	6	6	0	7	7
Mewat	0	0	0	0	0	0
Palwal	0	0	0	0	0	0
Panipat	0	5	5	0	10	10
Rewari	0	0	0	0	1	1
Rohtak	0	0	0	2	0	2
Sonepat	0	0	0	1	3	4

Name of district	Nephrologists (in number)			Urologists (in number)		
	Government	Private	Total	Government	Private	Total
Sub Region-Haryana	**0**	**33**	**33**	**4**	**59**	**63**
Baghpat	0	0	0	0	2	2
Bulandshaher	0	4	4	0	0	0
Gautam Budhnagar	0	7	7	0	22	22
Ghaziabad including Hapur	0	19	19	0	65	65
Meerut	1	11	12	0	9	9
Sub Region-UP	**1**	**41**	**42**	**0**	**98**	**98**
Alwar	0	1	1	0	6	6
Sub Region-Rajasthan	**0**	**1**	**1**	**0**	**6**	**6**
Delhi	12	133	145	13	314	327
Sub Region-Delhi	**12**	**133**	**145**	**13**	**314**	**327**
Total	**13**	**208**	**221**	**17**	**477**	**494**

Source: Findings of this study

2.6.5 Gastroenterologists

Table 2.31 details the availability of Gastroenterologists (GE) in different sub-regions of NCR. The availability of the GE specialist is less in Government sector. Out of total available 298 doctors, 195 are available in Delhi and out of them 157 are available in private facilities only.

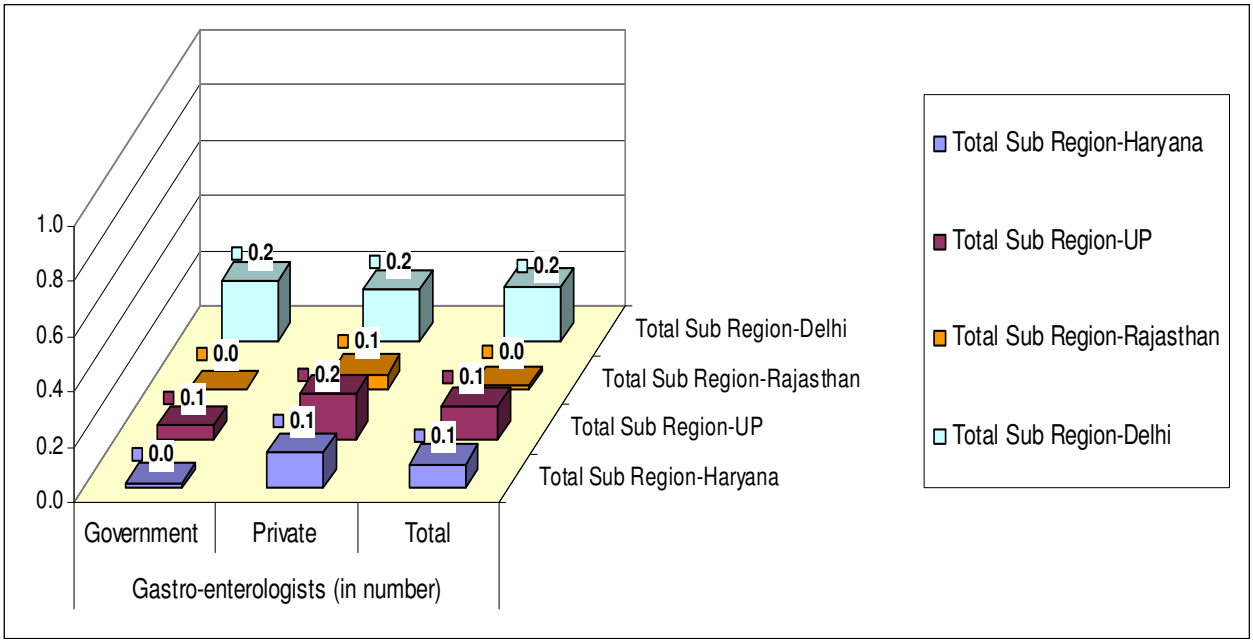
Gurgaon in Haryana sub-region and Ghaziabad (including Hapur) in Uttar Pradesh sub-region of NCR have considerable number of Gastroenterologists following Delhi.

Table 2.31: Availability of Gastro-Enterologists in NCR

Name of district	Government in number	Private in number	Total
Faridabad	0	7	7
Gurgaon	1	22	23
Jhajjar	0	6	6
Mewat	0	0	0
Palwal	0	0	0
Panipat	1	9	10
Rewari	0	1	1
Rohtak	2	0	2
Sonepat	0	0	0
Sub Region-Haryana	**4**	**45**	**49**
Baghpat	0	0	0
Bulandshaher	7	0	7
Gautam Budhnagar	1	15	16
Ghaziabad including Hapur	0	19	19
Meerut	1	9	10
Sub Region-UP	**9**	**43**	**52**
Alwar	0	2	2
Sub Region-Rajasthan	**0**	**2**	**2**
Delhi	38	157	195
Sub Region-Delhi	**38**	**157**	**195**
Total	**51**	**247**	**298**

Source: Findings of this study

Figure 2.18: Gastro-Enterologists - Average number per facility



Source: Findings of this study

Table 2.32: Gastro-Enterologists - Average number per facility

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	4	0.02	353	45	0.13
Sub Region-UP	178	9	0.05	260	43	0.17
Sub Region-Rajasthan	97	0	0.00	34	2	0.06
Sub Region-Delhi	175	38	0.22	841	157	0.19
Total	**658**	**51**	**0.08 Over all**	**1488**	**247**	**0.17 Over all**

Source: Findings of this study

2.6.6 Neurologists and Neuro-surgeons

A total of 438 neurologists and 184 neurosurgeons are available in NCR as given in Table 2.33. 75 per cent of the neurologists and nearly 65 percent of the neurosurgeons are based in Delhi followed by Ghaziabad including Hapur, Gautambudhnagar and Faridabad.

Table 2.33: Availability of Neurologists and Neuro-surgeons in NCR

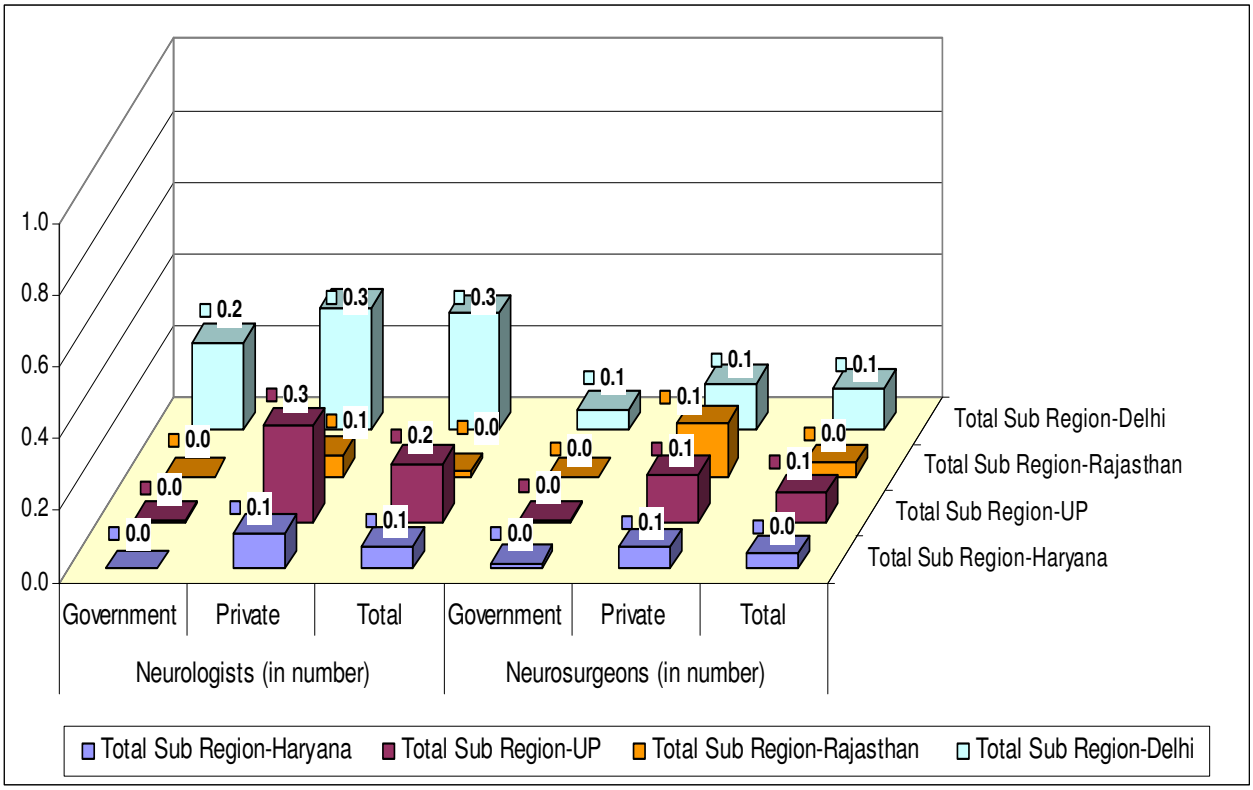
Name of district	Neurologists (in number)			Neurosurgeons (in number)		
	Government	Private in number	Total	Government in number	Private in number	Total
Faridabad	0	14	14	0	9	9
Gurgaon	0	6	6	0	6	6
Jhajjar	0	6	6	0	2	2
Mewat	0	0	0	0	0	0
Palwal	0	0	0	0	0	0
Panipat	0	9	9	0	4	4

Name of district	Neurologists (in number)			Neurosurgeons (in number)		
	Government	Private in number	Total	Government in number	Private in number	Total
Rewari	0	0	0	0	0	0
Rohtak	0	0	0	3	0	3
Sonepat	0	0	0	0	0	0
Sub Region-Haryana	**0**	**35**	**35**	**3**	**21**	**24**
Baghpat	0	1	1	0	1	1
Bulandshaher	1	10	11	0	0	0
Gautam Budhnagar	0	7	7	0	7	7
Ghaziabad including Hapur	0	42	42	0	15	15
Meerut	0	10	10	1	12	13
Sub Region-UP	**1**	**70**	**71**	**1**	**35**	**36**
Alwar	0	2	2	0	5	5
Sub Region-Rajasthan	**0**	**2**	**2**	**0**	**5**	**5**
Delhi	43	287	330	10	109	119
Sub Region-Delhi	**43**	**287**	**330**	**10**	**109**	**119**
Total	**44**	**394**	**438**	**14**	**170**	**184**

Source: Findings of this study

Figure 2.19 indicates that availability of neurospecialists is very less in Government sector. Except in NCR Rajasthan, 1 to 3 health facilities out of 10 in various NCR sub-regions have a neurospecialist.

Figure 2.19: Neurologists and Neuro-surgeons - Average number per facility



Source: Findings of this study

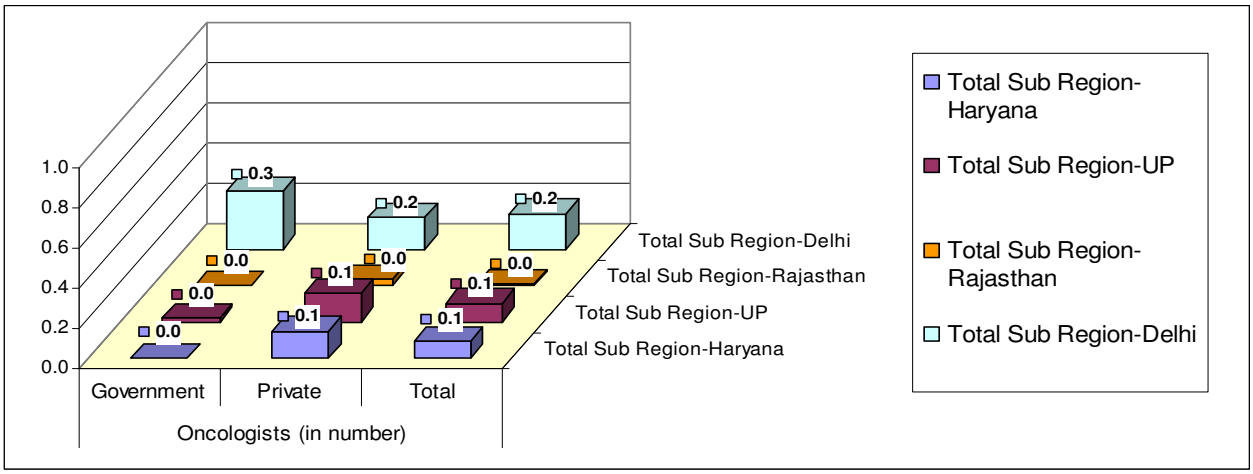
Table 2.34: Neurologists and Neuro-surgeons - Average number per facility

Name of Sub Region	Neurologists						Neurosurgeons					
	Government			Private			Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	0	0.00	353	35	0.10	208	3	0.01	353	21	0.06
Sub Region-UP	178	1	0.01	260	70	0.27	178	1	0.01	260	35	0.13
Sub Region-Rajasthan	97	0	0.00	34	2	0.06	97	0	0.00	34	5	0.15
Sub Region-Delhi	175	43	0.25	841	287	0.34	175	10	0.06	841	109	0.13
Total	**658**	**44**	**0.07 Over all**	**1488**	**394**	**0.26 Over all**	**658**	**14**	**0.02 Over all**	**1488**	**170**	**0.11 Over all**
Source: Findings of this study												

2.6.7 Oncologists

The average number of Oncologists is highest in Government facilities of Delhi, a total of 50 oncologists are available in Government hospitals of Delhi while 130 oncologists are available in private hospitals. Apart from Delhi only in Meerut Oncologists are available in Government facilities. 70 percent of the oncologists are available in Delhi, followed by Gurgaon, Ghaziabad including Hapur, Meerut and Faridabad. Table 2.36 and figure 2.20 depicts availability of Oncologists in various sub-regions of NCR.

Figure 2.20: Oncologists - Average number per facility



Source: Findings of this study

Table 2.35: Oncologists - Average number per facility

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	0	0.00	353	47	0.13
Sub Region-UP	178	3	0.02	260	37	0.14
Sub Region-Rajasthan	97	0	0.00	34	1	0.03
Sub Region-Delhi	175	50	0.29	841	130	0.15
Total	**658**	**53**	**0.08 Over all**	**1488**	**215**	**0.14 Over all**
Source: Findings of this study						

Table 2.36: Availability of Oncologists in NCR

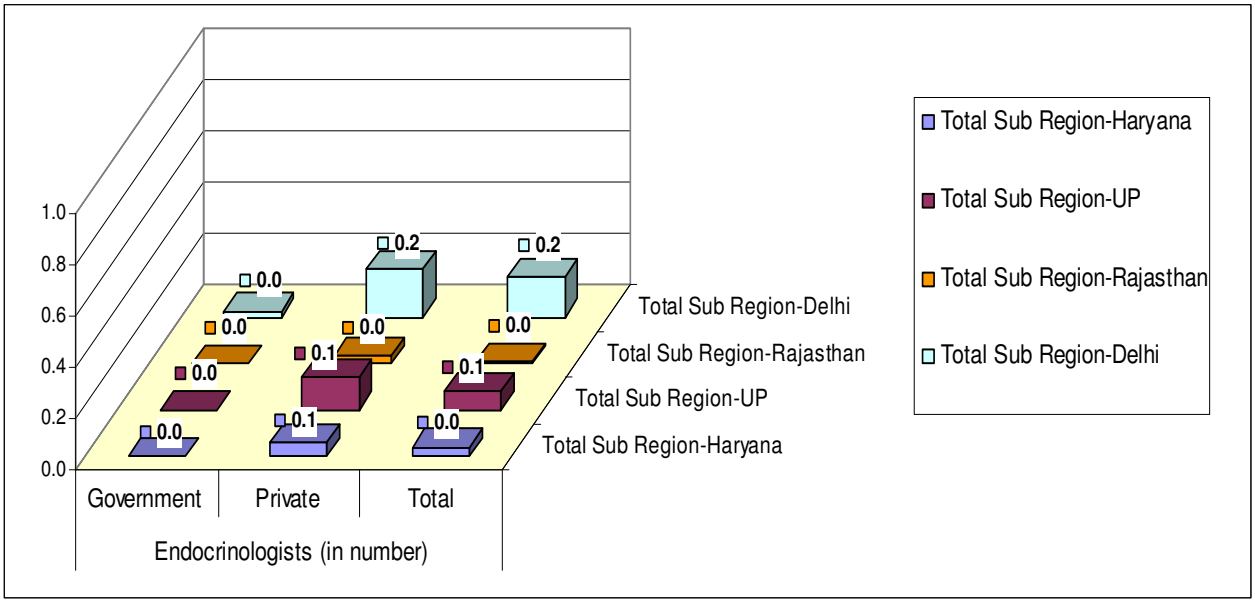
Name of district	Government Facilities (in number)	Private Facilities (in number)	Total
Faridabad	0	12	12
Gurgaon	0	24	24
Jhajjar	0	3	3
Mewat	0	0	0
Palwal	0	0	0
Panipat	0	8	8
Rewari	0	0	0
Rohtak	0	0	0
Sonepat	0	0	0
Sub Region-Haryana	**0**	**47**	**47**
Baghpat	0	1	1
Bulandshaher	0	6	6
Gautam Budhnagar	0	7	7
Ghaziabad including Hapur	0	13	13
Meerut	3	10	13
Sub Region-UP	**3**	**37**	**40**
Alwar	0	1	1
Sub Region-Rajasthan	**0**	**1**	**1**
Delhi	50	130	180
Sub Region-Delhi	**50**	**130**	**180**
Total	**53**	**215**	**268**

Source: Findings of this study

2.6.8 Endocrinologists

Figure 2.21 and Table 2.38 as follows depicts availability of endocrinologists in NCR.

Figure 2.21: Endocrinologists - Average number per facility



Source: Findings of this study

Table 2.37: Endocrinologists - Average number per facility

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	0	0.00	353	20	0.06
Sub Region-UP	178	0	0.00	260	33	0.13
Sub Region-Rajasthan	97	0	0.00	34	1	0.03
Sub Region-Delhi	175	4	0.02	841	157	0.19
Total	**658**	**4**	**0.01 Over all**	**1488**	**211**	**0.14 Over all**

Source: Findings of this study

As evident from the data except in Delhi, endocrinologists are only available in Private health facilities. 75 percent of the Specialists are available in Delhi followed by Ghaziabad including Hapur, Gurgaon and Meerut.

Table 2.38: Availability of Endocrinologists in NCR

Name of district	Government in number	Private in number	Total
Faridabad	0	4	4
Gurgaon	0	10	10
Jhajjar	0	4	4
Mewat	0	0	0
Palwal	0	0	0
Panipat	0	2	2
Rewari	0	0	0
Rohtak	0	0	0
Sonepat	0	0	0
Sub Region-Haryana	**0**	**20**	**20**
Baghpat	0	0	0
Bulandshaher	0	0	0
Gautam Budhnagar	0	3	3
Ghaziabad including Hapur	0	21	21
Meerut	0	9	9
Sub Region-UP	**0**	**33**	**33**
Alwar	0	1	1
Sub Region-Rajasthan	**0**	**1**	**1**
Delhi	4	157	161
Sub Region-Delhi	**4**	**157**	**161**
Total	**4**	**211**	**215**

Source: Findings of this study

2.6.9 Anaesthetists

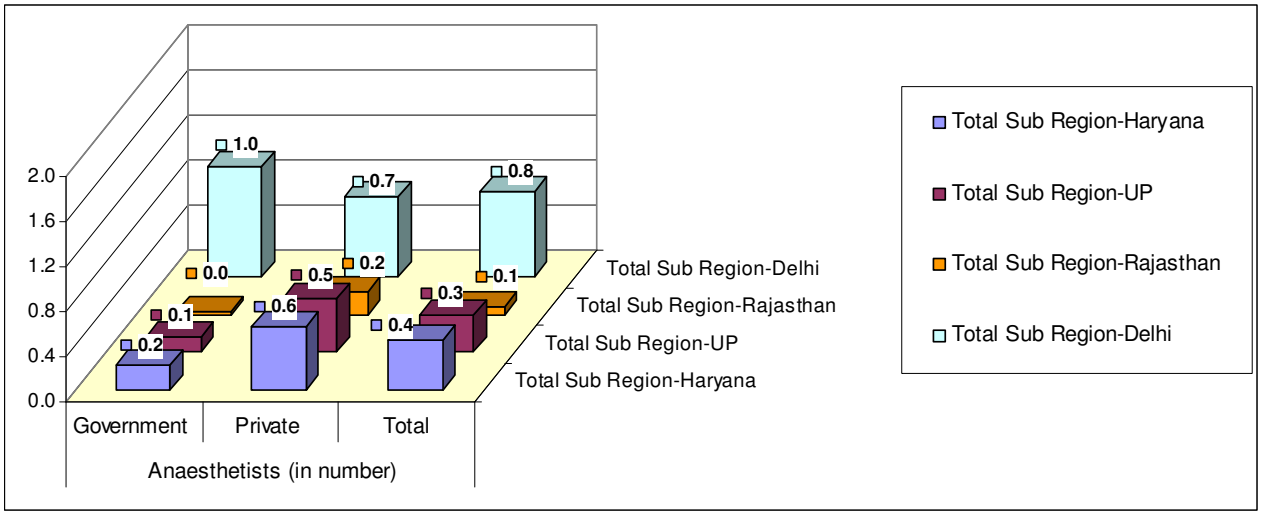
Figure 2.22 and Table 2.39 details the availability of anaesthetists in different NCR Sub-regions. As evident from the graph, one anaesthetist is available on an average per government hospital located in Delhi. 5 to 7 private hospitals and nursing homes out of 10 have anaesthetists in various NCR sub-regions except Rajasthan where only 10 anaesthetists are working altogether, 3 in government facilities and 7 in private hospitals. Private hospitals of Delhi and Gurgaon have very high number of anaesthetists, followed by Ghaziabad including Hapur and Gautam Budhnagar.

Table 2.39: Availability of Anaesthetists in NCR

Name of district	Government in number	Private in number	Total
Faridabad	14	36	50
Gurgaon	2	111	113
Jhajjar	0	18	18
Mewat	0	1	1
Palwal	0	1	1
Panipat	1	23	24
Rewari	1	4	5
Rohtak	25	1	26
Sonepat	4	4	8
Sub Region-Haryana	**47**	**199**	**246**
Baghpat	1	4	5
Bulandshaher	4	0	4
Gautam Budhnagar	3	36	39
Ghaziabad including Hapur	6	69	75
Meerut	9	15	24
Sub Region-UP	**23**	**124**	**147**
Alwar	3	7	10
Sub Region-Rajasthan	**3**	**7**	**10**
Delhi	172	599	771
Sub Region-Delhi	**172**	**599**	**771**
Total	**245**	**929**	**1174**

Source: Findings of this study

Figure 2.22: Anaesthetists - Average number per facility



Source: Findings of this study

Table 2.40: Anaesthetists - Average number per facility

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	47	0.23	353	199	0.56
Sub Region-UP	178	23	0.13	260	124	0.48
Sub Region-Rajasthan	97	3	0.03	34	7	0.21
Sub Region-Delhi	175	172	0.98	841	599	0.71
Total	**658**	**245**	**0.37 Over all**	**1488**	**929**	**0.62 Over all**

Source: Findings of this study

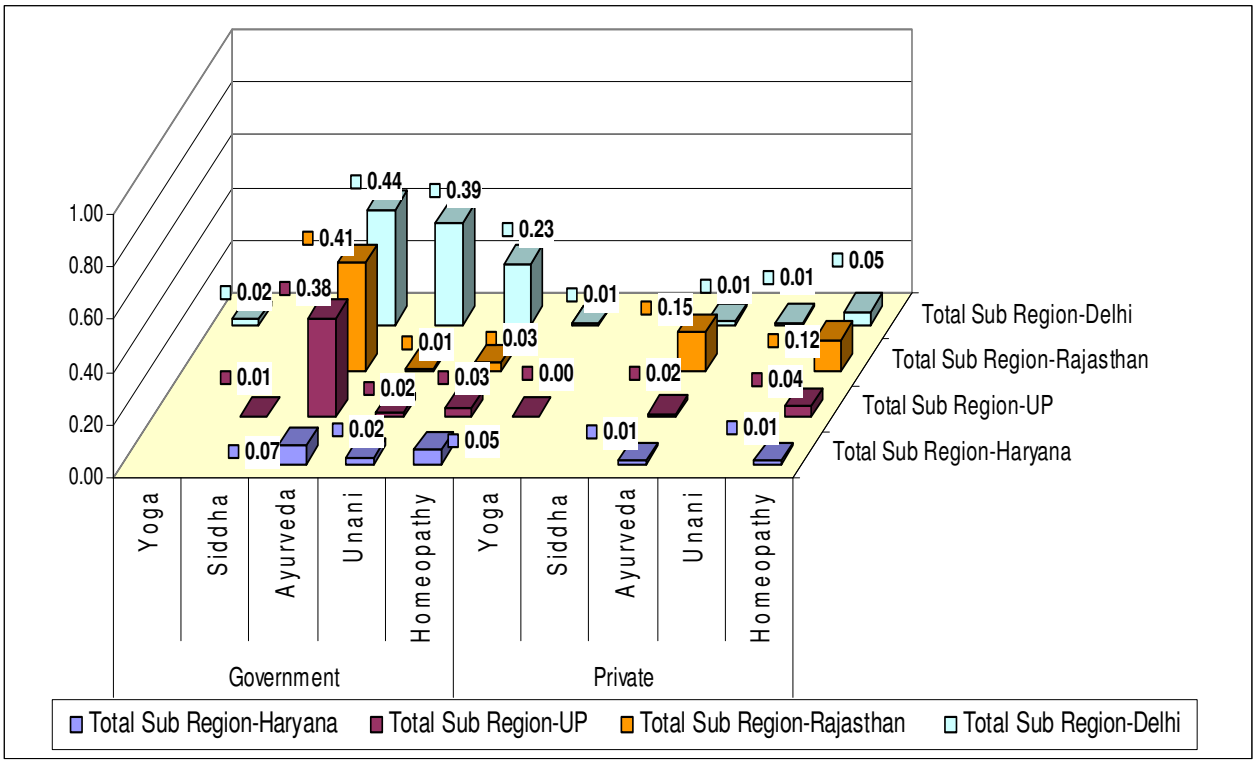
2.6.10 AYUSH

Among different categories of AYUSH medical facilities Ayurveda is most common. A total of 226 Ayurveda specialists are providing consultations to the patients in various NCR sub-regions.

Out of them, 200 are available in Government facilities. Majority of them are available in health facilities of Delhi and NCR Uttar Pradesh. The Government facilities in Alwar District of NCR Rajasthan have about 40 Ayurveda specialists.

The next popular AYUSH category is Homeopathy. There are a total of 123 homeopaths in NCR out of which 68% are in Delhi. Also in Delhi private and government health facilities have equal number of homeopaths. There are 11 Yoga, 1 Siddha and 85 Unani specialists in NCR, of which majority are available in Delhi.

Figure 2.23: AYUSH - Average number per facility



Source: Findings of this study

Table 2.41: AYUSH - Average number per facility

Name of the Sub Region	Yoga					
	Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	0	0.00	353	0	0.00
Sub Region-UP	178	0	0.00	260	1	0.00
Sub Region-Rajasthan	97	0	0.00	34	0	0.00
Sub Region-Delhi	175	4	0.02	841	6	0.007
Total	**658**	**4**	**0.02 Over all**	**1488**	**7**	**0.005 Over all**

Name of the Sub Region	Siddha					
	Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	0	0.000	353	0	0.000
Sub Region-UP	179	1	0.006	260	0	0.000
Sub Region-Rajasthan	97	0	0.000	34	0	0.000
Sub Region-Delhi	175	0	0.000	841	0	0.000
Total	**659**	**1**	**0.002 Over all**	**1488**	**0**	**0.000 Over all**
Name of the Sub Region	**Ayurveda**					
	Government			**Private**		
	Total Number of facility	**Available In Number**	**In Average**	**Total Number of facility**	**Available In Number**	**In Average**
Sub Region-Haryana	208	14	0.07	353	4	0.01
Sub Region-UP	178	68	0.37	260	4	0.02
Sub Region-Rajasthan	97	40	0.41	34	5	0.15
Sub Region-Delhi	175	78	0.44	841	13	0.01
Total	**658**	**200**	**0.30 Over all**	**1488**	**26**	**0.02 Over all**
Name of the Sub Region	**Unani**					
	Government			**Private**		
	Total Number of facility	**Available In Number**	**In Average**	**Total Number of facility**	**Available In Number**	**In Average**
Sub Region-Haryana	208	5	0.02	353	0	0.00
Sub Region-UP	179	4	0.02	260	0	0.00
Sub Region-Rajasthan	97	1	0.01	34	0	0.00
Sub Region-Delhi	175	68	0.39	841	7	0.01
Total	**659**	**78**	**0.12 Over all**	**1488**	**7**	**0.02 Over all**
Name of the Sub Region	**Homeopathy**					
	Government			**Private**		
	Total Number of facility	**Available In Number**	**In Average**	**Total Number of facility**	**Available In Number**	**In Average**
Sub Region-Haryana	208	11	0.05	353	4	0.01
Sub Region-UP	178	6	0.03	260	11	0.04
Sub Region-Rajasthan	97	3	0.03	34	4	0.12
Sub Region-Delhi	175	42	0.23	841	42	0.05
Total	**658**	**62**	**0.09 Over all**	**1488**	**61**	**0.04 Over all**

Source: Findings of this study

Table 2.42: Availability of AYUSH facility in NCR

	Government in number					Private in number					Total				
Name of district	**Yoga**	**Siddha**	**Ayurveda**	**Unani**	**Homeopathy**	**Yoga**	**Siddha**	**Ayurveda**	**Unani**	**Homeopathy**	**Yoga**	**Siddha**	**Ayurveda**	**Unani**	**Homeopathy**
Faridabad	0	0	2	0	2	0	0	2	0	0	0	0	4	0	2
Gurgaon	0	0	5	0	0	0	0	2	0	0	0	0	7	0	0
Jhajjar	0	0	1	0	5	0	0	0	0	2	0	0	1	0	7
Mewat	0	0	3	5	3	0	0	0	0	0	0	0	3	5	3
Palwal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panipat	0	0	1	0	0	0	0	0	0	2	0	0	1	0	2
Rewari	0	0	2	0	1	0	0	0	0	0	0	0	2	0	1
Rohtak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonepat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub Region-Haryana	**0**	**0**	**14**	**5**	**11**	**0**	**0**	**4**	**0**	**4**	**0**	**0**	**18**	**5**	**15**
Baghpat	0	0	19	2	1	0	0	0	0	0	0	0	19	2	1
Bulandshaher	0	0	9	0	0	0	0	0	0	0	0	0	9	0	0
Gautam Budhnagar	0	0	3	0	0	0	0	0	0	0	0	0	3	0	0
Ghaziabad including Hapur	0	0	7	0	0	0	0	2	0	10	0	0	9	0	10
Meerut	0	1	30	2	5	1	0	2	0	1	1	1	32	2	6
Sub Region-UP	**0**	**1**	**68**	**4**	**6**	**1**	**0**	**4**	**0**	**11**	**1**	**1**	**72**	**4**	**17**
Alwar	0	0	40	1	3	0	0	5	0	4	0	0	45	1	7
Sub Region-Rajasthan	**0**	**0**	**40**	**1**	**3**	**0**	**0**	**5**	**0**	**4**	**0**	**0**	**45**	**1**	**7**
Delhi	4	0	78	68	42	6	0	13	7	42	10	0	91	75	84
Sub Region-Delhi	**4**	**0**	**78**	**68**	**42**	**6**	**0**	**13**	**7**	**42**	**10**	**0**	**91**	**75**	**84**
Total	**4**	**1**	**200**	**78**	**62**	**7**	**0**	**26**	**7**	**61**	**11**	**1**	**226**	**85**	**123**

Source: Findings of this study

2.7 Number of Paramedical staff available in the surveyed facility

The following table details that there are a total of 35980 Paramedical staff available in NCR regions, out of which 15242 are available in Government health facilities.

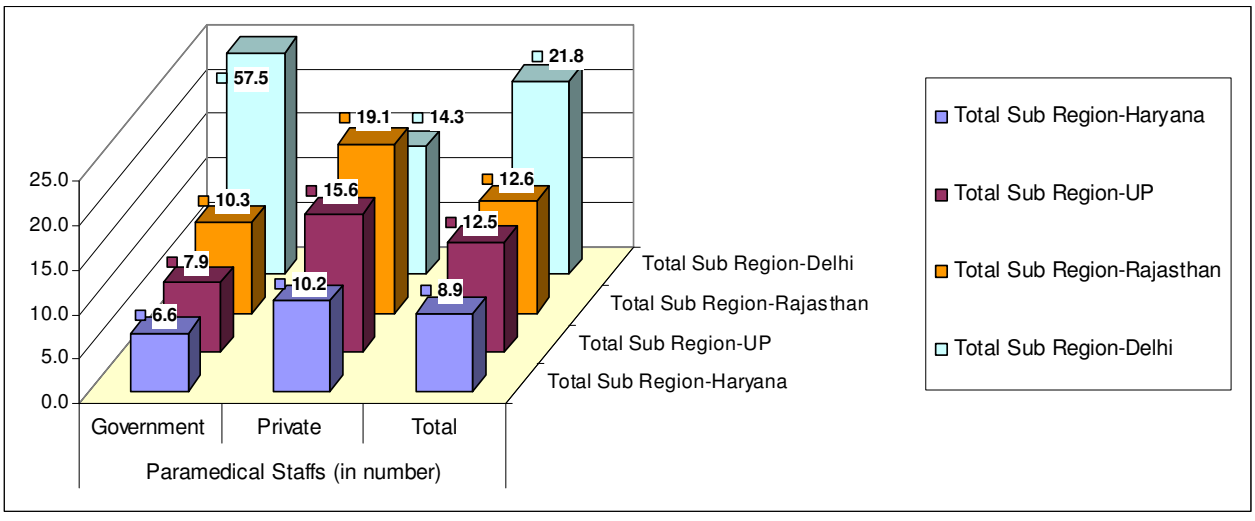
Table 2.43: Number of Paramedical staff available in the surveyed facilities in NCR

Name of district	Government in number	Private in number	Total
Faridabad	193	787	980
Gurgaon	141	802	943
Jhajjar	211	310	521
Mewat	202	56	258
Palwal	69	70	139
Panipat	162	876	1038
Rewari	146	225	371
Rohtak	120	101	221
Sonepat	125	374	499
Sub Region-Haryana	**1369**	**3601**	**4970**
Baghpat	104	90	194
Bulandshaher	511	334	845
Gautam Budhnagar	81	1055	1136
Ghaziabad including Hapur	155	1619	1774
Meerut	552	1224	1776
Sub Region-UP	**1403**	**4322**	**5725**
Alwar	1001	650	1651
Sub Region-Rajasthan	**1001**	**650**	**1651**
Delhi	11469	12165	23634
Sub Region-Delhi	**11469**	**12165**	**23634**
Total	**15242**	**20738**	**35980**

Source: Findings of this study

From Figure 2.24, one can see that on an average 57 paramedical staff are available in government health facilities of Delhi while in private facilities of Delhi the average is 14 to 15 paramedics per facility. The private hospital and nursing homes of NCR Rajasthan have on an average 19 staff, while in government sector the average is only 10.

Figure 2.24: Average number of Paramedical Staff available in the surveyed facility



Source: Findings of this study

In NCR Uttar Pradesh and Haryana, the average number of paramedics per facility in government sector is 6 to 8 while in private sector the average is 15 to 16 in NCR UP while in Haryana it is 10.

The number of paramedics is very low in comparison to the bed size of most of the facilities and need special attention for any further planning.

Table 2.44: Average number of Paramedical Staff available in the surveyed facility

Name of Sub Region	Government			Private		
	Total Number of facility	Available In Number	In Average	Total Number of facility	Available In Number	In Average
Sub Region-Haryana	208	1369	6.6	353	3601	10.2
Sub Region-UP	179	1403	7.8	260	4322	16.6
Sub Region-Rajasthan	97	1001	10.3	34	650	19.1
Sub Region-Delhi	175	11469	65.5	841	12165	14.5
Total	**659**	**15242**	**23.1 Over all**	**1488**	**20738**	**13.93 Over all**

Source: Findings of this study

2.8 GIS Mapping

Mapping of health infrastructures having in-patient facility has been carried out throughout National Capital Region, as part of Activity B under primary research.

2.8.1 Type of GIS file

The Geo-database is Environmental Systems Research Institute (ESRI) shape file with UTM-WGS84 coordinate system. GPS points are also on this coordinate system.

2.8.2 Data of the file

Base map of the file is NCR geo-referred map with basic features of administrative division, connectivity such as main roads, main rail line, district headquarters and two main rivers; Yamuna and Ganga.

The surveyed hospitals and other health facilities are marked on the NCR map from the GPS points taken during the survey on UTM-WGS84 coordinate system. Each hospital is linked with its attribute data. The attributes shown in the Health facilities GIS file are as per the checklist of mapping, consisting of all the parameters of survey and respective responses.

Information of each hospital / health facility is presented in a drop down information log. The attribute drop down log can be opened in the shape file. The district wise matrix is attached with the shape file which can also be handled as an excel sheet.

2.8.3 Data presentation

The hospital/ health facility surveyed and presented are 2145 points out of which 2015 health facilities having in patient services. The base map has been scaled at different levels to provide a clear presentation of the GIS map. The whole mapping data with GIS points is attached as Appendix D of Volume-II of the report, the soft copy of the same compatible to ArcInfo has been provided in CD to NCRPB. One sample model of Alwar is attached in this report.

2.8.4 Spatial Analysis

The spatial distribution of health facilities in different districts of sub regions of NCR shows that most of the health facilities are constructed by the side of roads and highways thus, are well connected and easily accessible. However, the high-end health facilities at district level are concentrated towards the district centre. Apart from this, the available tertiary health care facilities of NCR districts excluding NCT are mostly towards the Delhi border only. This could be the reason for patient's frequent visit to health facilities in Delhi. However, in district Alwar the health facilities are quite adequately dispersed in the district in comparison to other districts.

Table 2.45: District Wise Status of Spatial Analysis of Health Facilities in NCR

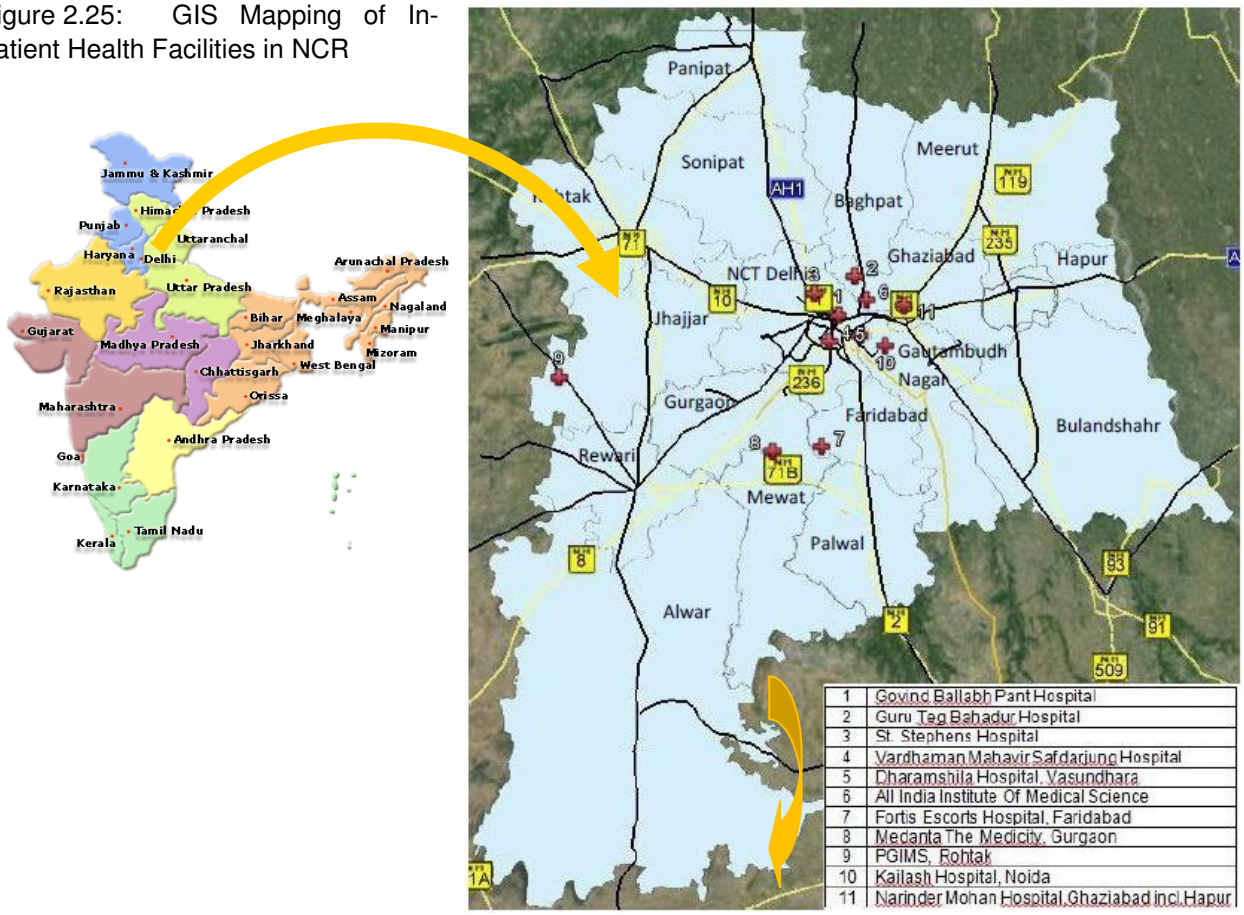
Sub Regions of NCR	Name of district	Result of Spatial Analysis
Haryana	Faridabad*	Concentration of Tertiary care health facilities are in district center and towards Delhi Border
	Gurgaon	Concentration of Tertiary care health facilities are in district center and towards Delhi Border
	Jhajjar	Concentration of Tertiary care health facilities are in district center and towards Delhi Border i.e. Bhadurgarh leaving the remaining part of the region unserved.
	Mewat	Concentration of Tertiary care health facilities are in district center and towards Sohna Road leaving the remaining part of the region under served.
	Palwal*	Concentration of Tertiary care health facilities are in district center
	Panipat	Concentration of Tertiary care health facilities are in district center
	Rewari	Concentration of Tertiary care health facilities are in district center and towards Delhi Border leaving the remaining part of the region under served.
	Rohtak	Well dispersed health facilities catering to patient of each region within the district
	Sonepat	Concentration of Tertiary care health facilities are in district center
Uttar Pradesh	Baghpat	Well dispersed health facilities catering to patient of each region within the district
	Bulandshaher	Well dispersed health facilities catering to patient of each region within the district
	Gautam Budhnagar	Concentration of Tertiary care health facilities towards Delhi Border. It seems they are catering to Delhi population also.
	Ghaziabad including Hapur	Concentration of Tertiary care health facilities are in district center and towards Delhi Border, hospitals like Pushpanjali, Narendra Mohan etc. leaving rest part of the region under served.
	Meerut	Well dispersed health facilities catering to patient of each region within the district
Rajasthan	Alwar	Well dispersed health facilities catering to patient of each region within the district
Delhi	Delhi	Well dispersed health facilities catering to patient of each region within the district
Source: Finding of this Study, * District boundaries of the Faridabad and Palwal are shown common in the map, as initially Pawal was a part of Faridabad district. ***Detailed GIS maps (facility wise, district wise, region wise) is attached as appendix D in Volume II of the report***		

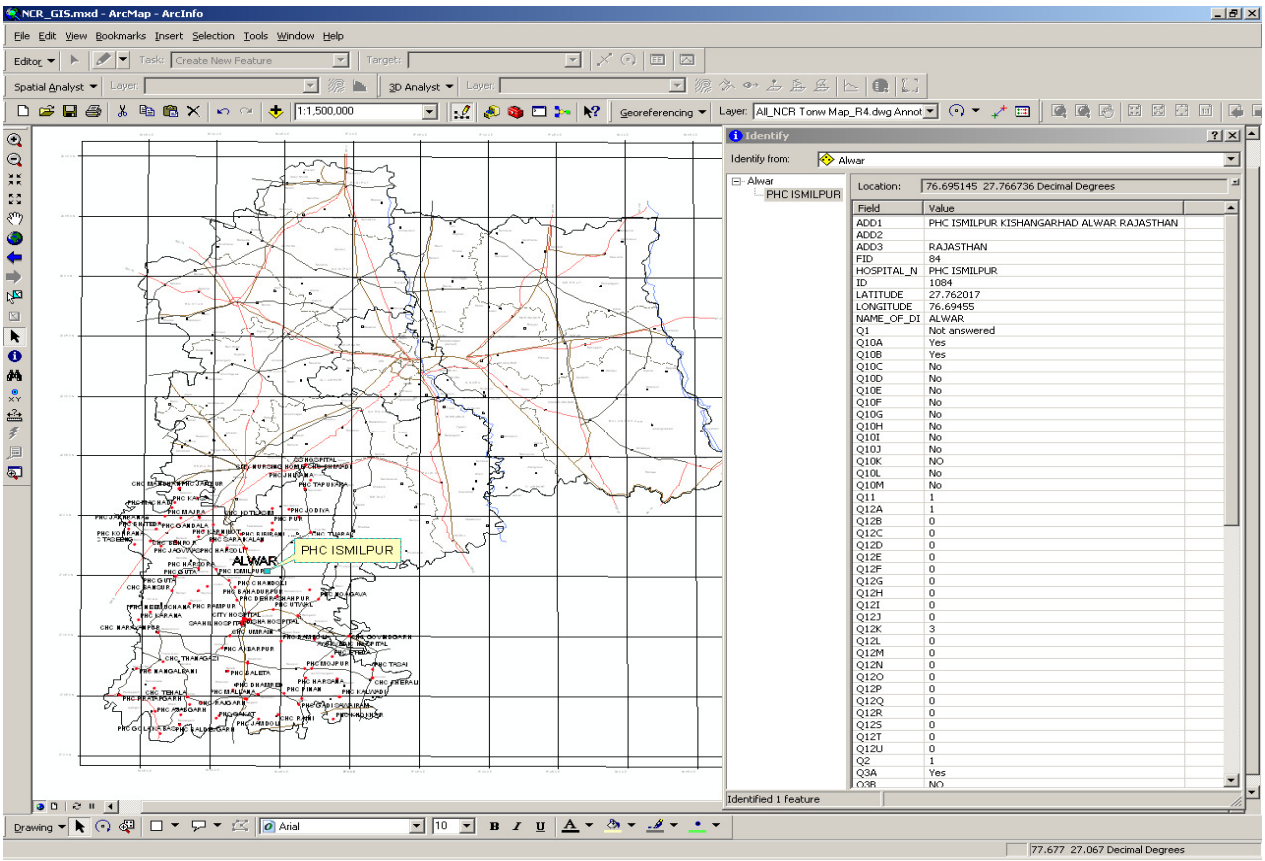
2.8.5 Alwar Sample model

Alwar has been taken up as a model for the NCR health facility GIS mapping. NCR geo-referred map was linked with the hospital / health facility geo-coordinate points to mark each facility location on the base map. The survey response sheet of respective hospital/ health facility is attached as attributes to each location. The GIS map presented in Figure 2.25 is as per the desired output of the study. The background information, provided as "Details of the health facility" is as per the approved checklist. The categories/parameters presented as Sl. No. in this model map is further decoded in the main data.

The GIS maps for all sub-regions, similar to the Alwar sample map are being provided in soft copy. The detailed GIS maps (facility wise, district wise, region wise) is attached as Appendix D in Volume II of the report

Figure 2.25: GIS Mapping of In-patient Health Facilities in NCR





Source: Findings of this study

3. Findings from Referral Hospitals

The primary survey has been carried out in 11 referral hospitals of NCR region to assess the existing infrastructure available in these facilities and study the profile of patients receiving treatment. The survey focused on identifying the gaps in the peripheral health facilities in the NCR districts for which patients visit the referral hospitals. The second objective of this activity was to identify the key concerns in these facilities.

3.1 Number of referral hospital covered

Out of the eleven referral hospitals covered under this activity, 45 percent are government facilities and 55 percent are private facilities. Category wise only two are General-Tertiary care hospitals, while rest nine are speciality or super speciality hospitals.

The sample is representative of the referral system prevailing in NCR. Half of the hospitals have been selected from Delhi NCT as the patient influx is highest here. Moreover tertiary care and super speciality government facilities are catering to a large section of patients. In UP and Haryana, larger share of speciality care is extended by the private sector.

Table 3.1: Referral hospitals in NCR shortlisted for primary survey

Name of district	Name of referral hospital	Category of hospital	
Delhi	Govind Ballabh Pant Hospital	Government	Super-Speciality
	Guru Teg Bahadur Hospital	Government	General – Tertiary Care
	St. Stephens Hospital	Private	Super-Speciality
	Vardhaman Mahavir Safdarjung Hospital	Government	Super-Speciality
	Dharamshila Hospital, Vasundhara	Private	Super-Speciality
	All India Institute Of Medical Science	Government	Super-Speciality
Haryana	Fortis Escorts Hospital, Faridabad	Private	Multi-Speciality
	Medanta The Medicity, Gurgaon	Private	Super-Speciality
	Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak	Government	General – Tertiary level
Uttar Pradesh	Kailash Hospital, Noida	Private	Super-Speciality
	Narinder Mohan Hospital, Ghaziabad	Private	Super-Speciality

Source: Findings of this study

3.2 Number of beds available

The bed strength in government tertiary care / speciality hospitals is higher (above 500), whereas the bed strength for all private facilities surveyed ranges between 200-500. It was also observed that the bed occupancy rate is also very high (above 85%) in government facilities. The occupancy varies season wise and during winter the occupancy remains at the lower side. However during summer-monsoon, especially during outbreak of malaria dengue etc, the occupancy rate in general and medicine wards escalates to 200 percent. The average occupancy rate in private hospitals ranges between 50 –100 percent.

Government hospitals cater to a large section of lower income group people. Many of these are empanelled with central and state government employee medical schemes. They also cater to critical patients from various income groups and from various states. On the other hand, service

is quite expensive in private hospitals. Obviously this leads to enormous pressure on the government referral hospitals. The following table provides bed availability and bed occupancy rates of various referral hospitals sampled.

Table 3.2: Beds availability and occupancy rates in referral hospitals under survey

Name of district	Name of referral hospital	Number of beds	Bed occupancy rate
Delhi	Govind Ballabh Pant Hospital	629	95%
	Guru Teg Bahadur Hospital	1014	96%
	St. Stephens Hospital	724	80%
	Vardhaman Mahavir Safdarjung Hospital	1576	100%
	Dharamshila Hospital, Vasundhara	299	50%
	All India Institute Of Medical Science	1803	100%
Haryana	Fortis Escorts Hospital, Faridabad	210	70%
	Medanta The Medicity, Gurgaon	497	75%
	Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak	1597	88%
Uttar Pradesh	Kailash Hospital, Noida	325	80%
	Narinder Mohan Hospital, Ghaziabad	300	50%

Source: Findings of this study

From analysis of patients, it was observed that about 16 percent of Delhi Patients are visiting referral hospitals contacted in NCR Uttar Pradesh and Haryana, the number as mentioned by hospital administration is about 70,000.

3.3 Type of facility available

Apart from Guru Teg Bahadur Hospital and Post Graduate Institute of Medical Sciences, Rohtak all other sampled referral facilities are super-speciality hospitals.

GB Pant Hospital has super-specialization in Cardiology, whereas Dharamshila Hospital has super specialization in Oncology. All other have multi-super-specialization. Fortis Escorts Hospital is a Multi-speciality hospital. The following table provides a snap shot of various types of facilities available in the referral hospitals.

Table 3.3: Type of facilty available in referral hospitals under study

Name of referral hospital	Type of facility available	
	Diagnostics	Super-specialization
District: Delhi		
Govind Ballabh Pant Hospital	• Neuropathology • Cardiovascular pathology • Gastrointestinal pathology • Cytology • Clinical pathology and haematology.	• Cardiology
Guru Teg Bahadur Hospital	• Gynaecology • Paediatrics & neonatal • Ophthalmic • Medicine • Orthopaedic • Surgery • Dermatology • Dental	Nil

Name of referral hospital	Type of facility available	
	Diagnostics	**Super-specialization**
	• ENT • Neurosurgery • Neurology • Accident & Emergency • Burns and plastics • Apart from the above, the facility has OPD for urology, psychiatry, anti retroviral diseases, pain clinic, anti-rabies clinic and ayurveda, homoeopathy and yoga.	
St. Stephens Hospital	• Gynaecology • Neonatology • Paediatrics • Cardiology • Cardiac Surgery • Neurology • Orthopaedics	• Paediatric surgery • Orthopaedic disorders • Gynaecology
Vardhaman Mahavir Safdarjung Hospital	• Coronary Artery Bypass Surgery • Heart Valves Replacement and repair Surgery • Congenital Heart Disease Repair Surgeries • Angiography and Angioplasty • Total Hip Replacement surgery • Knee Replacement Surgery • Arthroscopies and Arthroscopy assisted surgery of joints • Spots Injury Clinic • Lithotripsy for Kidney stones • Dialysis for Kidney Failure patients • Laproscopic Chole-cystectomy • Radiotherapy • Cancer Surgery • Artificial Limb Implant Facility • Antiretroviral therapy for AIDS patients • DOTS for TB patients • Aurveda, Homeopathy & Unani treatment Centres • Advanced Diagnostics like Blood Tests by Fully automated machines, Mammography, MRI, Digital X-Ray, OPG, Whole Body Spiral CT Scan etc	• Cardiac Surgery (CTVS) • Cardiology • Neurology • Nephrology • Nuclear medicine • Medical Oncology • Neurosurgery • Respiratory Medicine • Endocrinology • Haematology • Gastroenterology • Urology • Cancer Surgery • Burns and Plastic surgery • Paediatric Surgery
Dharamshila Hospital, Vasundhara	• Radiation Oncology at Dharamshila Hospital and Research Centre is one of the busiest departments servicing 50-60% of cancer patients. The facility provides • Conventional 3D Radiation Therapy • Brachy-therapy • Volumetric Arc Therapy (VMAT) • IMRT (Intensity Modulated Radiation Therapy) • IGRT (Image Guided Radiation Therapy) • Stereo-tactic Radio surgery (SRS) • Stereo-tactic Body Radiation Therapy (SBRT)	• Oncology
All India Institute of Medical Sciences	• Coronary Artery Bypass Surgery • Heart Valves Replacement and repair Surgery • Congenital Heart Disease Repair Surgeries	• Cardiac Surgery (CTVS) • Cardiology • Neurology

Name of referral hospital	Type of facility available	
	Diagnostics	**Super-specialization**
	• Angiography and Angioplasty • Total Hip Replacement surgery • Knee Replacement Surgery • Arthroscopies and Arthroscopy assisted surgery of joints • Spots Injury Clinic • Lithotripsy for Kidney stones • Dialysis for Kidney Failure patients • Radiotherapy • Cancer Surgery • Artificial Limb Implant Facility • Antiretroviral therapy for AIDS patients • DOTS for TB patients • Ayurveda, Homeopathy & Unani treatment Centres • Advanced Diagnostics like Blood Tests by Fully automated machines, Mammography, MRI, Digital X-Ray, OPG, Whole Body Spiral CT Scan etc	• Nephrology • Nuclear medicine • Medical Oncology • Neurosurgery • Respiratory Medicine • Endocrinology • Haematology • Gastroenterology • Urology • Cancer Surgery • Burns and Plastic surgery • Paediatric Surgery
District: Haryana		
Fortis Escorts Hospital, Faridabad	• Ultra Modern, Zero infection Operation Theatre dedicated for Cardiac Surgeries • Post Operative Cardiac recovery room (with 5 Isolation beds , nurse : patient ratio of 1:1 , along with round the clock availability of cardiologist) • Well equipped cardiac care unit with 16 beds dedicated for cardiac patients. • Dedicated cardiac ward with 8 beds. State of the art instrumentation including Image Intensifier , • Advanced Gynaecological Laparoscopy including Fertility enhancing surgery • Managing Infertility • Adolescent & Menopause Clinics	• Heart and Vascular Surgery • Nephrology and Urology Gastroenterology • Orthopaedics & Joint Replacement • Paediatric Cosmetic & Reconstructive Surgery • Ophthalmology • Neurology & Neurosurgery • Most Advanced Super Speciality Dental Clinic
Medanta The Medicity, Gurgaon	• All facilities	• Renal and Liver Transplant • Gastro and Gastro Intestinal • Oncology • Cardio Thoracic Vascular Surgery (CTVS) • Cardiology • Neurology & neurosurgery • Nephrology & Urology • Orthopaedics • Internal Medicine • Obstetrics and Gynaecology • Respiratory and Sleep • Vascular • Rheumatology • Plastic Surgery • ENT
Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak	• Anatomy • Burn and Plastic • Cardio-Thoracic Surgery	• Burn and Plastic • Cardio-Thoracic Surgery • Cardiology

Name of referral hospital	Type of facility available	
	Diagnostics	**Super-specialization**
	• Cardiology • Chest and TB • ENT • Forensic medicine • Medicine • Neuro surgery • Obstetrics and Gynaecology • Onco surgery • Ophthalmology • Orthopaedics • Paediatrics and Paediatric surgery • Psychiatry • Pulmonary and Critical Care Medicine • Radiology and Radiotherapy • Rheumatology • Skin • Social and Preventive Medicine • Surgery • Urology	• Neuro surgery • Onco surgery • Paediatric surgery • Urology
District: Uttar Pradesh		
Kailash Hospital, Noida	• Ultrafast M.R.I. 1.5 Tesla from Phillips, Netherlands • Whole Body Multi slice Spiral CT Scanner from Siemens, Germany • Computed Radiography System • Color Doppler, • Ultra Sound • Fully Auto Lab Analyser • Dialysis • EEG, PFT, TMT, Uroflowmetry, Mammography, etc. • Bone densitometry (BMD)	• Cardiothoracic & Vascular Surgery (CTVS) • Neuro • Burn Unit
Narinder Mohan Hospital, Ghaziabad	• Haematology • Biochemistry, Immunology, Microbiology. • Histopathology & Cytology Angiography(Coronary, Carotid, Peripheral) • Angioplasty (Coronary, Carotid, peripheral) • Balloon Valvuloplasty • Electrophysiology • Pacemaker Implantation: Temporary Pacing, Permanent Pacemaker • ECG • TMT • Echo Colour Doppler Study of Heart, TEE • Stress ECHO • Holter Monitoring • Pulmonary Function Test • Doppler Study of Carotid Vessels • Peripheral Vascular Doppler	• Burns & Plastic Surgery • Full fledged CARDIAC CENTRE • Cardiac Surgeries • Diabetes & Endocrinology • Gastroenterology-Medicine • Gastroenterology-Surgical • Geriatric Medicine • Nephrology • Neurology • Neurosurgery • Oncology Medicine • Paediatric Surgery • Urology (with Lithotripsy)

Source: Findings of this study

3.4 Availability of human resource

The data provided by the referral hospitals on the number of medical and paramedical staff available in these referral hospitals is presented in the following table. It can be seen from the data that in government hospitals and also in Narinder Mohan hospital 1 - 2 medical staff are generally available per 10 beds; however the number of medical staff per 10 beds is nearly 4 - 6 in private hospitals. In Medanta, on an average one doctor is available per bed. All four government facilities are also medical colleges and hence the doctors work as faculties too. The bed to doctor ratio has been presented in figure 3.1.

The number of available paramedical staff including nurses per bed has been between 1 and 2. The ratio is lowest *i.e.* 1 in Safdarjung Hospital and Narinder Mohan. The ratio of paramedics (excluding nurses) per bed is 0.8 in Medanta, Gurgaon. The ratio is highest *i.e.* 2.2 in G B Pant Hospital.

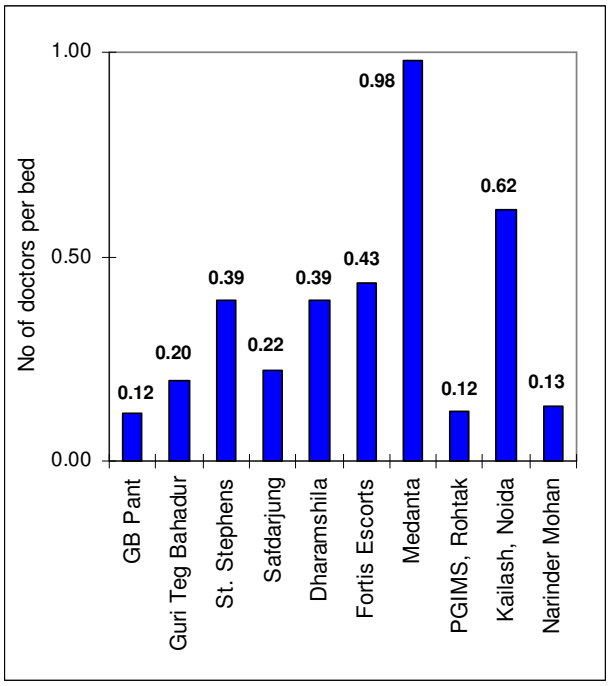
Table 3.4: Availability of Human resources in referral hospitals contacted

Name of district	Name of referral hospital	Medical staff (number)	Paramedical staff (N0)	Beds (number)	Doctor/ Bed (number)	Paramedic/ Bed (N0)
Delhi	Govind Ballabh Pant Hospital	75 + (131 SR* & 90 JR**)	1413	629	0.12	2.2
	Guru Teg Bahadur Hospital	199 + (160 SR* & 59 JR**)	1014	1014	0.20	1.0
	St. Stephens Hospital	284	NA	724	0.39	-
	Vardhaman Mahavir Safdarjung Hospital	352 + (550 SR* & JR**)	1896	1576	0.22	1.2
	Dharamshila Hospital, Vasundhara	118	396	299	0.39	1.3
	All India Institute Of Medical Science	NA	NA	1803	-	-
Haryana	Fortis Escorts Hospital, Faridabad	91	345	210	0.43	1.6
	Medanta The Medicity, Gurgaon	486	380 (excluding nurses)	497	0.98	0.8
	PGIMS, Rohtak	195	NA	1597	0.12	-
Uttar Pradesh	Kailash Hospital, Noida	200	500	325	0.62	1.5
	Narinder Mohan Hospital, Ghaziabad	40	303	300	0.13	1.0

Source: Findings of this study (* SR – Senior Resident ** JR – Junior Resident NA - Not Available)

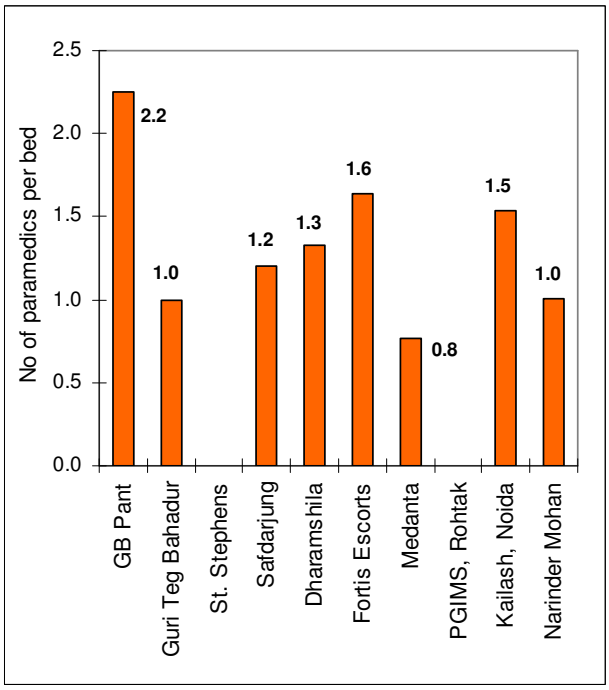
Figure 3.1: Number of Doctor & Paramedical staff per bed (* Data of AIIMS not included due to unavailability)

A. Number of Doctors per bed



Source: Findings of this study

B. Number of Paramedics per bed



Source: Findings of this study

Table 3.5: Availability of Doctors / Specialist in Referral Hospitals

Sl No	Doctors / Medical Category staff	G B Pant Hospital	GTB Hospital	Safdarjung Hospital	St. Stephen's	Dharam-shila	Fortis Escorts	Medanta the Medicity	PGIMS, Rohtak	Kailash Hospital	Narinder Mohan
1	Chief Medical Superintendent		1	1	1	1	1	2	1		1
2	Medical Specialist	12	52	58	31	10	3	2	17	1	
3	Surgery Specialists	11	18	35	19	7	9		20	12	3
4	O&G specialist	17	14	29	29	8	3	6	13	1	4
5	Psychiatrist		2	5		2		2	5		
6	Dermatologist / Venereologist		5	12		2		2			
7	Paediatrician	14	9	9	18	4	7		7	3	3
8	Anaesthetist (Regular / trained)	12	30	30	21	6	7	106	19		4
9	ENT Surgeon		6	9		3	1	8	6		
10	Ophthalmologist		7	13			2	2	12		2
11	Orthopaedician		11	17		3	6	20	10		
12	Radiologist		6	24		4	4	27	11		
13	Microbiologist		8	13		1	4	5	9		1
14	Pathologist and Blood Bank In-charge		15	21		2	1	21	13		
15	Casualty Doctors / General		33			4	4	32			
16	Dental Surgeon		6	8		2	1	2	22		1
17	Forensic Specialist		6	11					6		
18	Public Health Manager			6		1			10		

Sl No	Doctors / Medical Category staff	G B Pant Hospital	GTB Hospital	Safdarjung Hospital	St. Stephen's	Dharam-shila	Fortis Escorts	Medanta the Medicity	PGIMS, Rohtak	Kailash Hospital	Narinder Mohan
19	AYUSH Physician		3	6	3	3	5	14	2	1	
20	Environmental Officer			1		1					
21	Waste Management Officer			1		1					
22	Cardiologist			4	6	2	5	77	1	2	
23	CTVS			5	2		1	23	6		
24	Gastro Enterologist			0	3	3	2	20	2	2	
25	Nephrologist			1	4	2	3	13		1	
26	Neurologist			3	3	1	1	6		1	
27	Oncologist			3	3	10	5	24		1	
28	Endocrinologist			1	6			10			
29	Paediatric Surgeon	6		3	2		1	5	2		
30	Neurosurgeon			4	7	2	2	6	3		
31	Urologist			3	3			13	2		

Source: Findings of this study

3.5 Availability of referral facility

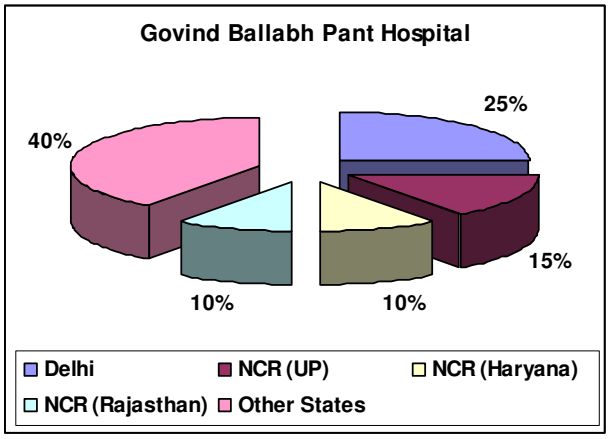
During discussion with hospital administrators and doctors it was discovered that the referral system operating in the hospitals is neither well established nor systematic. The patients, who are coming from outside NCR regions and other states, generally come on their own most of the time. Analysis confirms that in most cases, the service of primary or secondary health facilities were not sought.

In most cases, hospitals do not have proper records of the accounts of referred patients. The following set of graphs give the details of patients coming from different regions to few select referral hospitals under primary survey. It was observed that the patients from other states generally provide contact details of their relatives staying in Delhi / NCR regions. Thus, it is apparent that percentage of outside patients in NCR hospitals is actually higher than recorded (hospital wise fact sheets are attached in Appendix A). Hospitals have not provided the actual number of patients coming from different NCR sub regions but only stated the approximate percentage of patient influx from different NCR sub regions and outside NCR. Even the total number of inpatients getting admission in the hospital in a year has only been available for government referral hospitals.

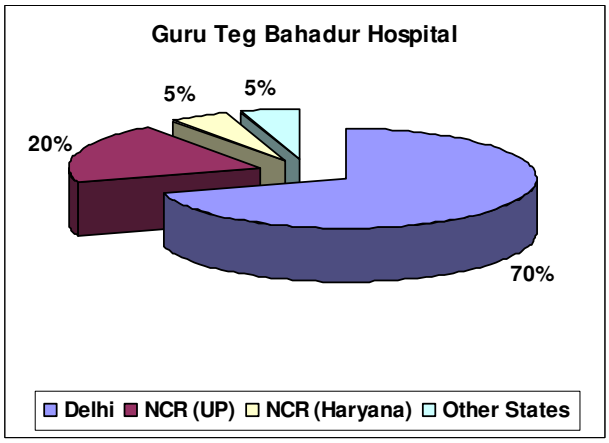
The general trend of patient influx in referral hospitals is detailed as follows:

- During 2009 the total number inpatients getting treatment in GB Pant Hospital was 21,193; while in Vardhaman Mahavir Safdarjung Hospital 1,28,175 inpatients received treatment during 2009. The total number of inpatients in Guru Teg Bahadur Hospital during 2010 was approximately 91,250. AIIMS catered to 1,74,353 inpatients during 2008-09 financial year.
- Based on the data provided by the hospitals during the survey, it can be seen that the super speciality Delhi hospitals like AIIMS, GB Pant Hospital have larger share of patients coming from other states outside NCR region (around 40%), whereas Safdarjung hospital and tertiary care government hospitals (like Guru Teg Bahadur Hospital) receives only 5-10 percent outside NCR patients and the largest share (60-70%) is from Delhi.

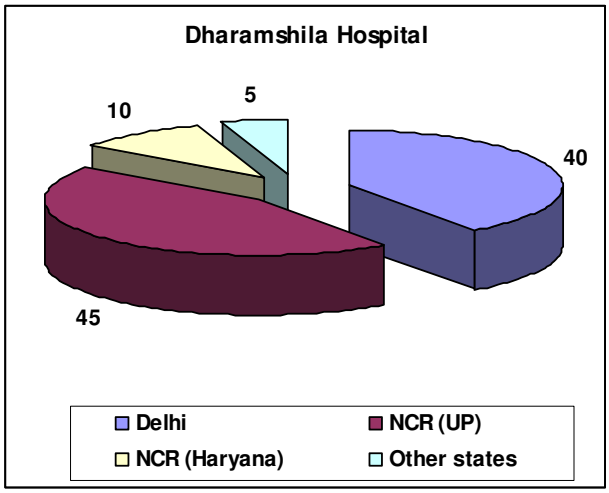
Figure 3.2: Percentage of patients coming to Delhi Hospitals from various regions



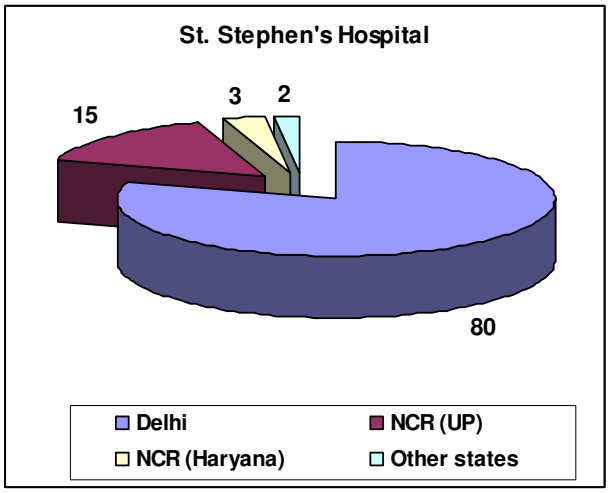
Source: Hospital Administration



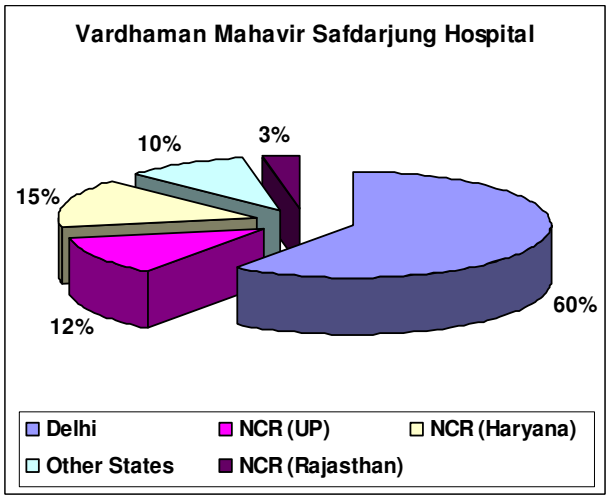
Source: Hospital Administration



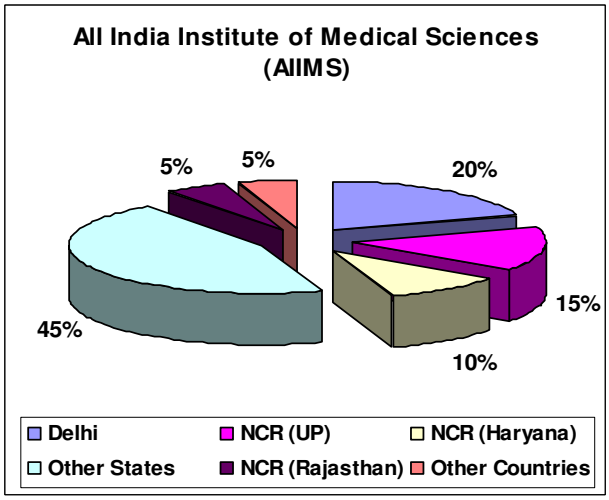
Source: Hospital Administration



Source: Hospital Administration



Source: Hospital Administration



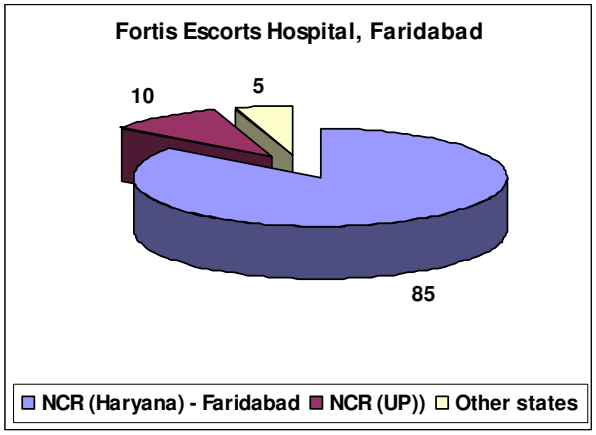
Source: Hospital Administration

- Private hospital (Fortis Escorts, Faridabad) in eastern Haryana receives majority of the patients (around 85%) from district only. 10 percent patients are coming from adjoining district under NCR (UP) primarily Noida and only 5 percent patients come from outside NCR region primarily from Uttar Pradesh. The hospital also receives few patients from Middle East countries like Iraq and from African countries.
- Medanta the Medicity is promoting itself as a destination for medical tourists and it receives 20 percent patients from other countries, majority from Middle-East and Africa, However patients from Europe and Canada are also coming to get treatment as the rates are cheaper than that

in their country. Apart from that, residents from Nepal, Bangladesh, Pakistan also come for treatment. 30 percent patients in Medanta come from other states and about 10 percent each from NCR-(Rajasthan) and NCT-Delhi. NCR-(Haryana) contributes 30 percent patients, half of this come from Gurgaon district.

- PGIMS, Rohtak receives 30 percent patient from Punjab, Rajasthan and Haryana (non NCR Districts) and 30 percent from NCR-(Haryana). While rest 40 percent are from NCR-(UP), NCR-(Rajasthan) and Delhi-mainly northern and western part. The total number of inpatients in PGIMS Rohtak during the year 2009 was 88,126.

Figure 3.3: Percentage of patients coming to NCR(Haryana) Hospitals from various regions



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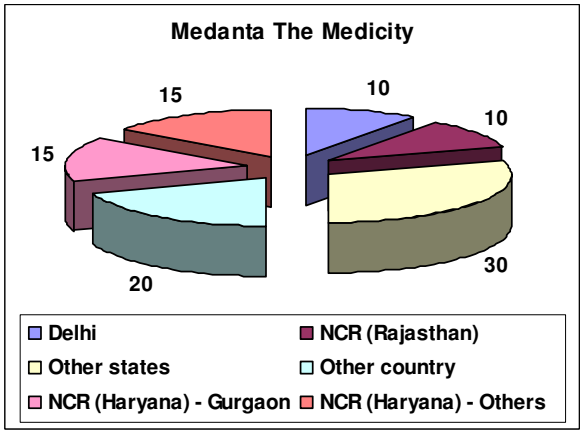

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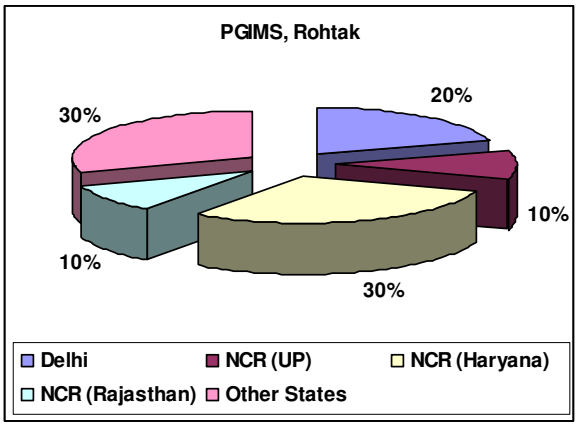
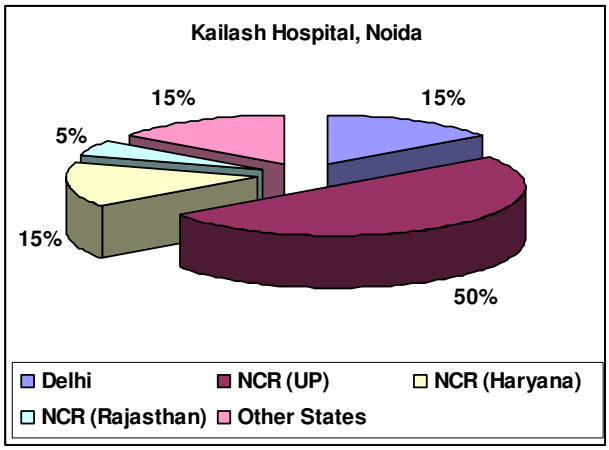


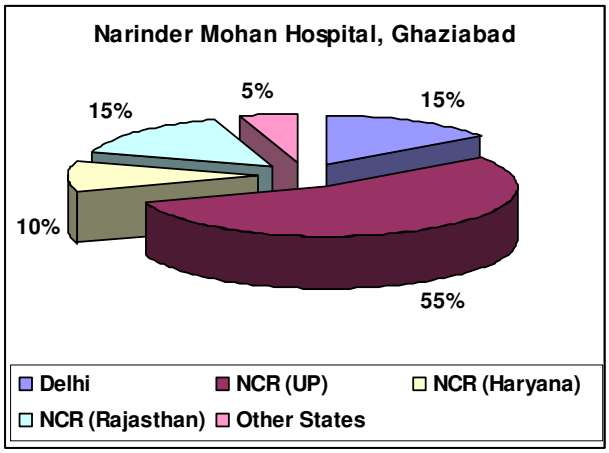
Source: Hospital Administration

- Both the private hospitals visited in NCR-(UP) receives half of the patients from NCR districts of UP, while 15 percent come from Delhi another 5-15 percent come from other states – generally UP, Bihar, Uttarakhand and Jammu & Kashmir. Rest 20-25 percent patients belong to NCR districts of Haryana and Rajasthan.

Figure 3.4: Percentage of patients coming to NCR(UP) Hospitals from various regions



Source: Hospital Administration



Source: Hospital Administration

The major ailments for which patients visit or are being referred to the tertiary care facilities are listed below:

Table 3.6: Major ailments for which patients are referred IN

Name of district	Name of referral hospital	Name of Ailments for which Patients (%) referred IN
Delhi	Govind Ballabh Pant Hospital	• Cardiology
	Guru Teg Bahadur Hospital	• Surgical • Neurosurgical • Neurological • Burns and plastics • Obstetrics & Gynaecological • Paediatrics and Neonatal • Eye • ENT
	St. Stephens Hospital	• Paediatric surgery • Orthopaedic disorders • Cardiac Surgery • Paediatric
	Vardhaman Mahavir Safdarjung Hospital	• Surgical • Neurosurgical • Neurological • Burns and plastics • Obstetrics & Gynaecological • Paediatrics and Neonatal • Eye • ENT
	All India Institute Of Medical Science	• Cancer • Paediatric surgery • Orthopaedic disorders • Cardiac Surgery • Surgical • Neurosurgical • Neurological • Burns and plastics • Obstetrics & Gynaecological

Name of district	Name of referral hospital	Name of Ailments for which Patients (%) referred IN
	Dharamshila Hospital, Vasundhara	• Cancer
Haryana	Fortis Escorts Hospital, Faridabad	• Heart • Paediatric • Obstetrics and Gynaecology • Dental • Neuro
	Medanta The Medicity, Gurgaon	• All facilities available • The hospital is promoting itself as a destination of medical tourism
	Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak	• General • Kidney transplant • Nephrology • Neurology
Uttar Pradesh	Kailash Hospital, Noida	• Cardiothoracic & Vascular Surgery (CTVS) • Neuro Problem • Burn Unit
	Narinder Mohan Hospital, Ghaziabad	• Cardiology • Dermatology • Ear-Nose-Throat • Eye • Internal Medicine • Obstetrics and Gynaecology • Orthopaedics • Paediatrics

Source: Findings of this study

The following table lists the ailments for which patients are referred out from the referral hospitals. Referring out is not done in Medanta, Kailash and St. Stephen's Hospitals

AIIMS was the referred facility in majority of cases, followed by Safdarjung Hospital. Private facilities also refer patients requiring critical care to government hospitals keeping in view their affordability.

Dharamshila Hospital refers out only selective cases to Tata Memorial, Mumbai and few to Kailash Hospital Noida. Fortis Escorts refers Tuberculosis patients to District Hospital, Faridabad. Apart from that all referrals are sent to Delhi Health facilities.

Table 3.7: Major ailments for which patients are referred OUT

Name of referral hospital	Name of ailments	Refer to (Name of hospital)
Delhi		
Govind Ballabh Pant Hospital	• Eye Problem	• Guru Nanak Eye Hospital
Guru Teg Bahadur Hospital	• Cardiac, vascular surgeries • Facio-maxillary surgeries • In-vitro fertilization	• GB Pant Hospital • AIIMS • Safdarjung Hospital
St. Stephens Hospital	Does not refer out	
Vardhaman Mahavir Safdarjung Hospital	Does not refer out	
AIIMS	Does not refer out	
Dharamshila Hospital, Vasundhara	• Cardiac Diseases	• AIIMS

Name of referral hospital	Name of ailments	Refer to (Name of hospital)
	• Organ Transplant • Opthalmology	• Kailash Hospital • Metro Hospital • TATA Memorial, Mumbai
Haryana		
Fortis Escorts Hospital, Faridabad	• Burn case (more then 30% burn) • Tuberculosis (TB) • Onco -surgery cases	• Safdarjung Hospital • B K Hospital (District Hospital) • Forties NOIDA
Medanta The Medicity, Gurgaon	Does not refer out	
Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak	• Kidney transplant • Nephrology • Neurology	• AIIMS • Safdarjung Hospital
Uttar Pradesh		
Kailash Hospital, Noida	Does not refer out	
Narinder Mohan Hospital, Ghaziabad	Various Ailments (in case of poor patients)	• AIIMS • Guru Teg Bahadur Hospital • Ram Manohar Lohia Hospital

Source: Findings of this study

3.6 Work load of doctors

On an average the doctors work in the hospital six days a week and devote 7 – 10 hours in the hospitals. The average working hour for doctors in Delhi hospitals contacted (excluding AIIMS) are highest (54 hours) while it is lowest in UP (44 hours). However the work load varies among different departments of same facility. Similarly Doctors devote 3 – 6 hours for two – three days a week for out patients. The average OPD time ranges from 6 – 18 hours a week. The status of working hours for doctors is given in the following table:

Table 3.8: Average working hours in a week-Doctors

Name of district	Average working hr/ week /doctor	Average OPD hr / week / doctor
Delhi	55	13
NCR (Haryana)	54	18
NCR (UP)	44	6

Source: Findings of this study

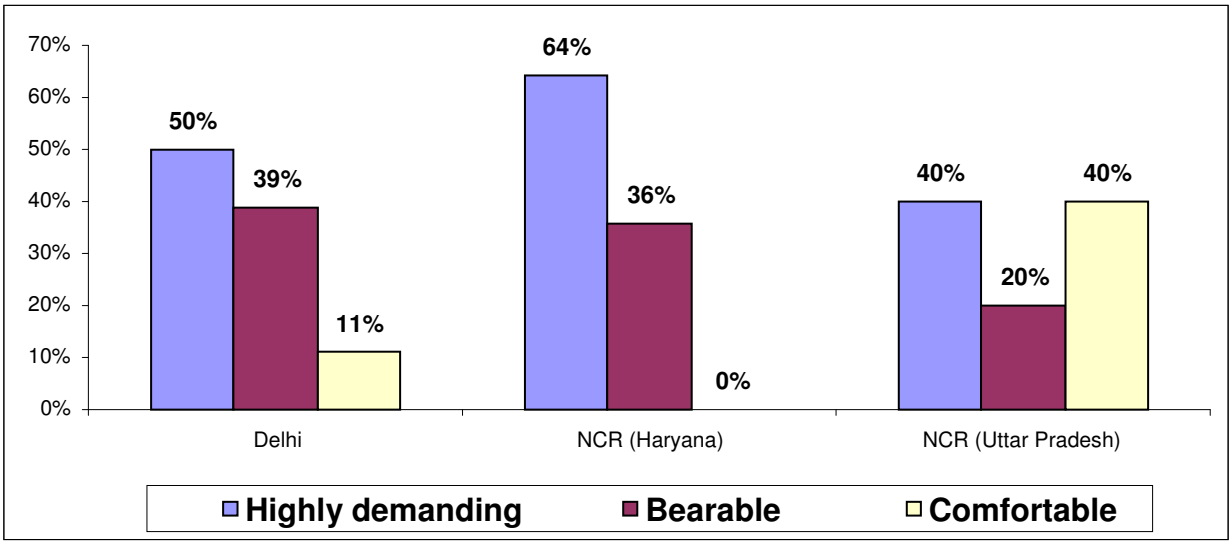
Majority of the doctors from all three regions have rated work load as highly demanding. While highest percentage of doctors reported work load comfortable belongs to Private facilities in NCR (UP). In NCR (Haryana) majority of the doctors (65%) have reported workload highly demanding and none have rated workload as comfortable.

Table 3.9: Rating of their work load by Doctors in NCR

Name of district	Highly demanding/ Bearable/ Comfortable
Delhi	Highly demanding
NCR (Haryana)	Highly demanding
NCR (UP)	Highly demanding

Source: Findings of this study

Figure 3.5: Work load as rated by Doctors (District Average)



Source: Findings of this study

Table 3.10: Work load as rated by Doctors (District Average)

Particulats	Delhi (N=18)		NCR (Haryana) (N=14)		NCR (Uttar Pradesh) (N=5)	
	No	%	No	%	No	%
Highly demanding	9	50%	9	64%	2	40%
Bearable	7	39%	5	36%	1	20%
Comfortable	2	11%	0	0%	2	40%

Source: Findings of this study

Average number of out-patients visiting a doctor in a day is around 50 – 60 in Government Hospitals; however in Safdarjung Hospital around 70 – 80 out-patients visit a doctor in a day. In private hospitals, the number of out-patients per day per doctor ranges from 12 (as in Medanta) to around 40 (as in Kailash Hospital and Narinder Mohan Hospital). Inpatient admission rate per month has been highest in PGIMS, Rohtak. This data was not available from doctors of Safdarjung hospital. The Inpatient number is lowest (108) in Fortis Escorts, Faridabad.

Table 3.11: Number of patients

Name of district	Name of referral hospital	Average no of OPD/ day /doctor	IPD admission rate / month / department
Delhi	Govind Ballabh Pant Hospital	55	180
	Guru Teg Bahadur Hospital	59	152
	St. Stephens Hospital	29	308
	Vardhaman Mahavir Safdarjung Hospital	76	Not available
	Dharamshila Hospital, Vasundhara	20	56
	All India Institute of Medical Science	Not available	Not available
Haryana	Fortis Escorts Hospital, Faridabad	26	108
	Medanta The Medicity, Gurgaon	12	265
	PGIMS, Rohtak	61	588
Uttar Pradesh	Kailash Hospital, Noida	43	460
	Narinder Mohan Hospital, Ghaziabad	40	

Source: Findings of this study

On an average, doctors from health facilities of Delhi found that the magnitude of adverse impact of work load on quality of service rendered by a doctor is high. Similarly doctors of PGIMS Rohtak

and Fortis Escorts rated the impact of work load as high. But in Medanta and Kailash hospitals, doctors find the work load moderate. In Narinder Mohan Hospital, the doctor opined that the work load has very little impact on quality of service (Table 3.12).

Table 3.12: Impact of work load on quality service rendered by medical staff

Name of district	Name of referral hospital	Rate (High, Significant, Moderate, Little and No effect)
Delhi	Govind Ballabh Pant Hospital	High
	Guru Teg Bahadur Hospital	High
	St. Stephens Hospital	High
	Vardhaman Mahavir Safdarjung Hospital	High
	Dharamshila Hospital, Vasundhara	Not Answered
	All India Institute Of Medical Science	Not Answered
Haryana	Fortis Escorts Hospital, Faridabad	High
	Medanta The Medicity, Gurgaon	Moderate
	PGIMS, Rohtak	High
Uttar Pradesh	Kailash Hospital, Noida	Moderate
	Narinder Mohan Hospital, Ghaziabad	Little

Source: Findings of this study

3.7 Quality of services available in the hospital

The quality of service rendered by nursing staff, attendant, ward-boys and paramedical staff has been rated by the doctors. The following table provides the district average of the rating:

Table 3.13: Quality of Service-Doctors

Name of district	Nursing staff	Attendant and Ward boys	Paramedical staff
Delhi	Good	Good	Good
NCR (Haryana)	Good	Good	Good
NCR (UP)	Excellent	Very good	Good

Source: Findings of this study

3.8 Suggestions as made by Hospital administrators and Doctors

The suggestions made by hospital administration are listed below;

Parameters	By Hospital Administrator	By Doctors
Infrastructure		• There is scope for expansion of facilities and equipments available considering the demand, however limited space is acting as a hindrance.
Human Resource	• There is shortage of manpower including doctors, trained nursing staff and technicians as well as attendants in most of the hospitals • Incentives may be given to the staff to increase their output	• Referral hospitals (especially Government facilities and private facilities like St. Stephens) have requirement of manpower. • Some of the private hospitals like Medanta, Kailash Hospital etc need more trained nursing and paramedical staff

Parameters	By Hospital Administrator	By Doctors
Equipment's	• Customs and excise tax should be exempted during procurement/purchase of life saving equipment's. • All equipment's in Government hospitals should be brought under comprehensive maintenance contract	• More modern and improved equipment's can be installed in hospitals to extend better treatment to patients and cater to the increasing number of patients
Medicine	• All vital drugs (required to deal emergencies and used in OTs) to be provided free of cost in order to cater to all in need	• Doctors in Government facilities like PGIMS Rohtak felt that more medicines are required for indoor patients

Administrators and Doctors of Government referral facilities suggested that the three tier referral system (Primary > Secondary > Tertiary) need to be revived. In most of the cases patients directly come to the tertiary care centres on their own even for common non critical ailments. As a result sometimes critical cases could not be catered due to unavailability of beds. Hence, the suggestion comes that strengthening and revival of primary and secondary health care is crucial to decrease the load in referral hospitals.

3.9 Survey findings – Patients

A total of 584 patients were interviewed from 11 referral hospitals of Delhi, NCR (Haryana) and NCR (UP). Out of those 336 patients were interviewed in 6 referral hospitals of Delhi sub-region, 146 patients were interviewed from three referral hospitals of NCR-Haryana sub-region and 102 patients were interviewed from two hospitals of NCR-UP sub-region. One third of the interviews were given by the patient him/herself and in rest two-third especially for critical patients or paediatric patients, the interview was given by the attending relatives.

3.9.1 Referred from other health facility

Analysis revels that only 32 percent of the patients have been referred from other health facilities and rest 68 percent have come directly to the facility. Further analysis of referral system has been carried out taking into account the 187 referred patients.

Following table provides an account of facilities from where the referred patients have come from. It was observed that nearly three fifth of the referrals have been made from government health facilities especially from district hospitals (28%) and community Health Centres (25%). On the other hand two fifth patients were referred from private health facilities mostly (18%) from private hospitals followed by private clinics (15%).

Table 3.14: Referred from other health facility

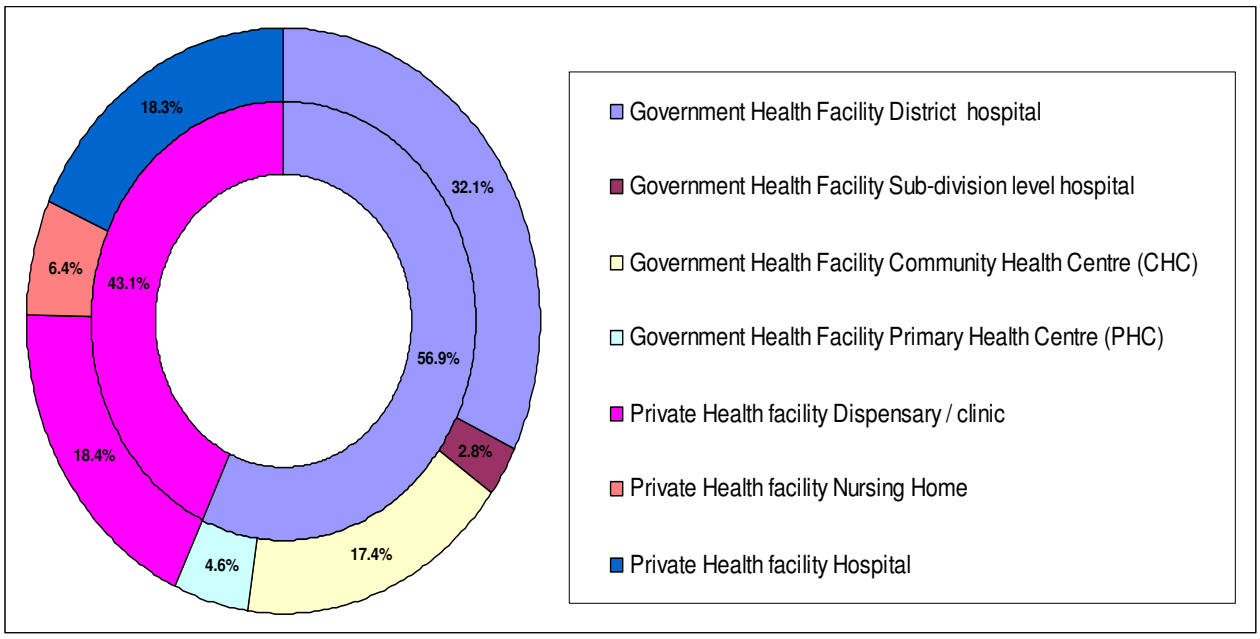
Parameter		Number	%	Number	%
Government Health Facility	District hospital	**113**	**60.4**	52	27.8
	Sub-division level hospital			7	3.7
	Community Health Centre (CHC)			47	25.1
	Primary Health Centre (PHC)			7	3.7
Private Health facility	Dispensary	**73**	**40**	4	2.1
	Clinic			28	15.0
	Nursing Home			8	4.3
	Hospital			33	17.6
Total (N) number of patients referred in all the 11 contacted hospitals – *1 referred but did not provide details of reference*		**187**		**100**	

Source: Findings of this study

The following graph shows the percentage of referred patients getting admission in Delhi Health facilities. Similar to overall scenario 57 percent patients are coming from government health facilities and 43 percent from private health facilities.

Analysis revels that two third of the local patients are referred from Government facilities while all references from NCR-Haryana was made from government facilities. In case of NCR-UP and other states it was observed that equal numbers of patients are referred from government and private health facilities.

Figure 3.6: Account of patients referred to Delhi Hospitals (data in %)



Source: Findings of this study

Table 3.15: Account of patients referred to Delhi Hospitals

Delhi Referral		**Number**	**%**	**Number**	**%**
Government Health Facility	District hospital	62	56.9%	36	32.1%
	Sub-division level hospital			3	2.8%
	Community Health Centre (CHC)			19	17.4%
	Primary Health Centre (PHC)			4	4.6%
Private Health facility	Dispensary / Clinic	47	43.1%	20	18.3%
	Nursing home			7	6.4%
	Hospital			20	18.3%
Total (N) number of patients referred in the 6 contacted Delhi hospital				**109**	**100**

Source: Findings of this study

3.9.2 Cause of referral

The referred patients were asked about the cause of referral. About 61 percent of referred patients have informed that the required treatment was not available in the previous hospital, while only 13 percent were critical cases. Better provision of treatment in the referral hospitals is the reason of referral for 26 percent patients.

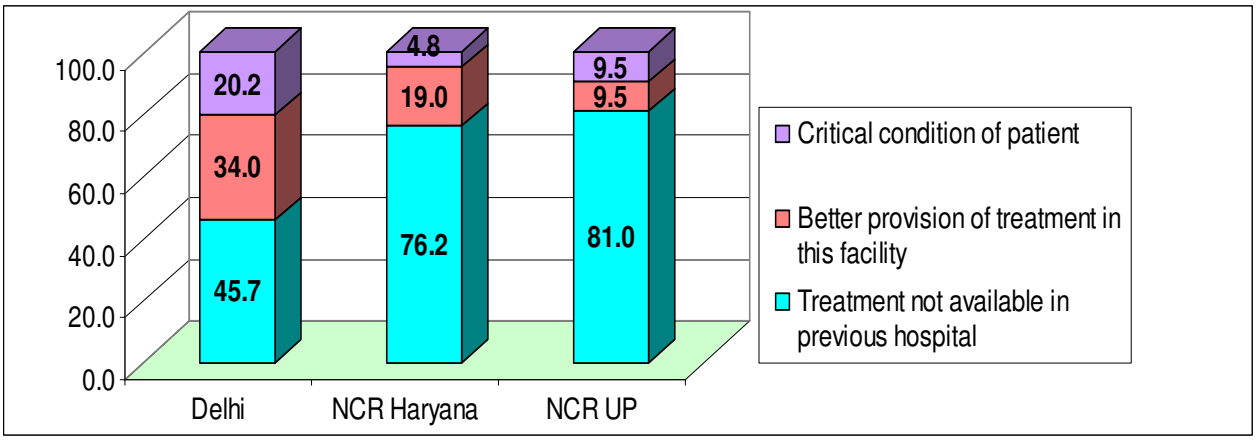
Table 3.16: Cause of referral (in %)

Parameter	Total
Treatment not available in previous hospital	61.3
Better provision of treatment in this facility	26.0
Critical condition of patient	12.7
Total (N)	**187**

Source: Findings of this study

The figure below represents the causes of referral for patients coming from NCR sub-regions.

Figure 3.7: Causes of referral for patientrs from NCR Sub-regions (in %)



Source: Findings of this study

Table 3.17: Causes of referral for patientrs from NCR Sub-regions (in %)

Parameters	Delhi		NCR Haryana		NCR UP	
	No	%	No	%	No	%
Treatment not available in previous hospital	50	45.7	27	76.2	34	81.0
Better provision of treatment in this facility	37	34.0	7	19.0	4	9.5
Critical condition of patient	22	20.2	2	4.8	4	9.5
Total (N)	**109**		**36**		**42**	

Source: Findings of this study

3.9.3 Regions from where patients are coming from

Out of 584 patient interviewed 38 percent come from Delhi, followed by NCR (UP) and NCR (Haryana) (22 percent and 18 percent patient respectively). 21 percent of the respondents have come from other states and only 1 percent from other countries.

Table 3.18: Regions from where patients are coming from

Parameter	No	%
Delhi	223	38
NCR (UP)	126	22
NCR (Haryana)	107	18
NCR (Rajasthan)	0	0
Other States	122	21
Other countries – Canada, Denmark, Uzbekistan, Nepal	6	1
Total	**584**	

Source: Findings of this study

In all 336 patients (57.5%) have been interviewed in six referral hospitals of NCT-Delhi. Similarly 146 patients (25%) have been interviewed in three referral hospitals of NCR-Haryana and 102 patients (17.5%) have been interviewed in two referral hospitals of NCR_Uttar Pradesh.

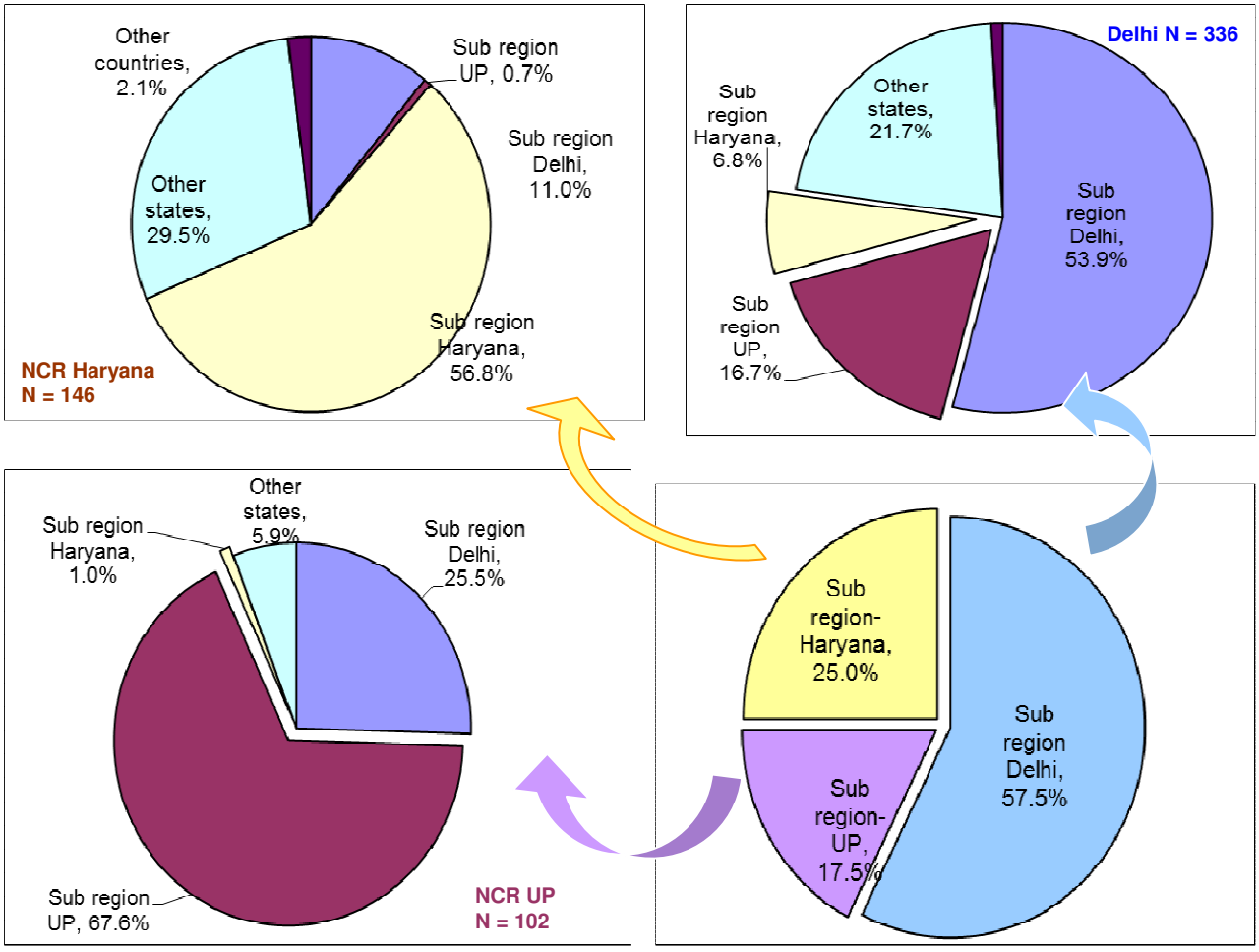
Table 3.19: Fraction of patients visiting referral hospitals of three Sub Regions

Location of Referral Hospital												
Delhi												
NCR-UP												
NCR-Haryana												
Parameters	**Delhi**		**NCR (UP)**		**NCR (Haryana)**		**Other states**		**Other countries**		**NCR (Rajasthan)**	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
Delhi (N =336)	118	53.9	56	16.7	23	6.8	73	21.7	3	0.9	-	-
UP (N =102)	26	25.5	69	67.6	1	1.0	6	5.9	-	-	-	-
Haryana (N =146)	16	11.0	1	0.7	83	56.8	43	29.5	3	2.1	-	-

Source: Findings of this study

On the basis of this sample survey, an account of patient influx from various sub-regions of NCR and outside NCR have been analysed separately for NCT-Delhi, NCR-Haryana and NCR-Uttar Pradesh as depicted in the following graphs.

Figure 3.8: Fraction of patients visiting referral hospitals of three Sub Regions



Source: Findings of this study

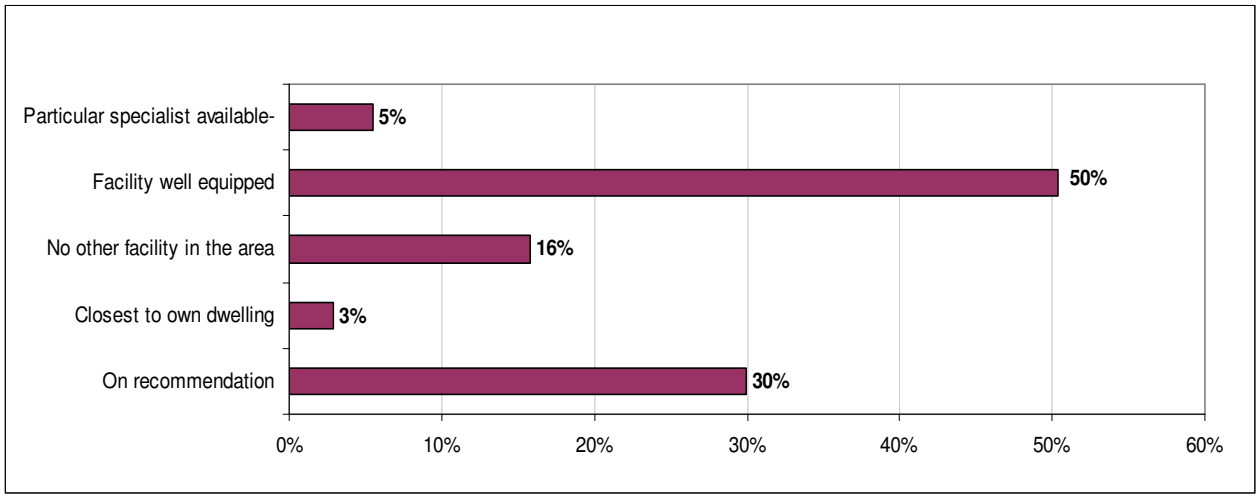
Analysis revels that about 16 percent of the patients from NCR (UP) visit Delhi health facilities while the percentage of patient coming from NCR (Haryana) to Delhi is only 6.8 percent. From outside NCR, the patients who were interviewed were from following states and countries.

- Out of four respondents from abroad, three were in Medanta, Gurgaon (NCR Haryana). These patients were from Uzbekistan, Denmark and Canada. One patient from Nepal was interviewed in a Government facility of Delhi.
- The patients from outside NCR coming to Delhi facilities were from Uttar Pradesh (districts – Agra, Azamgarh, Aligarh, Badaun, Bahraich, Bareli, Etawah, Farrukhabad, Mainpuri, Mujaffarnagar, Moradabad, Rampur and Saharanpur), Uttarakhand, Bihar and West Bengal.
- The patients from outside NCR coming to Haryana facilities were from Punjab, Uttar Pradesh, Bihar and Jammu and Kashmir.

3.9.4 Reasons for being admitted in the facility

The primary reason, as stated by half of the respondents, for being admitted to the particular referral facility is availability of well-equipped facility. Apart from that, 30 percent patients are recommended to the facility while 17 percent were compelled to come due to non-availability of similar facility in their area. Proximity to the residence or availability of specialist is not a significant reason for visiting the referral facility.

Figure 3.9: Reason for being admitted in the facility



Source: Findings of this study

Table 3.20: Reason for being admitted in the facility

Parameters	Patients (in number)	Patient (in %)
On recommendation	175	30%
Closest to own dwelling	17	3%
No other facility in the area	92	16%
Facility well equipped	294	50%
Particular specialist available-	32	5%

Source: Findings of this study

The following table lists major ailments for which patients visit referral hospitals of Delhi from various sub regions of NCR and non NCR regions. The key findings are as follows:

- The major ailments for which patients come to Delhi from other NCR (UP) sub-region are – Cancer, Gynaecological problems and obstetrics, Paediatric problems, Neurological problems, various types of fever like malaria, typhoid etc; pulmonary problems, Gastro intestinal problems and ENT problems.
- Majority of the patients from NCR (Haryana) visiting referral hospitals in Delhi are suffering from – Paediatric and Orthopaedic problems, Gynaecological problems and obstetrics, various types of fever like malaria, typhoid etc; and Cancer.

- Majority of the patients from outside NCR region, who come to Delhi for treatment, are suffering from – Neurological and Orthopaedic problems, Cancer and various types of fever like malaria, typhoid etc.
- It has been observed that 40 percent of the respondents randomly selected in referral Hospitals are not residents of Delhi. About a half of these outsiders are coming from NCR districts of Delhi while 7 percent form NCR districts of Haryana and nearly 17 percent from non NCR districts of UP and rest from other states like, Bihar, Uttarakhand, West Bengal etc.

Table 3.21: Reasons for being admitted in the facility of Delhi

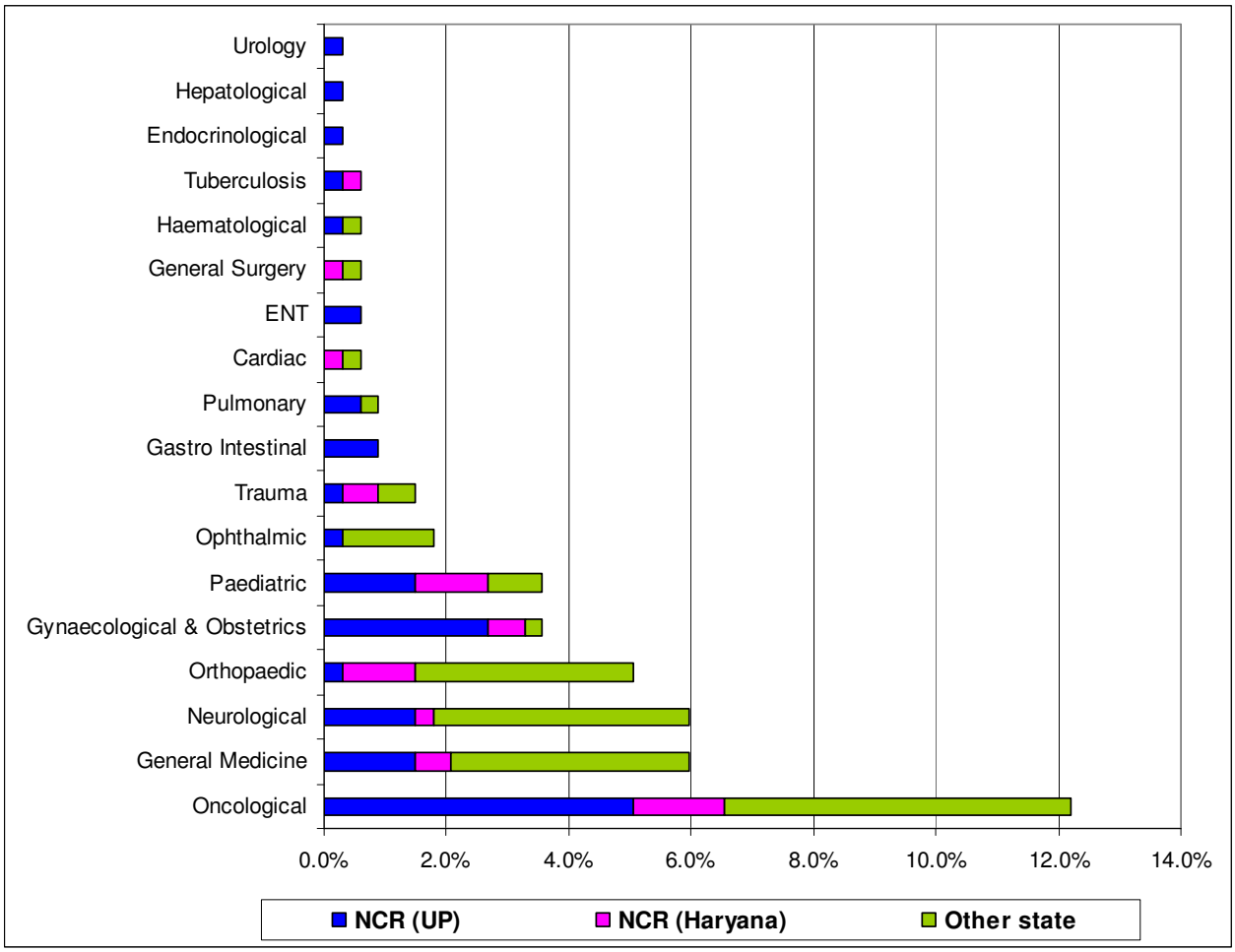
Ailments	Delhi		NCR (UP)		NCR (Haryana)		Other state		Other countries		Overall	
	No	%	No	%	No	%	No	%	No	%	No	%
Cardiac	4	1.2	0	0.0	1	0.3	1	0.3	0	0.0	6	1.8
Endocrinological	3	0.9	1	0.3	0	0.0	0	0.0	0	0.0	4	1.2
ENT	1	0.3	2	0.6	0	0.0	0	0.0	0	0.0	3	0.9
Gastro Intestinal	5	1.5	3	0.9	0	0.0	0	0.0	0	0.0	8	2.4
General Medicine	29	8.6	5	1.5	2	0.6	13	3.9	1	0.3	50	14.9
General Surgery	2	0.6	0	0.0	1	0.3	1	0.3	1	0.3	5	1.5
Gynaecological & Obstetrics	31	9.2	9	2.7	2	0.6	1	0.3	0	0.0	43	12.8
Haematological	1	0.3	1	0.3	0	0.0	1	0.3	0	0.0	3	0.9
Hepatological	4	1.2	1	0.3	0	0.0	0	0.0	0	0.0	5	1.5
Nephrological	2	0.6	0	0.0	0	0.0	0	0.0	0	0.0	2	0.6
Neurological	17	5.1	5	1.5	1	0.3	14	4.2	1	0.3	38	11.3
Oncological	23	6.8	17	5.1	5	1.5	19	5.7	0	0.0	64	19.0
Ophthalmic	1	0.3	1	0.3	0	0.0	5	1.5	0	0.0	7	2.1
Orthopaedic	16	4.8	1	0.3	4	1.2	12	3.6	0	0.0	33	9.8
Paediatric	27	8.0	5	1.5	4	1.2	3	0.9	0	0.0	39	11.6
Pulmonary	5	1.5	2	0.6	0	0.0	1	0.3	0	0.0	8	2.4
Trauma	9	2.7	1	0.3	2	0.6	2	0.6	0	0.0	14	4.2
Tuberculosis	0	0.0	1	0.3	1	0.3	0	0.0	0	0.0	2	0.6
Urology	1	0.3	1	0.3	0	0.0	0	0.0	0	0.0	2	0.6
Total	**181**	**53.9**	**56**	**16.7**	**23**	**6.8**	**73**	**21.7**	**3**	**0.9**	**336**	**100.0**

Source: Findings of this study

The following graph depicts the major ailments and percentage of suffering patients, who are coming to Delhi from NCR – UP and Haryana sub regions and from other states for treatment of such ailments.

- Cancer, Gynaecological problems & Obstetrics and Paediatric problems are major reasons of patient influx from NCR sub regions, followed by general medicine ward cases primarily different types of fevers; orthopaedic and neurological.

Figure 3.10: Major ailments for which patients come to Delhi from outside



Source: Findings of this study

Table 3.22: Major ailments for which patients come to Delhi from outside

Ailments	NCR (UP)		NCR (Haryana)		Other state		Total	
	No	%	No	%	No	%	No	%
Oncological	17	5.1	5	1.5	19	5.7	41	12.3
General Medicine	5	1.5	2	0.6	13	3.9	20	6.0
Neurological	5	1.5	1	0.3	14	4.2	20	6.0
Orthopaedic	1	0.3	4	1.2	12	3.6	17	5.1
Gynaecological & Obstetrics	9	2.7	2	0.6	1	0.3	12	3.6
Paediatric	5	1.5	4	1.2	3	0.9	12	3.6
Ophthalmic	1	0.3	0	0.0	5	1.5	6	1.8
Trauma	1	0.3	2	0.6	2	0.6	5	1.5
Gastro Intestinal	3	0.9	0	0.0	0	0.0	3	0.9
Pulmonary	2	0.6	0	0.0	1	0.3	3	0.9
Cardiac	0	0.0	1	0.3	1	0.3	2	0.6
ENT	2	0.6	0	0.0	0	0.0	2	0.6
General Surgery	0	0.0	1	0.3	1	0.3	2	0.6
Haematological	1	0.3	0	0.0	1	0.3	2	0.6
Tuberculosis	1	0.3	1	0.3	0	0.0	2	0.6
Endocrinological	1	0.3	0	0.0	0	0.0	1	0.3
Hepatological	1	0.3	0	0.0	0	0.0	1	0.3
Urology	1	0.3	0	0.0	0	0.0	1	0.3
Total	**56**	**16.7**	**23**	**6.8**	**73**	**21.7**	**152**	**45.2**

Source: Findings of this study

The table below enlists different NCR districts outside Delhi from where patients come to Delhi for referral and also their major ailments. As evident most of the referred patients are visiting government referral facilities and the private charitable hospital like St. Stephen's. Only for cancer treatment, service of high end private facility is being sought.

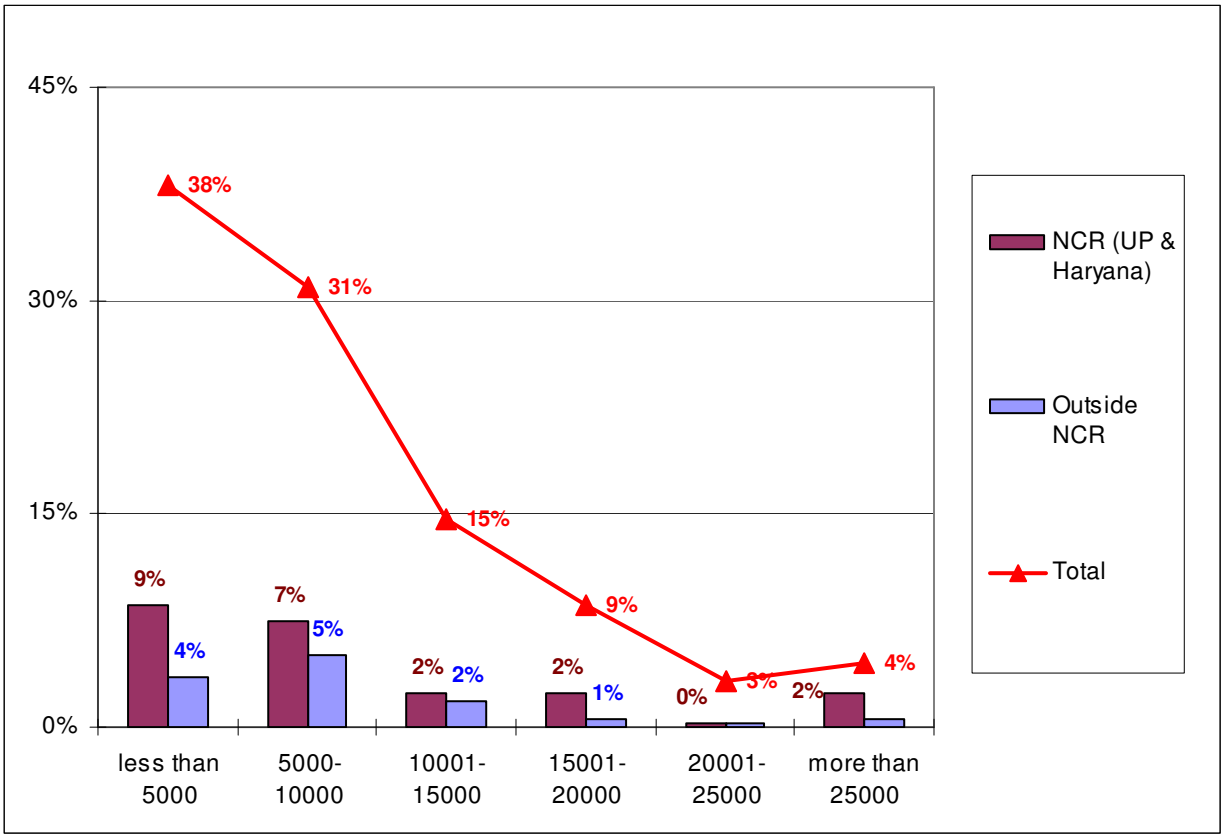
Table 3.23: Districts of NCR from where patients visit Delhi referral facility for various ailments

Ailments	**Patients coming from NCR (UP)**		**Patients coming from NCR (Haryana)**	
	Regions	**Hospitals visiting**	**Regions**	**Hospitals visiting**
General Medicine	• Ghaziabad including Hapur • Noida	• GB Pant Hospital • Guru Teg Bahadur Hospital • AIIMS	• Faridabad • Gurgaon	• Safdarjung Hospital • AIIMS
Gynaecological & Obstetrics (Delivery)	• Noida	• Safdarjung Hospital • AIIMs	• Faridabad • Gurgaon	• Safdarjung Hospital • AIIMS
Other Gynaecological Problems	• Baghpat • Ghaziabad including Hapur	• Guru Teg Bahadur Hospital • St Stephens Hospital • AIIMS		
Neurological	• Bulandshahar • Meerut • Noida	• GB Pant Hospital • Guru Teg Bahadur Hospital • Safdarjung Hospital • AIIMS	• Faridabad • Gurgaon	• AIIMS
Oncological	• Baghpat • Bulandshahar • Ghaziabad including Hapur • Meerut • Noida	• Dharamshila Hospital • GB Pant Hospital • Guru Teg Bahadur Hospital • St Stephens Hospital • AIIMS	• Sonipat	• Dharamshila Hospital • AIIMS
Orthopaedic	• Meerut	• GB Pant Hospital • AIIMS	• Faridabad • Gurgaon • Mewat	• Safdarjung Hospital • Guru Teg Bahadur Hospital • GB Pant Hospital • AIIMS
Paediatric	• Baghpat • Bulandshahar • Ghaziabad including Hapur • Meerut	• Guru Teg Bahadur Hospital • St Stephens Hospital	• Faridabad • Panipat	• Safdarjung Hospital • AIIMS
Pulmonary	• Baghpat • Bulandshahar	• St. Stephens Hospital		
Trauma (Accident / Burn)	• Bulandshahar	• Safdarjung Hospital • AIIMS	• Faridabad	• Safdarjung Hospital • AIIMS
Tuberculosis	• Ghaziabad including Hapur	• Safdarjung Hospital • AIIMS	• Faridabad	• Safdarjung Hospital • AIIMS

Source: Findings of this study

The following graph represents the economic profiles of respondents from Delhi health facilities:

Figure 3.11: Monthly Income of patients visiting Delhi Hospitals (data in %)



Source: Findings of this study

Table 3.24: Economic Profile of Patients visiting Delhi Hospitals

	NCR (UP & Haryana)		Outside NCR		Total	
Income Range	**No**	**%**	**No**	**%**	**No**	**%**
less than 5000	29	9%	12	4%	128	38%
5000-10000	25	7%	17	5%	104	31%
10001-15000	8	2%	6	2%	49	15%
15001-20000	8	2%	2	1%	29	9%
20001-25000	1	0%	1	0%	11	3%
more than 25000	8	2%	2	1%	15	4%
Total	**79**	**24%**	**40**	**12%**	**336**	**100%**

Source: Findings of this study

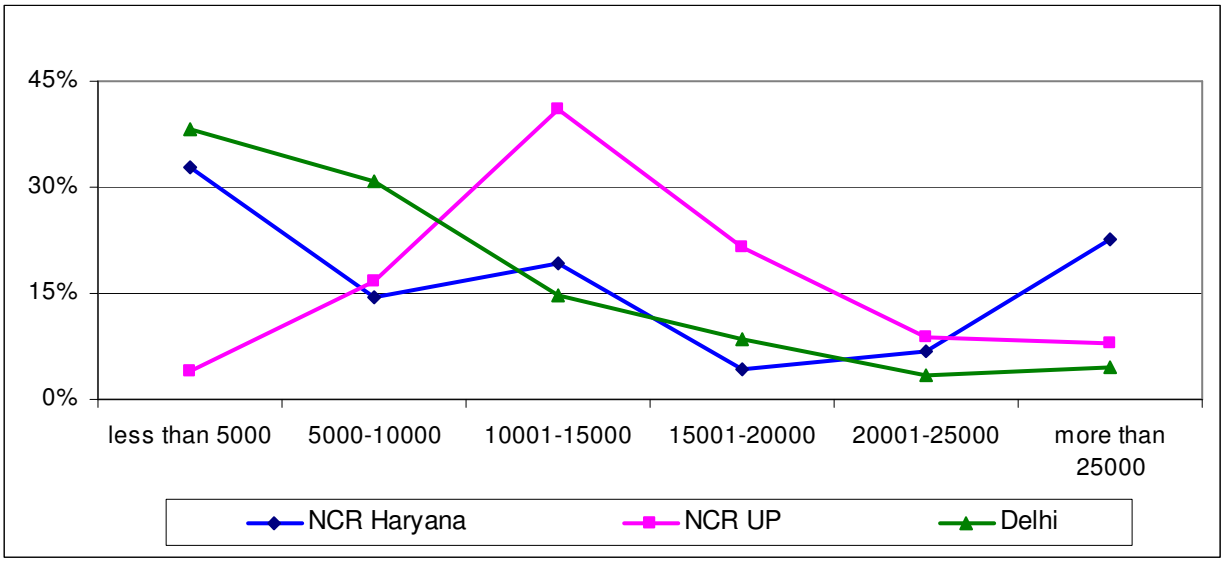
It was observed that about 38percent of the contacted patients in Delhi hospitals are earning less that INR 5000/- in a month, out of which 9 percent belong to NCR UP & Haryana, 4 percent to outside NCR and remaining 25 percent to Delhi sub-region itself.

Only 4 percent of all respondents interviewed in Delhi hospitals are earning more that INR 25000 monthly out of which 2 percent is from NCR UP & Haryana sub-region.

- Majority of the patients visiting Delhi health facilities belong to lower income group (more than 69% have monthly income below INR 10,000/-)
- In NCR Haryana health facilities, nearly half of the respondents belong to lower income group (47% have monthly income of not more than INR 10,000/-) and one fourth of the respondents belong to higher income group with an earning of more than INR 25,000/- per month
- Health facilities of NCR-UP mostly get patients form middle income group (more than 60% have monthly income of in between INR 10,000/ to 20.000/-)

The study shows that proper treatment for people belonging to lower income group is not adequate in NCR sub regions outside Delhi and considerable percentage of them come to Delhi at government referral hospitals.

Figure 3.12: Monthly Income of patients visiting different NCR sub regions (data in%)



Source: Findings of this study

Table 3.25: Monthly Income of patients visiting different NCR sub regions (data in%)

	NCR Haryana (N = 146)		NCR UP (N = 102)		Delhi (N = 336)	
Income Range	**No**	**%**	**No**	**%**	**No**	**%**
less than 5000	48	33%	4	4%	128	38%
5000-10000	21	14%	17	17%	104	31%
10001-15000	28	19%	42	41%	49	15%
15001-20000	6	4%	22	22%	29	9%
20001-25000	10	7%	9	9%	11	3%
more than 25000	33	23%	8	8%	15	4%

Source: Findings of this study

3.9.5 Quality of Services

Most of the patients have rated the service provided at the referral hospitals as good, the percentage of satisfied patients is above 95 percent.

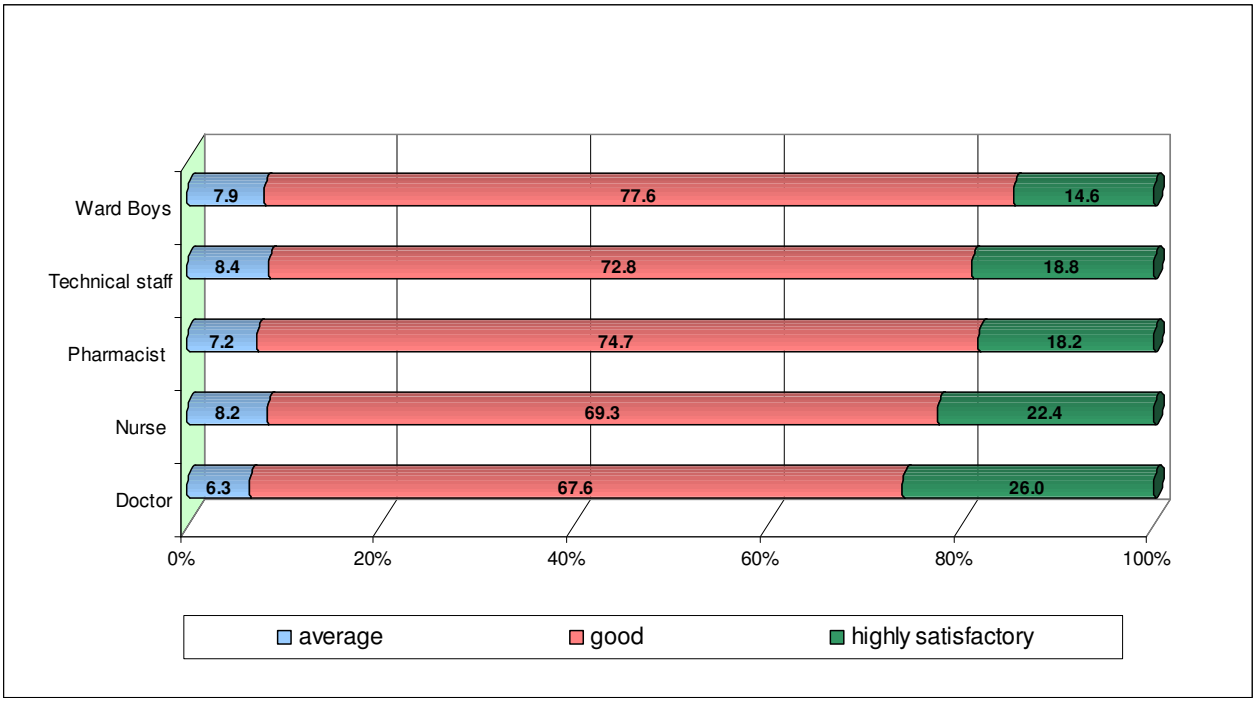
Table 3.26: Quality of service

Parameters	**In % of Satisfied and highly satisfied Patients**		
	Delhi	**NCR Haryana**	**NCR UP**
Doctor	98.1	98.4	96.5
Nurse	96.7	98.4	92.9
Pharmacist	97.2	99.2	95.1
Technical staff	96.7	97.7	93.6
Ward Boys	97.2	98.4	94.4

Source: Findings of this study

During interaction it was recorded that patient's satisfaction level about the doctors was highest.

Figure 3.13: Quality of service (data in %)



Source: Findings of this study

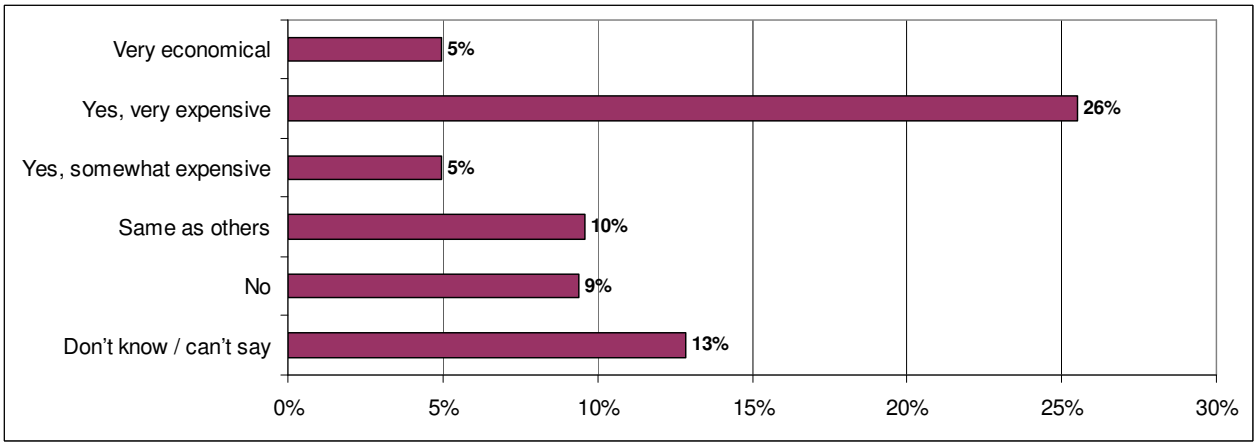
Table 3.27: Quality of service

Staffs category	Average		Good		Highly Satisfactory	
Doctor	**In Number**	**In %**	**In Number**	**In %**	**In Number**	**In %**
Doctor	37	6.3	395	67.6	152	26.0
Nurse	48	8.2	405	69.3	131	22.4
Pharmacist	42	7.2	436	74.7	106	18.2
Technical staff	49	8.4	425	72.8	110	18.8
Ward Boys	46	7.9	453	77.6	85	14.6

Source: Findings of this study

It was observed that most of the patients found the services to be expensive (26%) (Figure 3.14).

Figure 3.14: Whether service is expensive in comparison to other facilities visited earlier (% patient)



Source: Findings of this study

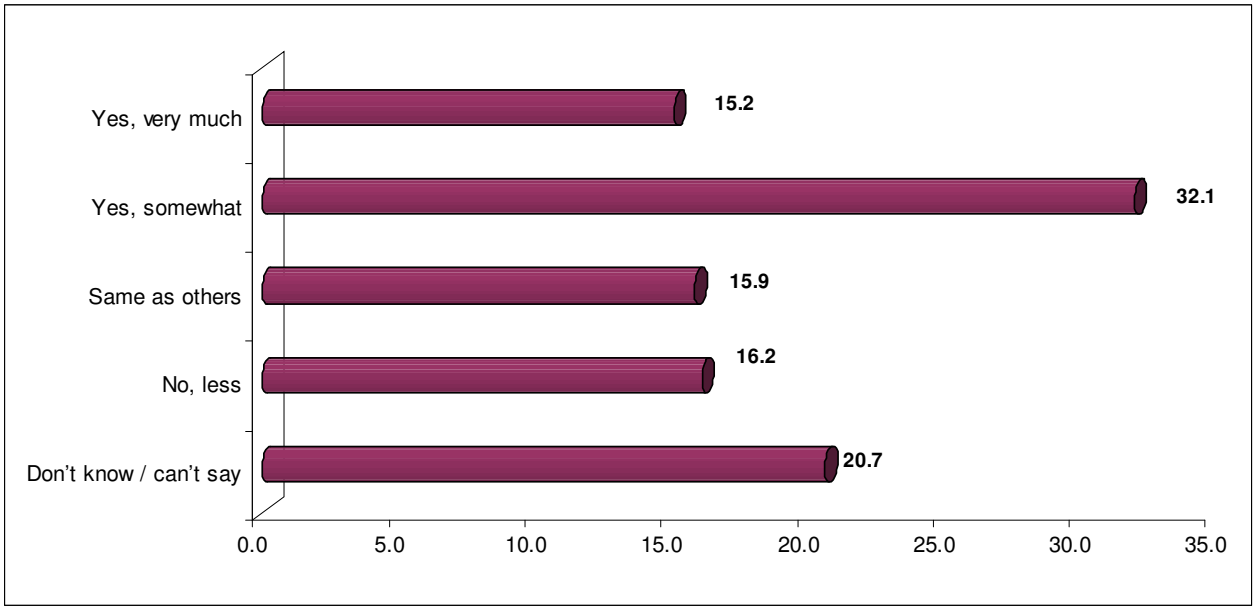
Table 3.28: Whether service is expensive in comparison to other facilities visited earlier (% patient)

Parameters	In Number	In %
Don't know / can't say	75	13%
No	55	9%
Same as others	56	10%
Yes, somewhat expensive	29	5%
Yes, very expensive	149	26%
Very economical	29	5%

Source: Findings of this study

It is interesting to report that despite finding the services expensive about 32 percent of the contacted patients found that the services are somewhat affordable in comparison to other facilities visited earlier (Figure 3.15).

Figure 3.15: Affordability of the service in comparison to other facilities visited earlier (% patient)



Source: Findings of this study

Table 3.29: Affordability of the service in comparison to other facilities visited earlier (% patient)

Parameters	In Number	In %
Don't know / can't say	121	20.7
No, less	94	16.2
Same as others	93	15.9
Yes, somewhat	187	32.1
Yes, very much	88	15.2

Source: Findings of this study

Case study- Gurgaon District Hospital

Health is a state of complete physical, mental & social well-being and not merely absence of disease or infirmity. Providing basic health well-being to all men, women and children is therefore, the ultimate objective of Health services. Efforts have been made by government, private and recently in public-private partnership mode to achieve this goal. Considerable expansion of medical and health services has taken place over the period of time.

The status of healthcare services in the NCR has been investigated through a study of the

Case study- Gurgaon District Hospital

demand and supply side of services available. The demand side of the healthcare services has been considered by exploring the economic condition of the patients and the services availed by them. The quality of healthcare has also been looked into along with their level of satisfaction and their demand for the quality healthcare services. Doctors, Nurses and all other Para - medical personnel form an integral part of any health system.

The supply side of the healthcare services has been taken into account by looking into the functioning of the hospitals including various services and charges as well as availability of doctors and nurses. The quality aspect of healthcare services has been given due emphasis in the study. The study has mainly focused on services available in urban medical establishments of the selected hospitals in the NCR. The study has been carried out with the help of secondary research and primary survey of patients, hospitals in the NCR. Survey data of Gurgaon District Hospital is depicted as a case study for the existing health infrastructure of NCR.

Gurgaon District Hospital is strategically located in the district headquarter Gurgaon. It is located near Gurgaon bus stand and easily accessible. The total covered area of the hospital is about 1.5 acre. Two 4 storey buildings are there in the hospital premises besides, a few small one storey buildings. It is 24X7 super-specialty hospital under the administrative control of Government of Haryana. This hospital serves entire Gurgaon district and adjacent districts of Haryana. The patients from neighbouring states like Rajasthan and Uttar Pradesh also visit this hospital. About 80 percent of the patients are from Gurgaon district followed by 15 percent from other NCR districts and rest 5 percent are from outside NCR regions.

About 25 OPDs are functional which include general medicine, general surgery, obstetric & gynaecology, ENT, neurology, paediatrics, eye, dermatology, psychiatry, orthopaedics, dentistry and AYUSH OPDs. It is the only hospital in government administration offering advanced cancer treatment. The hospital has 200 beds. However these beds are not sufficient for this hospital as bed occupancy rate is about 100 percent. It was evident during the field visit- 130 patients were admitted at 12 noon during the time of visit.

Gurgaon District hospital has 32 doctors and 73 paramedical staff. The Principal Medical Officer (PMO) informed that shortage of manpower is the main problem in this hospital particularly in the case of paramedical staff. He mentioned that there is a shortfall of about 31 doctors, 9 nursing in-charge and technicians. According to him, the health manpower scenario in the Government set-up is very bad.

Besides basic clinical facilities like blood test, urine test, radiological test (X-rays, Ultrasound Sonography Test (USG), Magnetic resonance imaging (MRI), Mammography), Electro Cardiogram (ECG), this hospital has other clinical test facilities like dialysis, Broncos copy/ Endoscopy and anaesthesia. It has 11 operational ambulances. The hospital is well equipped with General Surgery, Intensive Care Unit (ICU), Neonatal Intensive Care Unit (NICU) and Oncology surgery facilities but is facing problem of availability of technicians. This hospital has mortuary facilities. Some important statistics of Gurgaon hospital are given below.

Important Stastics of Gurgaon District Hospital

Particulars	**Details (per day)**
OPD footfall	900-1000
VVIP footfall	12-15
Admission	67-70
Number of surgery	16
Delivery	11
X-rays	54
ECG	10
Blood/Urine test	265

Case study- Gurgaon District Hospital

USG	40
MRI	4
LSCS	1

Source: Findings of this study

It is observed that despite supply gaps, Gurgaon district hospital maintains a very good health infrastructure with clean facilities. It is comparable with any good super-specialty hospital. The hospital wants to outsource some of services like house-keeping, security services, laundry services, dietary services, Central Sterile Services Department (CSSD) services, house surgeon, pharmacist, data entry operators, technicians and staff nurses for better management of the hospital. Generally, this hospital handles the cases on their own, however it refers some critical cases to Postgraduate Institute Chandigarh and some patients visit AIIMS at their convenience.

Source: Findings of this study

Case study- Mobile Health Scheme of Directorate of Health Services

Directorate of Health Services had started Mobile Health Scheme in the year 1989 to provide medical services to the residents of "Jhughi Jhopari" clusters of Delhi. The programme has a mandate to ensure universal immunization, safe delivery, new born care, prevention of waterborne and communicable diseases, improved nutrition etc. Under this component medical services were provided to the community at their doorstep through mobile dispensaries wherein free examination, consultation and advice were provided to the patients with free distribution of essential drugs.

Mobile Health Scheme was running with 90 mobile dispensaries out of which 45 were being run by Directorate of Health Services staff and remaining 45 with the help from various NGOs. The programme was covering 520 "Jhughi Jhopari" clusters of Delhi and 53 construction sites covering about 24 lakh patients every year. One mobile dispensary team was visiting two "Jhughi Jhopari" clusters per day and twice a week same clusters were covered by each mobile dispensary.

4. Norms & Population Projection

4.1 Population Projection

Table 4.1 deals with the district wise total population of NCR region and sub regions, the total population of NCR is 46,069,303 as per 2011 census. The population of each district and sub regions have been calculated using decadal growth rate for the purpose of assessment of required health facilities upto year 2036 in an interval of five years from 2011. Analysing the sub region wise distribution of available population, NCT Delhi has about 36.4 percent of the total population followed by Uttar Pradesh having about 32 percent, Haryana 24 percent and Rajasthan only 8 percent

Table 4.1: Population Projection

Sub Region	Name of District	Census 2011 (In number)	Growth rate (2001-2011)*	Estimated Population in Lakhs					
				2012	2016	2021	2026	2031	2036
Uttar Pradesh	Baghpat	1303048	11.95	13.2	13.8	14.6	15.4	16.1	16.9
	Bulandshahar	3499171	16.25	35.6	37.8	40.7	43.5	46.4	49.2
	Gautam Buddha Nagar	1648115	49.11	17.3	20.5	24.6	28.6	32.7	36.7
	Ghaziabad including Hapur	4681645	41.27	48.7	56.5	66.1	75.8	85.5	95.1
	Meerut	3443689	15.80	35.0	37.2	39.9	42.6	45.3	48.0
	Sub total Uttar Pradesh	**14575668**		**149.8**	**165.8**	**185.9**	**205.9**	**226.0**	**246.0**
Rajasthan	**Alwar**	**3674179**	**22.8**	**37.6**	**40.9**	**45.1**	**49.3**	**53.5**	**57.7**
Haryana	Faridabad	1809733	32.5	18.7	21.0	24.0	26.9	29.9	32.8
	Gurgaon	1514432	74.0	16.3	20.7	26.3	31.9	37.5	43.1
	Jhajjar	958405	8.9	9.7	10.0	10.4	10.9	11.3	11.7
	Mewat	1089263	37.9	11.3	13.0	15.0	17.1	19.2	21.2
	Palwal	1042708	25.8	10.7	11.8	13.1	14.5	15.8	17.1
	Panipat	1205437	20.2	12.3	13.3	14.5	15.7	16.9	18.1
	Rewari	900332	17.6	9.2	9.8	10.6	11.4	12.2	13.0
	Rohtak	1061204	12.9	10.7	11.3	12.0	12.7	13.3	14.0
	Sonepat	1450001	21.8	14.8	16.1	17.7	19.2	20.8	22.4
	Sub-total Haryana	**11031515**		**113.6**	**127.0**	**143.6**	**160.3**	**176.9**	**193.6**
NCT-Delhi	**Delhi**	**16,787,941**	**21.2**	**171.4**	**185.7**	**203.5**	**221.3**	**239.1**	**256.9**
NCR	**Total**	**46,069,303**		**472.4**	**519.4**	**578.1**	**636.8**	**695.5**	**754.2**

Source: census 2011

4.2 Establishment of norms for health services

After analysing different norms it was observed that as per WHO, 5 beds are required for each 1000 population and as per IPHS, the requirement is 3.33 beds per 1000 population (Table 4.2). However, IPHS norm is more suitable for hospitals in NCR as most part of the region is urban.

Table 4.2: Requirement of Beds as per different Norms

Norms	Number of Beds per 1 000 population	Source
WHO	5	Source WHO- World Health Statistics 2010 Report
Delhi Master Plan 2021 (Proposal)	5	Modified Master Plan for Delhi 2021:page number: V (as amended up to 15th October, 2009)
URDPFI Guidelines	2	Source: Urban Development Plans Formulation and Implementation Guidelines (UDPFI), MOUD&PA, Government of India, New Delhi 1996 and subsequently the updated URDPFI Guidelines 2014
Indian Public Health Standards (IPHS)		
DH-300 BEDS	3.33	IPHS standard
CHC	2.00	

Source: Findings of this study

As per WHO survey, the national average of India is 0.9 beds per 1000 population whereas the global average is 3.2 beds per 1000 population. As per the same survey, India has 6 physicians, 13 nursing and midwives and 6 pharmaceuticals per 1000 population (Source: World Health Statistics 2010 Report)

Table 4.3: Norms to be used- Medical Staff

Norms of Manpower	Unit		Source
Physicians			
National Average	6	per 000 population	Source WHO- World Health Statistics 2010 Report
World Average	14	per 000 population	
100 bedded	1.02	per bed	Source Department of Health Govt of Delhi
300-500 bedded	0.07	per bed	Source IPHS Guide Line
Surgery Specialists			
300-500 bedded	0.0075	per bed	Source IPHS Guide Line
O&G specialist			
300-500 bedded	0.02	per bed	Source IPHS Guide Line
Paediatrician			
300-500 bedded	0.01	per bed	Source IPHS Guide Line
AYUSH Physician			
300-500 bedded	0.01	per bed	Source IPHS Guide Line

Source: Findings of this study

The Delhi Government has issued the 100 beds norms in October 2006. As per the same, each 100 bedded hospital requires 1.02 Doctors per bed, 0.94 Nursing and paramedical staff and 0.16 pharmacists.

The tables 4.3 and 4.4 indicate the various norms, however IPHS have been used for gap analysis for medical and paramedical staff.

Table 4.4: Norms to be used-Para Medical

Norms of Manpower	Unit		Source
Nursing and Midwifery			
National Average	13	per 000 population	Source WHO- World Health Statistics 2010 Report
World Average	28	per 000 population	
100 bedded	0.94	per bed	Source Department of Health Govt of Delhi
300-500 bedded	0.59	per bed	Source IPHS Guide Line
Paramedical			
National Average	6	per 000 population	Source WHO- World Health Statistics 2010 Report
World Average	4	per 000 population	
100 bedded	0.16	per bed	Source Department of Health Govt of Delhi
300-500 bedded	0.03	per bed	Source IPHS Guide Line

Source: Findings of this study

During the study period our team has conducted in depth research on available guidelines (World Health Organisation, Urban Development Plans Formulation and Implementation (UDPFI), IPHS, Delhi Master Plan and Delhi Government's Guideline) and norms for establishing health Infrastructure in India. While doing analysis of the requirements we have seen that IPHS is the only guideline which is available in detail and provide guidance on requirements of health infrastructure including requirement of beds, medical staff, paramedical staff etc. considering this we have concluded to be using IPHS norms for calculating bed and man power requirements in NCR. The same was discussed and then decided during Consultancy Review Committee (CRC) meeting dated 28th April 2011 and further applied for gap analysis.

4.3 Assumptions for assessment

4.3.1 Calculation for Primary & Secondary Health Facilities

The number of facilities required for primary and secondary care facilities have been calculated using district population and adhering to the requirements of IPHS norms as mentioned below;

Table 4.5: Norms to be used for health infrastructure calculation

Norms of Health Facilities	Population Norms as per IPHS	
	Plain Area	Hilly Tribal/Difficult Area
Sub-Centre (SCs)	5000	3000
Primary Health Centre (PHCs)	30,000	20,000
Community Health Centre (CHCs)	1,20,000	80,000

Source: Findings of this study

4.3.2 Calculation for Tertiary Hospitals

The number of facilities required for tertiary care facilities have been calculated using district population and adhering to the requirements of IPHS norms, like a hospital with 300 bed is required for a population of 10,00,000/- assuming that 1 out of each 50 persons will be admitted to that hospital and will stay for 5 days in a year.

4.3.3 Calculation of costs

The cost sheet of few big multi-speciality hospital projects completed in year 2010-11 were collected and average project cost has been used for calculating per bed cost and the same has been then converted into 100 bed hospital block cost as mentioned in table below. The costs as provided in various State Project Implementation Plans have been considered for construction of new PHCs.

Table 4.6: Block cost of selected health projects (as per secondary research)

Type of Infrastructure	Cost in INR	Source
PHC	85 Lakhs	**State Project Management Unit, NRHM Uttar Pradesh,2010-11**
CHC	3.35 Crore	
DH	15 Crore (100 bedded)	
PHC	70 Lakhs	**NRHM Madhya Pradesh, 2010-11**
CHC	2 Crore	
DH	15 Crore (100 bedded)	
PHC	70 Lakhs	**State Project Management Unit, NRHM Haryana, 2010-11**
CHC	2 Crore	
DH	18 Crore (100 bedded)	
PHC	207.27 Lakhs	**NRHM Haryana, 2010-11**
CHC	690.85 Lakhs	
DH	20 Crore (100 bedded)	
* Land cost is not included in the block cost		

Source: Based on information collected from State NRHM 2010-11

For our block cost calculations, we are considering INR 2 crore for PHC, INR 7 crore for CHC and INR 18 crore for District Hospital. The construction cost of each of the health facility has considered cost of construction of staff quarters and AYUSH units as per NRHM.

5. Need Assessment & Gap Analysis

5.1 Health System in India

5.1.1 Two & Three Tier Health System

Availability and accessibility of health infrastructure is not merely the presence of physical infrastructure like healthcare centres, dispensaries, or hospitals but it needs to be manned by well trained staff with a service perspective. Thus, while assessing the gap in present health infrastructure in NCR we have included the gap in the human resources, viz, medical and paramedical staff in urban as well as rural health infrastructure.

The current condition of physical infrastructure, staff, access and usage have been laid out before identifying critical gaps and requirements in infrastructure and services. Issues related to institutions, financing and policy need to be discussed in the context of these critical needs and then the potential role of the private sector in healthcare should be explored.

The healthcare in rural areas has been developed as a three tier structure based on predetermined population norms. Sub-centre is the most peripheral and first contact point between the primary health care system and the community. It is set up based on the population norms: 1 Sub-centre is established for every 5000 population in plain areas and for every 3000 population in hilly/tribal/desert areas. It is the lowest rung of a three-tier set up with referral linkage to the Primary Health Centre (PHC). A Sub-centre provides interface with the community at the grass-root level, providing all the primary health care services of particular importance with the package of services such as immunization, antenatal, natal and postnatal care, prevention of malnutrition and common childhood diseases, family planning services and counselling for communicable diseases.

Table 5.1: Health Infrastructure & Staffing Pattern as per NRHM norms

Health Facility	**Population Norms**		**Health Staffs**	**Services**
	Plain Area	**Hilly / Tribal / Difficult Area**		
Sub-Centre (Sacs)	5000	3000	2 staff comprising: 1 Female Health Worker commonly known as Auxiliary Nurse Midwife (ANM) 1 Male Health Worker commonly known as Multi Purpose Worker (Male). Voluntary health worker	Only OPD immunization, antenatal, natal and postnatal care, prevention of malnutrition and common childhood diseases, family planning services counselling
Primary Health Centre (PHCs)	30,000	20,000	14 staff comprising: 1 Medical Officer 1 Pharmacist 1 Nurse Mid-wife (Staff Nurse) 1 Health Worker (Female)/ANM 1 Health Educator 1 Health Assistant (Male) 1 Health Assistant (Female)/LHV 1 Upper Division Clerk 1 Lower Division Clerk 1 Laboratory Technician 1 Driver (Subject to	Should have 4-6 beds Should provide curative, preventive and promotive health care

Health Facility	Population Norms		Health Staffs	Services
	Plain Area	Hilly / Tribal / Difficult Area		
			availability of Vehicle) 4 Class IV Staff	
Community Health Centre (CHCs)	1,20,000	80,000	25 staff comprising: 4 Medical Officer (Surgeon, Obstetrician, Physician and Paediatrician) 7 Nurse Mid– Wife(staff Nurse) 1 Dresser 1 Pharmacist/ Compounder 1 Laboratory Technician 1 Radiographer 2 Ward Boys 1 Dhobi 3 Sweepers 1 Mali 1 Chowkidar 1 Ayah 1 Peon	30-bedded hospital providing specialist care in Medicine, Obstetrics and Gynaecology, Surgery and Paediatrics.
Source: Bulletin on rural health statistics in India,2008				

Primary Health Centres (PHCs) comprise the second tier in rural healthcare structure envisaged to provide integrated curative and preventive healthcare to the rural population with emphasis on preventive and promotive aspects. (Promotive activities include promotion of better health and hygiene practices, tetanus inoculation of pregnant women, intake of IFA tablets and institutional deliveries.) PHCs are established and maintained by State Governments under the Minimum Needs Programme (MNP)/Basic Minimum Services Programme (BMS). A medical officer is in charge of the PHC supported by fourteen paramedical and other staff. It acts as a referral unit for six sub-centres. It has four to six beds for inpatients. The activities of PHC involve curative, preventive and Family Welfare Services.

Community Health Centres (CHC) form the uppermost tier and are established and maintained by the State Government under the MNP/BMS programme. Four medical specialists including Surgeon, Physician, Gynaecologist, and Paediatrician supported by twenty-one paramedical and other staff are supposed to operate each CHC. Norms require a typical CHC to have thirty in-door beds with Operation Theatre (OT), X-ray, Labour Room, and Laboratory facilities. A CHC is a referral centre for four PHCs within its jurisdiction, providing facilities for obstetric care and specialist expertise.

The following table provides the details of inpatient health facilities in the NCR.

Table 5.2: Number of health facility having Inpatient Services in NCR

Name of Sub Regions	Government Health Facilities					Private Health Facilities				
	District / SD Hospital	CHC	PHC	Others	Total	Multi Sp. / Speciality Hospital	General Hospital	Nursing Home	Others	Total
Haryana	16	37	151	4	208	5	227	101	20	353
Uttar Pradesh	7	37	126	8	178	6	146	93	15	260
Rajasthan	1	24	72		97		33	1		34
Delhi	134	0	8	33	175	14	448	362	17	841
Total	**158**	**98**	**357**	**45**	**658**	**25**	**854**	**557**	**52**	**1488**

Source: Findings of this study

5.1.2 Gaps in Health System

During mapping exercise the study collected data on facilities available in public health care centres PHC onwards and could confirm that they lack equipment, there is absence of repairs and maintenance of available equipment's, improper functioning, and also lacks in providing complementary facilities such as 24-hour running water, electricity back-ups, and so on. But conditions being what they are, unreliable electricity and water supplies also take their toll on the performance of these centres.

During interactions with the district health authorities (CMOs/CMHOs) and Civil Surgeons they opined that the three tier in rural (as available in sub-regions: Uttar Pradesh, Haryana and Rajasthan) and two tiers in urban health (as available in Delhi) are not functioning properly. The reasons for non-functionality is different for both the rural and urban regions, in rural areas the quality of services are sparse. Apart from this, most of the primary and secondary health care units in government are lacking basic health infrastructure thus, are unable to provide basic health care facilities and as a result lose trust of patients/community. The reason in urban area is different; in urban areas patients have access to tertiary care hospitals. Thus, even for a small reason they prefer visiting tertiary care. This behaviour of patients have created unnecessary load in the tertiary care health services, and because of this extra load tertiary care units are not able to provide due care to the referral patients who visit the facility for getting specialised services.

Apart from the above, issues like availability of human resource is a huge gap in critical government healthcare institutions particularly in rural areas, which provide healthcare to the poorer segments of population. A large number of vacant posts of both ANMs and doctors are reported at the primary level in government hospitals. Also, most of the specialist positions in government hospitals in rural areas are lying vacant. The situation at the secondary and tertiary level is somewhat better, as doctors generally reside in urban areas. Vacancies continue to exist for the posts of laboratory technicians, radiographers and other para-professionals which have serious service implications. Other constraints include the low priority given to in-service training, inadequate staffing of training institutions, quality of trainers and inadequate facilities in training institutions.

While several initiatives have been taken for effective management of human resources, certain systemic issues such as remuneration, and seniority based promotion disregarding suitability and merit that contribute to low morale and uncommitted staff remains unresolved across States and need to be dealt on a priority basis. Apart from the above, rural public health facilities across the country are having a difficult time attracting, retaining, and ensuring regular presence of trained medical professionals (India holds top position in migration of physicians to developed countries like UK and the US). According to Planning Commission the country has a shortfall of six lakh doctors, 10 lakh nurses and two lakh dental surgeons. It is evident that the higher the level of training required for the position, the greater is this need gap. Gaps are mostly due to various reasons like;

- Vacant posts of medical and paramedical staffs
- In addition to the shortage of service providers, the system is plagued by poor involvement and participation of those who are employed.
- There is a significant problem with the adequacy of working facilities (supplies and equipment) within these centres,
- There is lack of adequate access to the facilities that exist.
- Lack of effective monitoring and evaluation mechanism.
- Overburdening of tertiary care.
- It is observed that rural marginalised poor population is moving towards government tertiary care and well to do population is moving towards high profile private hospitals. Thus, it is not true that patients of NCR are only moving towards NCT but it is poor patients who are moving towards NCT in search of better health services within their affordability.

This, of course, affects usage of the healthcare infrastructure and therefore access to adequate healthcare, a concern we have addressed in the details in the section on issues related to access.

Overview of National Rural Health Mission

Rural India is suffering from a long-standing healthcare problem. Although more than 70 per cent of its population lives in the village, only 20 per cent of India's hospital beds are located in rural areas. Most of the health problems that people suffer from in the rural community and in urban slums are preventable and easily treatable. In view of the above issues, the National Rural Health Mission (NRHM) was launched by the Government of India (GOI) in April 2005. It seeks to provide effective healthcare to the rural population throughout the country with special focus on eighteen states, which have weak public health indicators and/or weak infrastructure.
The goals of the NRHM include:

1. Reduction in Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR);
2. Universal access to integrated comprehensive public health services;
3. Child health, Water, Sanitation and Hygiene;
4. Prevention and control of communicable and non-communicable diseases, including locally endemic diseases;
5. Population stabilization, gender, and demographic balance;
6. Revitalization of local health traditions and main-stream Ayurvedic, Yoga, Unani, Siddha, and Homeopathy Systems of Health (AYUSH);
7. Promotion of healthy lifestyles.

The strategies to achieve the goals include:

1. Train and enhance capacity of Panchayati Raj Institutions (PRIs) to own, control and manage public health services;
2. Health plan for each village through Village Health Committee of the Panchayat;
3. Strengthening sub-centre through an untied fund to enable local planning and action (each sub-centre will have an Untied Fund for local action at INR 10,000 per annum). This Fund will be deposited in a joint Bank Account of the ANM and Sarpanch and operated by the ANM, in consultation with the Village Health Committee, and more Multi Purpose Workers (MPWs);
4. Provision of 24 hour service in 50 per cent PHCs by addressing shortage of doctors, especially in high focus states, through mainstreaming AYUSH manpower;
5. Preparation and implementation of an inter-sectoral District Health Plan prepared by the District Health Mission, including drinking water, sanitation, and hygiene and nutrition;
6. Integrating vertical Health and Family Welfare programs at National, State, Block, & District levels.
7. The duration of NHRM will be from 2005 to 2012.

Limitations of NRHM

- There is no data from pilot studies on the technical, operational and administrative feasibility of NRHM implementation in any state of the country. There is no corrective action plan in case of failures.
- The new mission is being launched without taking stock of failures with previous programmes such as Voluntary Health Guide (VHG) scheme launched in 1977.
- Decentralized planning process is still going on.
- Systematic monitoring process still needs strengthening.
- HMIS is not functioning in many of the sub region districts.

5.2 Hospital Beds

5.2.1 Need assessment of Hospital Beds in NCR

Table 5.3 provides details of requirement of beds in different sub regions of NCR considering bed population ratio as per IPHS norms for District Hospital i.e. 3.33 beds per 1000 population. Projections on the requirement of number of beds up to year 2036 at five years interval from year 2011 has been presented in Table 5.3 and the extrapolation of population has done using decadal growth rate. The analysis indicates that NCR has 65803 beds available in year 2011 against a requirement of 153411 beds which is about 43 percent of the total requirement. Looking into sub region wise need it could be concluded that the gaps in availability of beds is more in sub region Uttar Pradesh which is currently having only 20 percent of its required beds strength followed by Rajasthan having 22 percent of required beds and Haryana having about 30 percent.

Our analysis shows that to fulfil current needs NCR needs about 2.3 fold increase in its bed strength which will go up to five fold increase if considered for 2036. Looking into sub region wise distribution of required beds, sub region Uttar Pradesh needs about 5 fold increase in present situation which will increase to 7.5 times if considered for 2036.

Table 5.3 details the requirement of Health Infrastructure during the period 2011 to 2036.

Table 5.3: Requirement of Health Infrastructure 2011 to 2036(Figures in number)

Name Sub Region	Name of District	Number of Beds required as per IPHS Norms for DH	Available Number of Beds as in 2011	Gap in Number of Beds as in 2011	Gap In %	Estimated requirement of beds(2016-2036) (as per IPHS Norms for DH i.e.3.33 beds/1000 population)				
						2016	2021	2026	2031	2036
NCT Delhi	**All districts**	**55904**	**42467**	**13437**	**24.0**	**57090**	**61833**	**67761**	**73690**	**79619**
Haryana	Panipat	4014	1577	2437	60.7	4095	4419	4823	5228	5633
	Sonepat	4829	1075	3754	77.7	4934	5355	5881	6408	6934
	Gurgaon	5043	2275	2768	54.9	5416	6908	8773	10639	12504
	Palwal	3472	523	2949	84.9	3562	3919	4367	4814	5261
	Faridabad	6026	1620	4406	73.1	6223	7007	7987	8968	9948
	Mewat	3627	214	3413	94.1	3765	4315	5003	5691	6378
	Rewari	2998	724	2274	75.9	3051	3263	3527	3791	4056
	Jhajjar	3191	709	2482	77.8	3220	3334	3476	3618	3760
	Rohtak	3534	2169	1365	38.6	3579	3761	3989	4216	4444
Haryana Total		**36735**	**10886**	**25849**	**70.4**	**37844**	**42281**	**47826**	**53372**	**58917**
Rajasthan	**Alwar**	**12235**	**2661**	**9574**	**78.3**	**12514**	**13631**	**15027**	**16424**	**17820**
Uttar Pradesh	Baghpat	4339	384	3955	91.2	4391	4598	4858	5117	5376
	Bulandshaher	11652	1960	9692	83.2	11842	12599	13546	14493	15440
	Meerut	11467	2809	8658	75.5	11649	12373	13279	14184	15090
	Ghaziabad including Hapur	15590	3230	12360	79.3	16233	18807	22024	25241	28458
	Gautam Budhnagar	5488	1406	4082	74.4	5758	6836	8184	9531	10879
Uttar Pradesh Total		**48537**	**9789**	**38748**	**79.8**	**49872**	**55213**	**61890**	**68566**	**75242**
NCR	**Total**	**153411**	**65803**	**87608**	**57.1**	**157320**	**172958**	**192505**	**212052**	**231598**

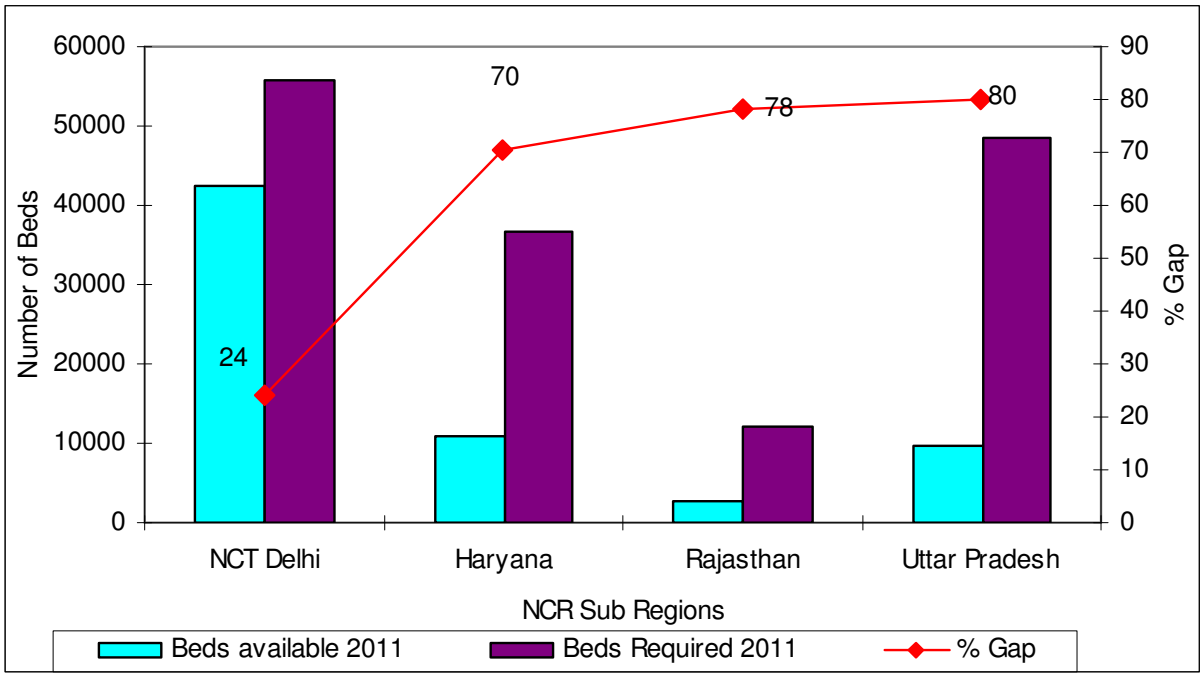
Source: Findings of this study

5.2.2 Gap in Hospital Bed Population Ratio

A total 65803 beds is available in NCR out of which 42467 is in NCT Delhi. NCT Delhi has about 65 percent of the total available beds in NCR against about 36 percent of the total population of the NCR. NCT Delhi is followed by sub region Haryana with 10,886 beds, Uttar Pradesh with 9,789 beds and Rajasthan with 2661 beds (wherein Alwar is the only NCR district).

As mentioned above, the analysis of bed population ratio has been done using IPHS norms for District Hospital i.e.3.33 beds per 1000 population. The available bed-population ratio is 1.43 in NCR, 2.53 in NCT Delhi, 0.99 in Haryana, 0.72 Rajasthan and 0.67 Uttar Pradesh.

Figure 5.1: Sub Region wise distribution of availability and Gap in Beds



Source: Findings of this study

Looking at the gap of beds (in percentage), it can be observed that the overall gap is about 57 percent for NCR. While analysing this issue sub region wise, we can see that the gap in proportion of bed is minimum in NCT Delhi about 24 percent while that in the other regions is quite high: Haryana (70.4%), Rajasthan (78.3%) and Uttar Pradesh (79.9%) which is maximum.

Analysis of the interactions with the patients in referral hospitals indicates that a major portion of the patients who come to Delhi for medical facilities are from Uttar Pradesh. It is evident from the above mentioned discussion and Table 5.3 that more emphasis is required in developing health infrastructure in Uttar Pradesh. However, none of the sub region has adequate health facilities in terms of beds including NCT Delhi. District wise gap analysis for NCR is provided in Table 5.4.

Table 5.4: Distribution of Beds in Different Sub Regions of NCR

Sub Regions	Total Population as per Census 2011	Distribution of Population in %	Total Beds Available	Distribution of beds in %	Available Bed Population Ratio as on 2011	Gap in Ratio as on 2011
NCT Delhi	**16,787,941**	36.4	42467	64.5	2.53	0.80
Haryana	**11,031,515**	24.0	10886	16.5	0.99	2.34
Rajasthan	**3,674,179**	8.0	2661	4.0	0.72	2.61
Uttar Pradesh	**14,575,668**	31.7	9789	14.9	0.67	2.66
Total	**46,069,303**	**100.0**	**65803**	**100.0**	**1.43**	**1.90**

Source: Findings of this study

5.3 Medical Staff

5.3.1 Requirement/ Need assessment of Medical Staff in NCR

In this section, requirement/ need assessment has been done for the following medical staff only as the IPHS medical norm is available for them only:

- General Physicians
- Obstetrics & Gynaecologists (O&G)
- Surgeons
- Paramedical staff

Table 5.5, 5.6, 5.7 and 5.8 tabulates the requirement of General Physicians, Obstetrics & Gynaecologists (O&G), Surgeons and Paramedical staff considering bed to medical staff norms of IPHS for District Hospital i.e.300 to 500 beds. The referred table also details the projections of medical staff up to year 2036 at five year interval from 2011.

The availability data is based on the information as provided by each facility during the primary survey. But in actual circumstances, as has been mentioned earlier a doctor/ specialist is attached to few health institutions thereby the number of doctors/ specialists available in true sense will be lower than the ones as has been reported to us during the primary survey of this study by the various health institutions. This is more so in case of NCT, some districts of Haryana and Uttar Pradesh.

From Table 5.5 one can see that NCR has 4535 general physicians available in year 2011 against a requirement of 10585 thereby indicating the availability to be only 43 percent of the total requirement. Looking into sub region wise availability one could see that majority of the physicians are concentrated in NCT Delhi i.e. about 50 percent of total followed by Haryana (26%) and Uttar Pradesh (21%). Our analysis shows that to fulfil current requirements, NCR needs about 2.3 fold increases so far number of physicians is concerned and this will go up to 3.5 fold increase if considered for 2036. Looking into sub region wise distribution of required number of physicians, sub region Uttar Pradesh needs about 3.5 fold increase in present situation which will increase to 5.4 times if considered for 2036. The sub region Haryana having a fast growing population needs 3.5 fold increase by the year 2036.

Table 5.6 provides details of availability of O&G Specialist in different districts as well as sub regions of NCR. NCR has 2778 O&G Specialists wherein the requirement is 3068 thus, having a deficit of only 10 percent. Looking into sub region wise availability only could see NCT Delhi is having excess number O&G Specialists (about 45%). On the contrary Rajasthan has only about 14 percent of the required O&G Specialist. Our analysis shows that to fulfil current demand, NCR needs about one fold increases so far number of O&G Specialist is concerned and this will go up to 1.7 fold increase if considered for 2036. Looking into sub region wise distribution of required

number of O&G Specialists, the sub region Uttar Pradesh needs about 1.6 fold increase in present situation which will increase to 2 times if considered for 2036.

Table 5.7 provides details of availability of Surgeons in different districts as well as sub regions of NCR. NCR has 1990 Surgeons wherein the requirement is 1151 thus, having no deficit at this point of time. Looking into sub region wise availability, one could see NCT Delhi is having excess number surgeons. On the contrary, Rajasthan has only about 38 percent of the required Surgeons. Our analysis shows that to fulfil current needs Rajasthan should appoint Surgeons.

Table 5.8 provides details of availability of Paramedical staffs in different districts as well as sub regions of NCR. NCR requires about 93966 Paramedical staffs out of which only 35980 are available which is only 38 percent of the requirement. NCT Delhi is having about 65 percent of paramedical staffs followed by Haryana (22%), Rajasthan (22%) and Uttar Pradesh (18%) (Table 5.8).

Our analysis shows that to fulfil current needs NCR needs about 2.6 fold increase in number of paramedical staff and this will go up to 3.9 fold increase if considered for 2036. Looking into sub region wise distribution of required number of paramedical staff, the sub region Uttar Pradesh needs about 5.2 fold increase over the present which will increase to 8.3 times if considered for 2036. This is followed by sub region Haryana, which is a State having significantly high population growth and requires 7.3 fold increase in existing number of paramedical for the year 2036 (Table 5.8)

Table 5.5: Need assessment of Doctors-Physicians (Figures in numbers)

Name of sub Regions	Name of District	Number of Physicians Required in 2011 as per IPHS Norms	Number of Physicians Available - 2011	Gap in Number of Physicians as on 2011	Gap In %	Estimated Requirement (as per IPHS Norms)				
						2016	2021	2026	2031	2036
NCT Delhi	**All districts**	**3857**	**2249**	**1608**	**41.7**	**3939**	**4266**	**4676**	**5085**	**5494**
Haryana	Panipat	277	182	95	34.3	283	305	333	361	389
	Sonepat	333	188	145	43.6	340	369	406	442	478
	Gurgaon	348	137	211	60.6	374	477	605	734	863
	Palwal	240	70	170	70.8	246	270	301	332	363
	Faridabad	416	153	263	63.2	429	483	551	619	686
	Mewat	250	36	214	85.6	260	298	345	393	440
	Rewari	207	169	38	18.3	211	225	243	262	280
	Jhajjar	220	91	129	58.7	222	230	240	250	259
	Rohtak	244	138	106	43.4	247	260	275	291	307
Haryana Total		**2535**	**1164**	**1371**	**54.1**	**2611**	**2917**	**3300**	**3683**	**4065**
Rajasthan	**Alwar**	**844**	176	**668**	**79.2**	**863**	**941**	**1037**	**1133**	**1230**
Uttar Pradesh	Baghpat	299	42	257	86.0	303	317	335	353	371
	Bulandshaher	804	395	409	50.9	817	869	935	1000	1065
	Meerut	791	133	658	83.2	804	854	916	979	1041
	Ghaziabad including Hapur	1076	290	786	73.0	1120	1298	1520	1742	1964
	Gautam Budhnagar	379	86	293	77.3	397	472	565	658	751
Uttar Pradesh Total		**3349**	**946**	**2403**	**71.8**	**3441**	**3810**	**4270**	**4731**	**5192**
NCR	**Total**	**10585**	**4535**	**6050**	**57.2**	**10855**	**11934**	**13283**	**14632**	**15980**

Source: Findings of this study

Table 5.6: Need assessment of Doctors-O & G Specialist (Figures in Number)

Name of sub Region	Name of District	Number of O & G Specialist Required in 2011 as per IPHS Norms	Number of O & G Specialist Available -2011	Gap in Number of O & G Specialist as on 2011 **	Gap In %	Estimated Requirement (as per IPHS Norms)				
						2016	2021	2026	2031	2036
NCT Delhi	**All districts**	**1118**	1620	**-503**	**-45**	**1142**	**1237**	**1355**	**1474**	**1592**
Haryana	Panipat	80	98	-18	-22.5	82	88	96	105	113
	Sonepat	97	101	-2	-2	99	107	118	128	139
	Gurgaon	101	72	29	28.7	108	138	175	213	250
	Palwal	69	16	53	76.8	71	78	87	96	105
	Faridabad	121	88	32	26.7	124	140	160	179	199
	Mewat	73	15	58	79.5	75	86	100	114	128
	Rewari	60	58	2	3.3	61	65	71	76	81
	Jhajjar	64	37	27	42.2	64	67	70	72	75
	Rohtak	71	29	42	59.2	72	75	80	84	89
Haryana Total		**735**	514	**223**	**30.3**	**757**	**846**	**957**	**1067**	**1178**
Rajasthan	**Alwar**	**245**	34	**211**	**86.1**	**250**	**273**	**301**	**328**	**356**
Uttar Pradesh	Baghpat	87	8	79	90.8	88	92	97	102	108
	Bulandshaher	233	220	13	5.6	237	252	271	290	309
	Meerut	229	94	136	59.1	233	247	266	284	302
	Ghaziabad including Hapur	312	214	97	31.2	325	376	440	505	569
	Gautam Budhnagar	110	74	40	35.7	115	137	164	191	218
Uttar Pradesh Total		**971**	**610**	**363**	**37.3**	**997**	**1104**	**1238**	**1371**	**1505**
NCR	**Total**	**3068**	**2778**	**294**	**9.6**	**3146**	**3459**	**3850**	**4241**	**4632**

*** Figures in –ve do not truly mean that there is excess specialists. In fact, a specialist is available on call/ attached to different hospitals and hence the data as provided by hospitals have counted a specialist more than once*

Source: Findings of this study

Table 5.7: Need assessment of Doctors-Surgeon (Figures in Number)

Name of sub Regions	Name of District	Number of Surgeons Required in 2011 as per IPHS Norms	Number of Surgeons Available -2011	Gap in Number of Surgeons as on 2011 **	Gap In %	Estimated Requirement (as per IPHS Norms)				
						2016	2021	2026	2031	2036
NCT Delhi	**All districts**	**419**	1345	**-926**	**-221**	**428**	**464**	**508**	**553**	**597**
Haryana	Panipat	30	41	-11	-36.7	31	33	36	39	42
	Sonepat	36	28	8	24.3	37	40	44	48	52
	Gurgaon	38	29	9	23.7	41	52	66	80	94
	Palwal	26	2	24	92.3	27	29	33	36	39
	Faridabad	45	74	-29	-64.4	47	53	60	67	75
	Mewat	27	3	24	88.9	28	32	38	43	48
	Rewari	22	27	-5	-22.7	23	24	26	28	30
	Jhajjar	24	39	-15	-62.5	24	25	26	27	28
	Rohtak	27	26	1	0	27	28	30	32	33
Haryana Total		**276**	269	**7**	**2.2**	**284**	**317**	**359**	**400**	**442**
Rajasthan	**Alwar**	**92**	35	**57**	**62**	**94**	**102**	**113**	**123**	**134**
Uttar Pradesh	Baghpat	33	6	27	81.8	33	34	36	38	40
	Bulandshaher	87	15	72	82.8	89	94	102	109	116
	Meerut	86	47	39	45.3	87	93	100	106	113
	Ghaziabad including Hapur	117	181	-64	-54.7	122	141	165	189	213
	Gautam Budhnagar	41	92	-51	-119	43	51	61	71	82
Uttar Pradesh Total		364	341	-23	6.6	374	414	464	514	564
NCR	**Total**	**1151**	**1990**	**-839**	**-72.9**	**1180**	**1297**	**1444**	**1590**	**1737**

*** Figures in –ve do not truly mean that there is excess specialists. In fact, a specialist is available on call/ attached to different hospitals and hence the data as provided by hospitals have counted a specialist more than once*

Source: Findings of this study

Table 5.8: Need assessment of Paramedical staff including nurse & midwife (Figures in number)

Name of sub Regions	Name of District	Number of Paramedical Required in 2011 as per IPHS Norms	Number Paramedical Available - 2011	Gap in Number of Paramedical as on 2011	Gap In %	Estimated Requirement (as per IPHS Norms)				
						2016	2021	2026	2031	2036
NCT Delhi	**All districts**	**34242**	**23634**	**10608**	**31.0**	**34967**	**37872**	**41504**	**45135**	**48767**
Haryana	Panipat	2459	1038	1421	57.8	2508	2706	2954	3202	3450
	Sonepat	2958	499	2459	83.1	3022	3280	3602	3925	4247
	Gurgaon	3089	943	2146	69.5	3317	4231	5374	6516	7659
	Palwal	2127	139	1988	93.5	2182	2401	2675	2948	3222
	Faridabad	3691	980	2711	73.5	3811	4292	4892	5493	6093
	Mewat	2222	258	1964	88.4	2306	2643	3064	3485	3907
	Rewari	1836	371	1465	79.8	1869	1998	2160	2322	2484
	Jhajjar	1955	521	1434	73.3	1972	2042	2129	2216	2303
	Rohtak	2164	221	1943	89.8	2192	2304	2443	2583	2722
Haryana Total		**22501**	**4970**	**17531**	**77.9**	**23179**	**25897**	**29294**	**32690**	**36087**
Rajasthan	**Alwar**	**7494**	**1651**	**5843**	**78.0**	**7665**	**8349**	**9204**	**10059**	**10915**
Uttar Pradesh	Baghpat	2658	194	2464	92.7	2689	2816	2975	3134	3293
	Bulandshaher	7137	845	6292	88.2	7253	7717	8297	8877	9457
	Meerut	7024	1776	5248	74.7	7135	7579	8133	8688	9243
	Ghaziabad including Hapur	9549	1774	7775	81.4	9943	11519	13490	15460	17430
	Gautam Budhnagar	3362	1136	2226	66.2	3527	4187	5013	5838	6663
Uttar Pradesh Total		**29729**	**5725**	**24004**	**80.7**	**30547**	**33818**	**37907**	**41997**	**46086**
NCR	**Total**	**93966**	**35980**	**57986**	**61.7**	**96359**	**105937**	**117909**	**129882**	**141854**

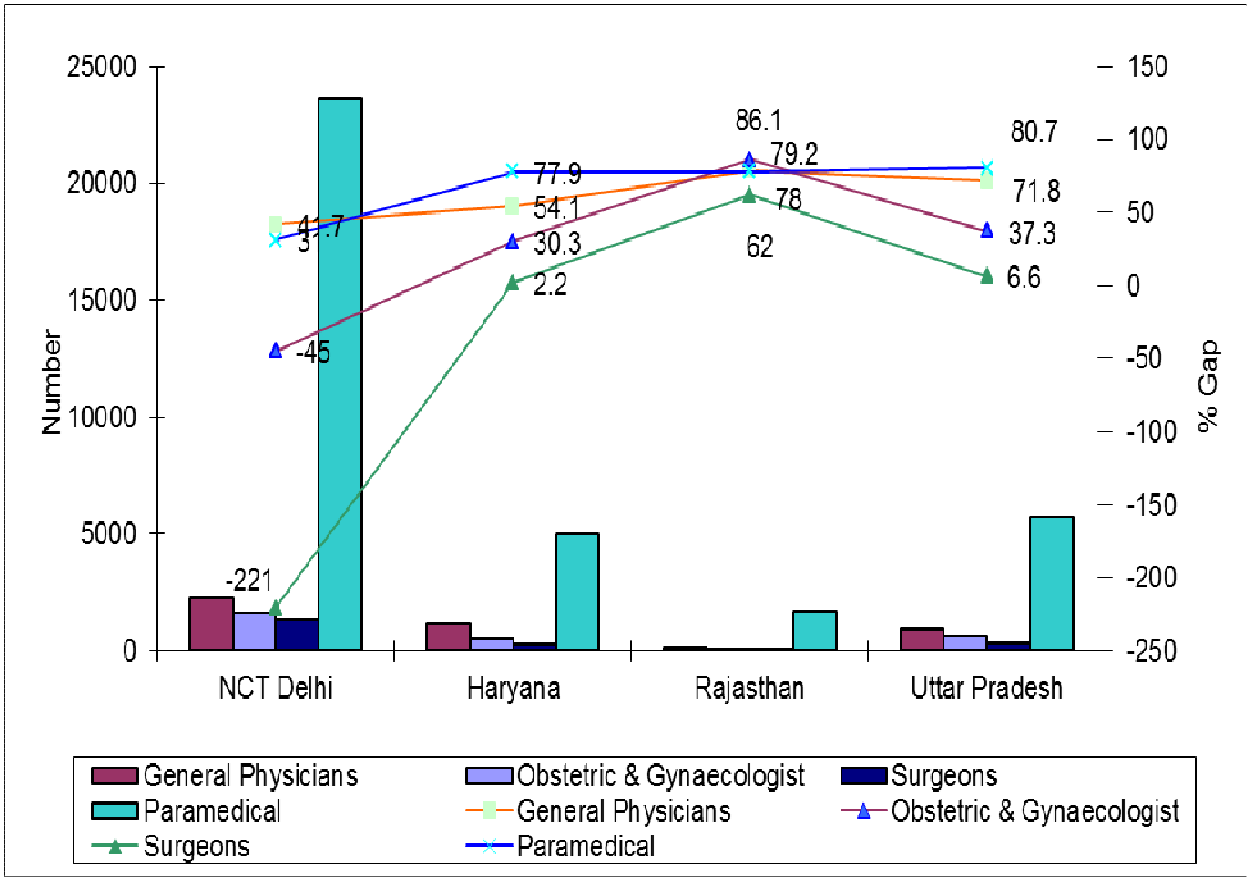
Source: Findings of this study

5.3.2 Gaps in availability of Medical Staff

A total 4535 general physicians are available in NCR out of which, 2249 are in NCT Delhi i.e about 49 percent of the total. About 59 percent of the Obstetrics & Gynaecologists, 68 percent of the Surgeons and 65 percent paramedical staff of NCR are available in NCT Delhi.

The assessment of the current pattern of medical and paramedical staff indicates that among the doctors/specialist, there is acute shortage of General Physicians and Paramedical staff. The overall gap of paramedical staff in NCR is about 61.7 percent followed by 57.2 percent in General Physicians and 9.6 percent on Obstetrics & Gynaecologists. However, from the analysis of the data it seems that the availability of surgeons in the NCR is adequate (the actual data analysis shows excess number but it may be due to repeat counting of the same surgeon as he is available on call in various facilities).

Figure 5.2: Sub Region wise distribution of availability and Gap in Medical Staff



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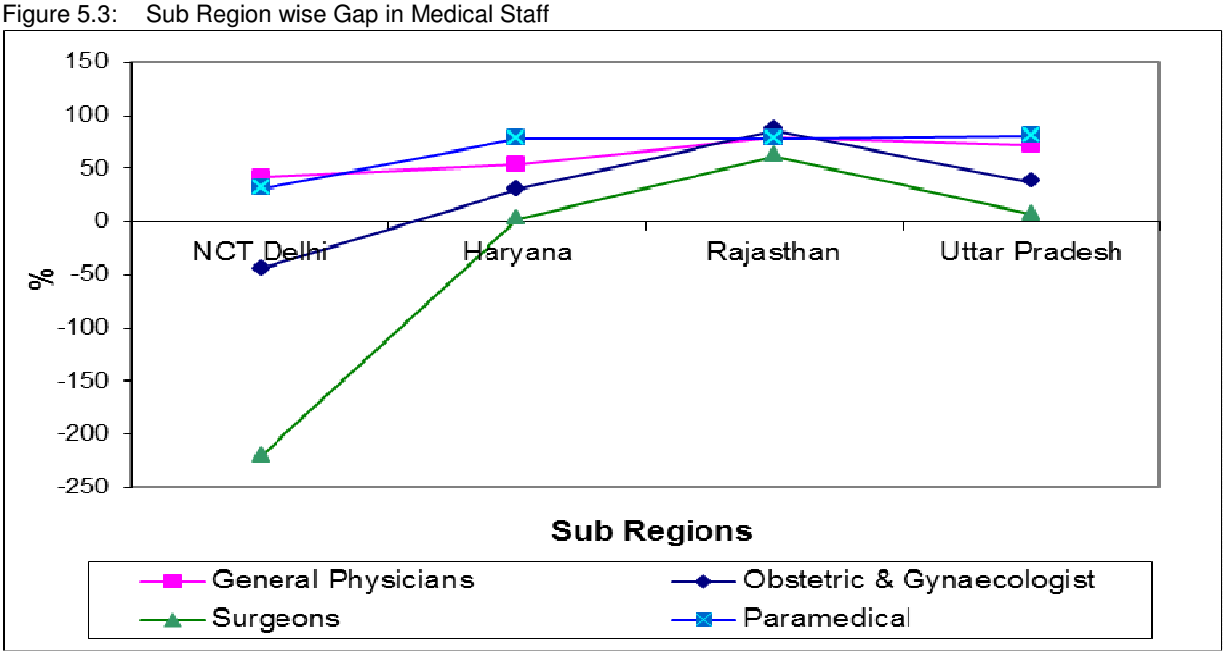
Source: Findings of this study

While analysing sub region wise data, one can observe that the gap in each category of medical staff is less in NCT Delhi followed by Haryana, Rajasthan and Uttar Pradesh. In Uttar Pradesh, there is acute requirement of medical and paramedical staff. The Rajasthan sub-region has very few specialists in O&G care vis-à-vis the overall requirement.

Figure 5.3: Sub Region wise Gap in Medical Staff



Source: Findings of this study

Analysis of the interactions with the referral hospitals indicates that most of the patients who come to Delhi for medical facilities are from Uttar Pradesh, this could be probably due to lesser availability of medical staff. It is evident from the above analysis and Table 5.9 that in the current context more number of medical staff is required except surgeons in NCR.

Table 5.9: Distribution of Basic Medical Staff in different Sub Regions of NCR (2011)

Sub Regions	Total Medical Staff Available (Number)				Gap in Availability of Medical Staff (%) **			
	General Physicians	Obstetric & Gynaecologist	Surgeons	Paramedical	General Physicians	Obstetric & Gynaecologist	Surgeons	Paramedical
NCT Delhi	2249	1620	1345	23634	41.7	-45	-221	31.0
Haryana	1164	514	269	4970	54.1	30.3	2.2	77.9
Rajasthan	176	34	35	1651	79.2	86.1	62	78
Uttar Pradesh	946	610	341	5725	71.8	37.3	6.6	80.7
Total	**4535**	**2778**	**1990**	**35980**	**57.2**	**9.6**	**-72.9**	**61.7**
*** Figures in –ve do not truly mean that there is excess specialists. In fact, a specialist is available on call/ attached to different hospitals and hence the data as provided by hospitals have counted a specialist more than once*								

Source: Findings of this study

Also, the doctors are not willing to serve in the rural areas due to lack of facilities even if they are paid higher salaries. Due to this, majority of the young doctors appointed in Government facilities do not continue after gaining some experience.

5.4 Government Health Facility- Primary, Secondary & Tertiary

5.4.1 Need assessment in Number of Government Health Facility

Table 5.10 details the availability of health infrastructure for each level (Primary, Secondary & Tertiary) and their requirement and Gap as on 2011. Analysis of this table shows that out of the total 170 government tertiary care facilities available in NCR, 79 percent is in NCT Delhi followed

by about 12 percent in Haryana (catering to 24 percent of the NCR population), 9 percent in Uttar Pradesh (catering to 32 percent of NCR population) and 0.6 percent in Rajasthan (catering to 8 percent of the NCR population).

Moreover it is apparent from the study that Delhi patients are not visiting secondary health care services because they are not available which is causing extra burden to the tertiary care services in NCR. Further, the sub region Haryana is better in availability of tertiary (54.1%), Rajasthan has better secondary health facility available (77.4%) and primary (59%) in comparison to other sub region excluding NCT Delhi.

Table 5.11 indicates that about 140 tertiary care units with 100 beds are required in NCR followed by 384 secondary and 976 primary care units. Of which 170 primary, 97 secondary and 357 tertiary are available with a gap of 49 percent in Tertiary care (excluding Delhi as Delhi has excess number of tertiary care units) followed by 75 percent gap in secondary and 64 percent gap in primary health care units. This is to be noted that while calculation of tertiary care units required we have considered units with 100 beds only so that spread could also be ensured.

Table 5.10: Distribution of Available Health Infrastructure and Gap in Different Districts and Sub Regions of NCR

Name of sub Regions	Name of District	Population 2011*	Number of Health facilities Required as on 2011			Number of Health facilities Available as on 2011			Gap in Number of Health facilities as on 2011			% Gap as on 2011		
			Tertiary Care	Secondary Care	Primary Care	Tertiary Care	Secondary Care	Primary Care	Tertiary Care	Secondary Care	Primary Care	Tertiary Care	Secondary Care	Primary Care
NCT Delhi	**All districts**	**16,787,941**	**56**	**140**		**134**	**0**	**8**	**0**	**140**		**0**	**100**	**0**
Haryana	Panipat	1205437	4	10	40	1	3	17	3	7	23	75	70	57.5
	Sonepat	1450001	5	12	49	3	7	32	2	5	17	40	41.7	34.7
	Gurgaon	1514432	5	13	50	2	3	12	3	10	38	60	76.9	76
	Palwal	1042708	3	9	35	1	5	8	2	4	27	66.7	44.4	77.1
	Faridabad	1809733	6	15	60	3	2	12	3	13	48	50	86.7	80
	Mewat	1089263	4	9	36	1	3	12	3	6	24	75	66.7	66.7
	Rewari	900332	3	7	30	2	4	12	1	3	18	33.3	42.9	60
	Jhajjar	958405	3	8	32	3	5	24	0	3	8	0	37.5	25
	Rohtak	1061204	4	9	35	4	5	22	0	4	13	0	44.4	37.1
Haryana Total		**11031515**	**37**	**92**	**368**	**20**	**37**	**151**	**17**	**55**	**217**	**45.9**	**59.8**	**59**
Rajasthan	**Alwar**	**3674179**	**12**	**31**	**122**	**1**	**24**	**72**	**11**	**7**	**50**	**91.7**	**22.6**	**41**
Uttar Pradesh	Baghpat	1303048	4	11	43	0	6	22	4	5	21	100	45.5	48.8
	Bulandshaher	3499171	12	29	117	8	17	55	4	12	62	33.3	41.4	53
	Meerut	3443689	11	29	115	4	5	40	7	24	75	63.6	82.8	65.2
	Ghaziabad including Hapur	4681645	16	39	155	2	5	6	14	34	149	87.5	87.2	96.1
	Gautam Budhnagar	1648115	6	14	56	1	4	3	5	10	53	83.3	78.6	94.6
Uttar Pradesh Total		**14575668**	**49**	**122**	**486**	**15**	**37**	**126**	34	**85**	360	**69.4**	**70.5**	**74.1**
NCR	**Total**	**46,069,303**	**154**	**385**	**976**	**170**	**98**	**357**	**62**	**287**	**627**	**40.5**	**74.7**	**64.2**

Source: Findings of this study

Table 5.11: Need assessment of Health Infrastructure (Figures in number)

Name of sub Regions	Name of District	Population 2011*	Estimated Number of Health facilities Required as on 2011			Number of Health facilities Available as on 2011			Gap in Number of Health facilities as on 2011			Estimated Requirement of Health facilities (as per IPHS Norms)														
												as on 2016			as on 2021			as on 2026			as on 2031			as on 2036		
			Level of Care			Level of Care			Level of Care			Level of Care			Level of Care			Level of Care			Level of Care			Level of Care		
			T*	S*	P*	T	S	P	T	S	P	T	S	P	T	S	P	T	S	P	T	S	P	T	S	P
NCT Delhi	**All districts**	**16,787,941**	**56**	**140**		**134**	**0**	**8**	**0**	**140**		**52**	**143**	**0**	**56**	**155**	**0**	**62**	**172**	**0**	**69**	**191**	**0**	**77**	**211**	**0**
Haryana	Panipat	1205437	4	10	40	1	3	17	3	7	23	4	11	44	4	12	49	5	13	54	5	15	59	6	16	66
	Sonepat	1450001	5	12	49	3	7	32	2	5	17	5	14	56	6	16	63	6	18	71	7	20	80	8	22	90
	Gurgaon	1514432	5	13	50	2	3	12	3	10	38	7	18	72	9	26	103	13	37	147	19	53	210	27	75	300
	Palwal	1042708	3	9	35	1	5	8	2	4	27	4	10	39	4	11	45	5	13	51	5	14	57	6	16	65
	Faridabad	1809733	6	15	60	3	2	12	3	13	48	6	18	70	7	20	82	9	24	96	10	28	112	12	33	131
	Mewat	1089263	4	9	36	1	3	12	3	6	24	4	11	44	5	13	53	6	16	63	7	19	76	8	23	92
	Rewari	900332	3	7	30	2	4	12	1	3	18	3	8	33	3	9	35	4	10	39	4	10	42	4	11	46
	Jhajjar	958405	3	8	32	3	5	24	0	3	8	3	8	33	3	9	35	3	9	36	3	9	38	4	10	40
	Rohtak	1061204	4	9	35	4	5	22	0	4	13	3	9	38	4	10	40	4	11	43	4	11	45	4	12	48
Haryana Total		**11031515**	**33**	**37**	**92**	**368**	**20**	**37**	**151**	**17**	**55**	**217**	**107**	**429**	**46**	**126**	**504**	**54**	**150**	**599**	**66**	**180**	**721**	**80**	**219**	**878**
Rajasthan	**Alwar**	**3674179**	**12**	**31**	**122**	**1**	**24**	**72**	**11**	**7**	**50**	**12**	**34**	**137**	**14**	**38**	**153**	**16**	**43**	**172**	**17**	**48**	**192**	**20**	**54**	**215**
Uttar Pradesh	Baghpat	1303048	4	11	43	0	6	22	4	5	21	4	12	46	4	12	49	5	13	52	5	14	55	5	15	58
	Bulandshaher	3499171	12	29	117	8	17	55	4	12	62	11	32	126	12	34	137	13	37	148	15	40	161	16	44	174
	Meerut	3443689	11	29	115	4	5	40	7	24	75	11	31	124	12	34	135	13	36	146	14	39	158	16	43	171
	Ghaziabad including Hapur	4681645	16	39	155	2	5	6	14	34	149	17	47	190	21	58	231	26	71	283	31	86	345	38	105	421
	Gautam Budhnagar	1648115	6	14	56	1	4	3	5	10	53	7	18	72	8	23	92	11	30	119	14	38	152	18	49	196
Uttar Pradesh Total		**14575668**	**44**	**49**	**122**	**486**	**15**	**37**	**126**	34	**85**	360	**140**	**558**	**59**	**161**	**644**	**68**	**187**	**747**	**79**	**218**	**871**	**93**	**255**	**1020**
NCR	**Total**	**46,069,303**	**154**	**385**	**976**	**170**	**98**	**357**	**62**	**287**	**627**	**158**	**436**	**1124**	**181**	**498**	**1301**	**207**	**570**	**1518**	**239**	**658**	**1783**	**277**	**763**	**2112**

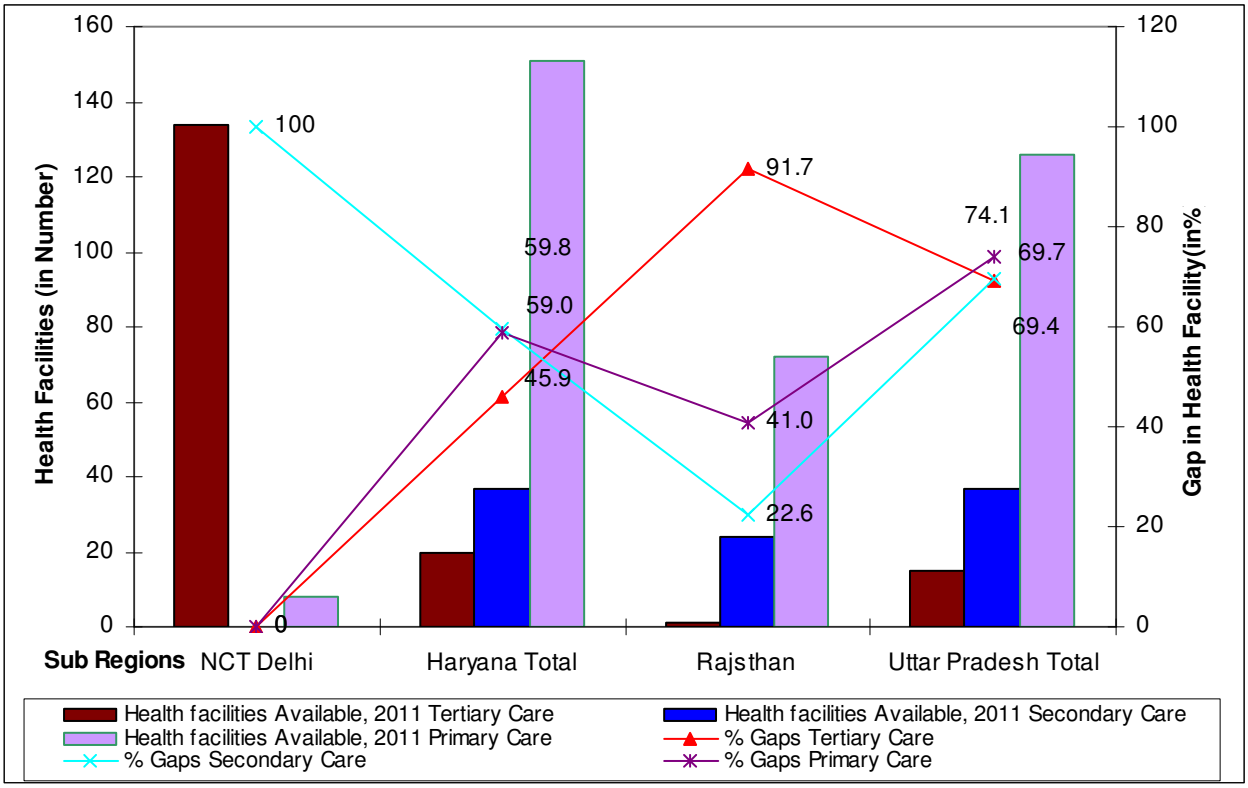
T=Tertiary, S=Secondary, P= Primary Source: Findings of this study

5.4.2 Gap in number of Government Health Facility

Assessment of the data indicates that NCR excluding NCT Delhi has a gap of about 78 percent so far tertiary care is concerned followed by 60 percent in secondary health care facilities and 64 percent in primary health care facilities.

NCT Delhi lacks government supported secondary health care services and this is overburdening the tertiary care facilities (91.7%) of this region (Figure 5.4). While analysing this sub region wise, we can see that the gap in tertiary care is maximum in sub region Rajasthan followed by Uttar Pradesh (69.4%) and then Haryana (45.9%). Similar results can be seen for other level of care.

Figure 5.4: Sub Region wise Gap in Health Facilities



Source: Findings of this study

Table 5.12: Distribution of Available Health Infrastructure and Gap in Different Sub Regions of NCR

Name of sub Regions	Available Health facilities, 2011 (in number)			Gap (in Percent)		
	Tertiary Care	Secondary Care	Primary Care	Tertiary Care	Secondary Care	Primary Care
NCT Delhi	134	0	8	0	100	0
Haryana Total	20	37	151	45.9	59.8	59.0
Rajasthan	1	24	72	91.7	22.6	41.0
Uttar Pradesh Total	15	37	126	69.4	69.7	74.1
NCR	170	98	357	40.3	74.5	64.2

Source: Findings of this study

5.5 Analysis of Available Medical Colleges

Availability of appropriate and adequately trained human resources is an essential concomitant of Rural Health Infrastructure. Medical education infrastructures in the country have shown rapid growth during the last 20 years. The country has 314 medical colleges, 289 Colleges for BDS courses and 140 colleges conduct MDS courses with total admission of 29,263 (in 256 Medical

Colleges), 21547 and 2,783 respectively during 2010-11.There are 2028 Institution for General Nurse Midwives with admission capacity of 80332 and 608 colleges for Pharmacy (diploma) with an intake capacity of 36115 as on 31st March, 2010.

NCR has 16 medical colleges out of which 37.5 percent is in Uttar Pradesh and Delhi each and remaining 25 percent in Haryana. The total student intake is 1930 in 16 medical colleges of NCR.

Table 5.13: Analysis of Medical Collages and Student Intake (Figures in number)

S.No.	Course Name	Sub region	Name and Address of Medical College / Medical Institution	Management of College	Year of Inception of College	Annual Intake (Seats)
1.	M.B.B.S.	Delhi	All India Institute of Medical Sciences, New Delhi	Govt.	1956	50
2.	M.B.B.S.		Army College of Medical Sciences, New Delhi	Trust	2008	100
3.	M.B.B.S.		Lady Hardinge Medical College, New Delhi	Govt.	1916	130
4.	M.B.B.S.		Maulana Azad Medical College, New Delhi	Govt.	1958	250
5.	M.B.B.S.		University College of Medical Sciences & GTB Hospital, New Delhi	Univ.	1971	150
6.	M.B.B.S.		Vardhman Mahavir Medical College & Safdarjung Hospital, Delhi	Govt.	2002	100
7.	M.B.B.S.	Haryana	Gold Field Institute of Medical Sciences & Research, Ballabgarh, Faridabad	Trust	2011	100
8.	M.B.B.S.		Maharaja Agrasen Medical College, Agroha , Rohtak	Society	2002	50
9.	M.B.B.S.		Pt. B D Sharma Postgraduate Institute of Medical Sciences, Rohtak (Haryana)	Govt.	1960	200
10.	M.B.B.S.		Shree Guru Gobind Singh Tricentenary Medical College, Gurgaon	Trust	2010	100
11.	M.B.B.S.	Uttar Pradesh	LLRM Medical College, Merrut	Govt.	1966	100
12.	M.B.B.S.		Rama Medical College Hospital and Research Centre, Hapur, Ghaziabad	Trust	2011	150
13.	M.B.B.S.		Santosh Medical College, Ghaziabad	Trust	1996	100
14.	M.B.B.S.		Saraswati Institute of Medical Sciences, Hapur	Trust	2008	100
15.	M.B.B.S.		School of Medical Sciences & Research, Greater Noida	Trust		100
16.	M.B.B.S.		Subharti Medical College, Meerut	Trust	1996	150

Source: Medical Council of India

If we consider total intake and 100 percent pass out rate then also the required seats in Bachelor of Medicine, Bachelor of Surgery is compounding to 197780 for the year 2016 because of huge back log which is 102 times of the original intake. However, two new MBBS colleges are recently sanctioned in Delhi only. In a written reply to a question in the Rajya Sabha, the minister said the recent revision of guidelines by the Medical Council of India "has increased a total of 4,542 MBBS seats in 21 new medical colleges and 33 existing medical colleges during the academic year 2011-12". Establishing additional medical colleges will again as per availability of teaching staffs and facilities with medical institutions to run the same in a profitable manner because many a times private medical college may not get required number of students due to high fee.

Table 5.14: Student Intake and Estimated Requirement of Medical Staffs (Figures in number)

Sub Region	Parameters	Estimated Requirement of Doctors (as per IPHS Norms)				
		2016	2021	2026	2031	2036
Sub Region-Delhi	Annual Intake (in Number)	780	780	780	780	780
	Additional Doctors Required (Estimates)	6659	7387	8194	9090	10083
	Additional MBBS seats require	28057	59607	95031	134752	179241

Sub Region	Parameters	Estimated Requirement of Doctors (as per IPHS Norms)				
		2016	2021	2026	2031	2036
Sub Region-Haryana	Annual Intake (in Number)	450	450	450	450	450
	Additional Doctors Required (Estimates)	30428	35785	42537	51157	62306
	Additional MBBS seats require	140914	306393	502682	738113	1023922
Sub Region-Rajasthan	Annual Intake (in Number)	0	0	0	0	0
	Additional Doctors Required (Estimates)	1370	1533	1715	1919	2148
	Additional MBBS seats require	6551	13881	22084	31264	41536
Sub Region -UP	Annual Intake (in Number)	700	700	700	700	700
	Additional Doctors Required (Estimates)	5442	6280	7283	8490	9946
	Additional MBBS seats require	22258	48424	79262	115709	158916
Total NCR	Annual Intake (in Number)	1930	1930	1930	1930	1930
	Additional Doctors Required (Estimates)	43899	50985	59730	70656	84483
	Additional MBBS seats require	197780	428306	699059	1019837	1403615

Source: Findings of this study

Apart from this external migration of doctors further reduces the number of available allopathic doctors in the country. Although there is no current mechanism of tracking annual overseas migration of doctors from India, it is a phenomenon that must be factored into all future planning of human resources with an understanding of personal and professional factors. It has been estimated that 50% of students from AIIMS have migrated overseas as well as internally to the private sector (GOI, NCMH, 2005)

The potential for exchange of medical personnel between countries is attested by experience from across the world. Developing countries – particularly from Asia – supply over half of all migrating physicians, with around 100,000 doctors of Indian origin settled in the USA and UK alone. Indian doctors, nurses, technicians amongst others deliver services in the Middle East on short-term bilateral contracts. Most of migration in health care sector is permanent. The main advantage is due to availability of low cost, well trained, high quality health care providers from India. Active international recruitment by national health systems has generated a particularly high level of cross-border mobility among nurses. As per the available data for the year 2002 India was the most important source country for registered nurses under H1A category to the US supplying around 81,091 nurses compared to 15,838 for China, 5,509 for Philippines (Source: Health Workforce in India, WHO Country Office, 2007).

6. Issues & Recommendations

6.1 Issues

Based on the data analysis as presented in the earlier sections and interactions/ discussions with the health facilities in various level of care in NCR, it is evident that the health system and infrastructure of NCR has constraints/gaps. These gaps, in turn, need interventions. These gaps are detailed in the following sub-sections.

6.1.1 Non-functionality of the 3 tier health system

As mentioned in previous section, the three tier system (PHC-CHC-DH) is not fully functional/ effective as per the NRHM stipulations/ guidelines. The reasons for non-functionality are similar for the rural and urban regions i.e. unavailability of adequate number of health facilities (Primary/Secondary/Tertiary care) and poor quality of services due to lack of manpower.

As already mentioned in section 5.4 that NCR has a huge gap so far number of health facilities are concerned (41% in tertiary health care facilities, 75% secondary and 64% primary health care services). The gap is more prominent when looked at sub region level; status of Uttar Pradesh is poor as the sub region is not able to provide primary health facility to about three-fourth of its population, followed by Haryana sub region where about three-fifth and Rajasthan where two-fifth of the of the population remain underserved so far primary health care services are concerned. Similarly the respective sub regions are also lacking so far availability of secondary and tertiary health care services are concerned (table 5.10). The district wise gap is presented below for the respective districts.

Table 6.1: Distribution of district by Underserved Population

Level of Health Care	Sub Region	Underserved Population range	Gap in Districts
Tertiary	Haryana	Up to 33%	• Rewari
		34%-66%	• Sonepat • Gurgaon • Faridabad
		66% and above	• Panipat • Palwal • Mewat
	Uttar Pradesh	Up to 33%	• Bulandshaher
		34%-66%	• Meerut
		66% and above	• Baghpat • Ghaziabad including Hapur • Gautam Budhnagar
	Rajasthan	66% and above	• Alwar
Secondary	NCT Delhi	66% and above	• All the districts
	Haryana	34%-66%	• Rewari • Sonepat • Jhajjar • Rohtak • Palwal

Level of Health Care	Sub Region	Underserved Population range	Gap in Districts
		66% and above	• Gurgaon • Faridabad • Panipat • Mewat
	Uttar Pradesh	34%-66%	• Baghpat • Bulandshaher
		66% and above	• Meerut • Ghaziabad including Hapur • Gautam Budhnagar
	Rajasthan	Up to 33%	• Alwar
Primary	Haryana	Up to 33%	• Jhajjar
		34%-66%	• Sonepat • Panipat • Rewari • Rohtak
		66% and above	• Gurgaon • Faridabad • Palwal • Mewat
	Uttar Pradesh	34%-66%	• Bulandshaher • Baghpat • Meerut
		66% and above	• Ghaziabad including Hapur • Gautam Budhnagar
	Rajasthan	34%-66%	• Alwar

Source: Findings of this study

In rural areas the quality of services are further sparse for example most of the primary and secondary Government health care units (in Uttar Pradesh and Haryana) lack basic health infrastructure, thus they have lost trust of patients/community. In contrary, in urban areas the patients have access to tertiary care hospitals because they are well connected and also crowded with other facilities like lodge, food joints, markets etc. Thus, patients prefer to visit the tertiary care for even minor problems. This tendency is creating unnecessary load on the tertiary care health services and less utilisation of lower health care services. Due to this, the tertiary care units are not able to provide adequate care to the referral patients who visit the facility for getting specialised services.

6.1.2 Inadequate availability of human resources

Generally rural public health facilities of the NCR are having a difficult time attracting, retaining, and ensuring regular availability of highly trained medical professionals. The higher the level of specialisation, the greater is the gap. Over and above the shortage of service providers, the system is plagued by low involvement and participation of those who are employed.

As mentioned above in section 5.3 NCR has a gap of about 58 percent so far availability in number physicians are concerned the gap becomes wider when analysed for respective sub regions, gap is maximum in Rajasthan (79.5%) followed by Uttar Pradesh (72.2%), Haryana (54.8%) and Delhi (42.5%). Similar analysis can be seen in section 5.3. However, gap in availability of paramedical staffs is a serious concern which needs immediate attention as NCR has a gap of about 64 percent which becomes more severe when analysed for sub regions, gap

is maximum in Uttar Pradesh (81.7%) followed by Rajasthan (78%), Haryana (77.9%) and Delhi (35.3%). The reasons for such gaps are mentioned below;

- It was reported by most of the administrative health Officials that in Government health facilities medical staff posted at distant/difficult places/regions are not interested to continue their services. Suitable action needs to be put in place for retaining staff in the difficult locations.

- There is non-availability of required number of medical and paramedical staff due to which their posts in various Government Healthcare institutions are lying vacant. This is primarily due to:
    - Low intake of students in the medical colleges (as reported by Medical Council of India, detailed in table 5.13)
    - Lower pay package
    - High migration rate to other countries

6.1.3 Improper spread of Health Infrastructures in NCR Sub Region

It is evident from the spatial analysis that tertiary health care facilities are concentrated in the District Centres and on Delhi border for other NCR sub regions. Looking into sub region wise spatial gap one can see that in all districts of Haryana Sub Region (except Rohtak district), health facilities are located either near district centre or towards Delhi Border(e.g in Bhadurgarh for Jhajjhar) leaving the remaining part of the region underserved.

Table 6.2: Distribution of district by Unequal distribution

Sub Region	Name of district	Unequal distribution
Haryana	Faridabad	Concentration of Tertiary care health facilities are in district center and towards Delhi Border
	Gurgaon	Concentration of Tertiary care health facilities are in district center and towards Delhi Border
	Jhajjar	Concentration of Tertiary care health facilities is in district center and towards Delhi Border i.e. Bhadurgarh leaving the remaining part of the region unserved.
	Mewat	Concentration of Tertiary care health facilities are in district center and towards Sohna Road leaving the remaining part of the region under served.
	Palwal	Concentration of Tertiary care health facilities are in district center
	Panipat	Concentration of Tertiary care health facilities are in district center
	Rewari	Concentration of Tertiary care health facilities are in district center and towards Delhi Border leaving the remaining part of the region under served.
	Sonepat	Concentration of Tertiary care health facilities are in district center
Uttar Pradesh	Baghpat	Well dispersed health facilities catering to patient of each region within the district
	Bulandshaher	Well dispersed health facilities catering to patient of each region within the district
	Gautam Budhnagar	Concentration of Tertiary care health facilities towards Delhi Border. It seems they are catering to Delhi population also.
	Ghaziabad including Hapur	Concentration of Tertiary care health facilities are in district center and towards Delhi Border, hospitals like Pushpanjali, Narendra Mohan etc. leaving rest part of the region under served.
	Meerut	Well dispersed health facilities catering to patient of each region within the district
Rajasthan	Alwar	Well dispersed health facilities catering to patient of each region within the district
Delhi	Delhi	Well dispersed health facilities catering to patient of each region within the district

Source: Findings of this study

The condition is same for sub region Uttar Pradesh. Out of five districts of UP falling in NCR, except for Baghpat, Bulandshaher and Meerut the dispersion of medical health facilities is not proper. Also, the number of tertiary and speciality health facilities is very less in Uttar Pradesh, failing the uniform access to health facilities.

6.1.4 Augmentation needs of Infrastructure and related projects

- The data analysis in previous chapter indicates that there is a general lack of health facilities (CHC/PHC/Sub-DH) across NCR, which includes
  - Less number of health facilities as per IPHS norms
  - Less number of functional beds within each facility
- There is also non-availability of required medical equipment's in Government health facilities, the reasons being
  - Non procurement of equipment's due to lack of staff(operate them) or infrastructure /building (to house them)
  - The equipment's that have been procured are non-functional due to lack of proper maintenance.

6.1.5 Gaps in specialised services

Some specialised services are not available in Government facilities like: Oncology, Paediatric Surgery, Cardiology, Neurology etc. Specialisation wise gaps in different districts are mentioned in table below:

Table 6.3: Distribution of district by Gaps in Specialisation

Specialisation	Gap in Districts
Paediatric Surgery	• Baghpat • Bulandshahar • Ghaziabad including Hapur • Meerut • Gautam Budhnagar • Panipat • Sonepat • Palwal • Mewat • Rewari • Alwar
Neurological	• Bulandshahar • Meerut • Panipat • Sonepat • Palwal • Mewat • Rewari • Alwar
Oncological	• Baghpat • Bulandshahar • Ghaziabad including Hapur • Meerut • Gautam Budhnagar • Panipat • Sonepat • Palwal

Specialisation	Gap in Districts
	• Mewat • Rewari • Alwar
Orthopaedic	• Meerut • Panipat • Sonepat • Palwal • Mewat • Rewari • Alwar
Cardiology	• Baghpat • Bulandshahar • Panipat • Sonepat • Palwal • Mewat • Rewari • Alwar

Source: Findings of this study

6.1.6 Lack of clear policy on Public Private Partnership Related Projects

The sophisticated medical equipment's that enable to offer treatment using advanced technology are quite expensive and hence are available in only selective Government Health institutions. In order that these are available in Government Hospitals and that there is regular O&M of the same, the private sector can be encouraged. However, in order that the private players are encouraged to participate in PPP, they have to be given incentives and accordingly certain policy directives need to be put in place.

6.2 Recommendations

The major constraints analysed were the shortage of physical health infrastructure and shortage of adequate and skilled manpower. Our recommendations for overcoming the shortfall have been detailed in the following sections.

6.2.1 Strengthening and Effective functioning of the 2 and 3 tier Health system

It was observed that the tier-system of Health services is not functioning effectively thereby leading to overburdening of higher level of health care facility i.e. Tertiary care. The failure of the public delivery system through the tier-system is an outcome of systematic breakdown of accountability within the institutional framework. The institutional framework of entire health system should be strengthened by introducing systematic monitoring which was also thought of in NRHM, but not implemented in proper mechanism. For strengthening the system, the following action can be taken:

Strengthening the institutional framework by establishing specialized units- Dedicated separate and specialized units within the system should be set up immediately which will look at the four activities: A) Planning B) Implementation C) Monitoring D) Financial Management. This activity will definitely enable to strengthen the existing institutional framework for efficient service delivery.

Strengthening the Monitoring & Evaluation System- The Monitoring unit would need to take up specific action including: A) Strengthening HMIS by developing software & reporting formats B) Conducting frequent Review Meetings preferably on monthly basis C) Physical verification of hospitals to verify the quality and efficiency of services provided to the patients.

6.2.2 Ensure adequate availability of human resources

Our analysis reveals that there is huge gap in human resources. It is natural that it cannot be met at a go and it requires a long term dedicated and systematic intervention. However, effective management and recent techniques can add value to the interventions and can provide a spurt to it. Apart from this, certain systematic actions such as improvement in remuneration (incentive based system) and promotion to the deserving and committed individuals (disregarding seniority) should be taken up on priority basis. Moreover, rural public health facilities across the country are unable to attract and retain trained medical professionals.

The following action should be taken up at the earliest:

- Students passing MBBS from Government Colleges should serve the Government facilities in the underserved areas for minimum time period of 3 years. A bond on service contract for the students should be drafted by the Ministry of Health & Family Welfare (in the lines as that of Armed Forces Medical College (AFMC)) and introduced at the earliest.
- A plan on deputation of medical staff (doctor/ paramedical) to the different locations on rotation basis (maybe 3 year plan) should be put in place at the State level. This will enable each medical staff to serve the difficult regions of the state on mandatory basis. Also, in order to incentivise the staff to go to remote locations, certain compensatory allowance should be given like, incentive of Rs. 12,000 to Rs. 20,000/month is being provided to Doctors for service in rural areas by Government of Rajasthan. The plan based on detailed exercise should be undertaken at each state level.
- The revision in salary and benefits of doctors/ specialists (in line with the current industry rates) need to be undertaken by the Ministry of Health & Family Welfare, GOI and also by the State Governments.

- It should be made mandatory by the Government of India that the private speciality and multi-speciality hospitals above certain bed strength would have to include the medical college for medical and para-medical staff.

6.2.3 Ensuring Adequate Spread of Health Infrastructure

This study has enabled to map the health facilities in the NCR. It is recommended that in future as State Governments provide approvals to the private sector for setting up of new health infrastructure, the spatial spread is taken into consideration. Some state specific incentives (preferably in select districts lacking the basic health infrastructure) may be offered to the private sector for them to be encouraged to make the investment in the backward districts.

6.2.4 Augmentation of the Infrastructure and related projects

It was observed during gap analysis that adequate number of health infrastructure is not available in NCR and that more health facilities are required. It was observed that private sector is filling in the requirements to an extent and their role is rapidly expanding. Today, the private sector health care provision in urban areas is *greater* than that of the public sector. But the private health care network is not present in remote and far flung habitations and in the absence of adequate penetration by public sector health centres, these areas remain unserved. The following actions need to be taken up systematically and on immediate basis.

6.2.4.1 Establishment of PHCs, CHC, sub divisional & District hospitals adhering to IPHS norms

The study indicates the requirement of 69 tertiary care, 287 secondary care and 627 primary care units in the NCR region. Looking into sub region wise gap, there is a huge gap in Uttar Pradesh as compared to the other sub regions followed by Haryana. Thus, construction of new health facilities as per the IPHS norms should be created without delay and State could submit proposal to NCRPB for funding.

The total cost of establishment of new health infrastructure in NCR will cost around INR 4,643 Crores. Out of this, INR 1,902 Crores is required for Uttar Pradesh sub-region followed by Haryana (INR 1,097 Crores). NCT Delhi will require INR 980 Crores for establishing secondary healthcare facilities so that the burden on tertiary care can be minimised (Table 6.5 provides district and sub region wise block cost estimates for construction of health care services).

While some user charges are being paid by all economic segments for availing of health care services, but the pertinent question remains as to who will pay for the expansion and rationalization of health care facilities to augment physical, technical as well as human resource infrastructure to cater better to the needs of the economically challenged sections of the society. Clearly it is not the user but the state or the central government budget that must bear this expense. One potential source of funding could be the private sector backed by rural health insurance schemes like Rastriya Swastha Bima Yojana for establishing tertiary care services at district and sub district level. However, primary and secondary health care will have to be taken up by the State or by employing Non-Government Organisations. Some facilities to be made available in New Hospital (tertiary care) are mentioned in table 6.4

Table 6.4: Services to be made available in the Tertiary care hospitals

Services	Details
Emergency Services	Operating round the clock, there will be qualified medical and paramedical staff to attend to any emergency, including trauma cases, which is increasing in the region every day. There will be well equipped emergency operation theatre, with the facilities for general / special surgical procedures. Round the clock X-ray and Laboratory services to be attached to the emergency services
Outpatient Services	Specialist consultation facility will be available throughout the week or on specified days both in the morning and evening. The patient services will be ably supported by

	diagnostic services and laboratory services
Inpatient Services	Facilities will be made available for all Surgical and Medical cases, except in the case of infectious / communicable diseases. The super speciality cases like Cardio-Thoracic Surgery, Micro Neuro-Surgery, Renal Transplant Surgery, etc. will be referred to big hospitals in the city / region. Special equipment's to be made available for Paediatric and Neonatology inpatients and also for ICU/CCU.
Diagnostic Facilities	
Radiology department	X-Ray imaging plays an important role among various imaging modalities. Tertiary care hospitals to have a well-equipped X-ray Department to cater to the needs of Traumatology and other hospital departments. There should be a high powered X-ray system with an image intensifier TV facility to do all the special investigations. This will help to reduce the patient radiation dosage while screening and also carryout various procedures. There should be another Portable X-ray Machine to take care of needs of the critically ill patients in ICU/OT etc. A mobile C-arm image intensifier should also be planned for this department.
Sonography	Ultrasound has become a powerful non-invasive diagnostic modality today. Use of multipurpose ultrasound machine for all medical / surgical and Obs./Gynae work of the hospital.
Laboratory services	Clinical laboratory plays an important role in the diagnosis, prognosis and treatment of diseases. Laboratory services to function under the head a Pathologist. Biochemistry department will have the latest multi-channel auto-analyser and electrolyte analyser. In the Haematology Department, there should be electronic cell counters, blood coagulometers etc. Pathology and Microbiology will be equipped as per the modern needs of hospitals. Video Endoscopy to be provided as an outpatient procedure in the field of Gastroenterology.
Engineering Services	Engineering services of the hospital will comprise a sub-station for maintenance of electric supply to the hospital; public health services for water supply, sanitation and fire protection and firefighting systems, space heating, ventilation and air-conditioning for environmental management of essential areas in the hospital including intensive care, critical and operative care areas, selected intermediate care areas and laboratories.
Administrative Services	This will consist of accommodation for the Chief Executive, Medical & Nursing administrators; Personnel, financial & materials management, computerised hospital information and ancillary accommodation for transport, security, fire, housekeeping, staff quartets, and building maintenance staff.

Source: Findings of this study

Table 6.5: Block Cost estimates for setting up identified Health Infrastructure

Name of sub Region	Name of District	New Health Facilities Required			Block Cost in INR Crores*			
		Tertiary Care	Secondary Care	Primary Care	Tertiary Care-100 Bed	Secondary Care-30 Bed	Primary Care-6 Bed	Total
NCT Delhi	**All districts**		**140**	**840**	**0**	**980**	**0**	**980**
Haryana	Panipat	3	7	23	60	49	46	155
	Sonepat	1	5	17	20	35	34	89
	Gurgaon	3	10	38	60	70	76	206
	Palwal	2	4	27	40	28	54	122
	Faridabad	2	13	48	40	91	96	227
	Mewat	2	6	24	40	42	48	130
	Rewari	1	3	18	20	21	36	77
	Jhajjar	0	3	8	0	21	16	37
	Rohtak	1	4	13	20	28	26	74
Haryana Total		**13**	**55**	**217**	**260**	**385**	**434**	**1079**
Rajasthan	**Alwar**	**10**	**7**	**50**	**200**	**49**	**100**	**349**
Uttar Pradesh	Baghpat	4	5	21	80	35	42	157
	Bulandshaher	3	12	62	60	84	124	268
	Meerut	6	24	75	120	168	150	438
	Ghaziabad including Hapur	12	34	149	240	238	298	776
	Gautam Budhnagar	4	11	53	80	77	106	263
Uttar Pradesh Total		**29**	**86**	**360**	**580**	**602**	**720**	**1902**
NCR	**Total**	**69**	**287**	**627**	**1380**	**2009**	**1254**	**4643**

Source: Findings of this study

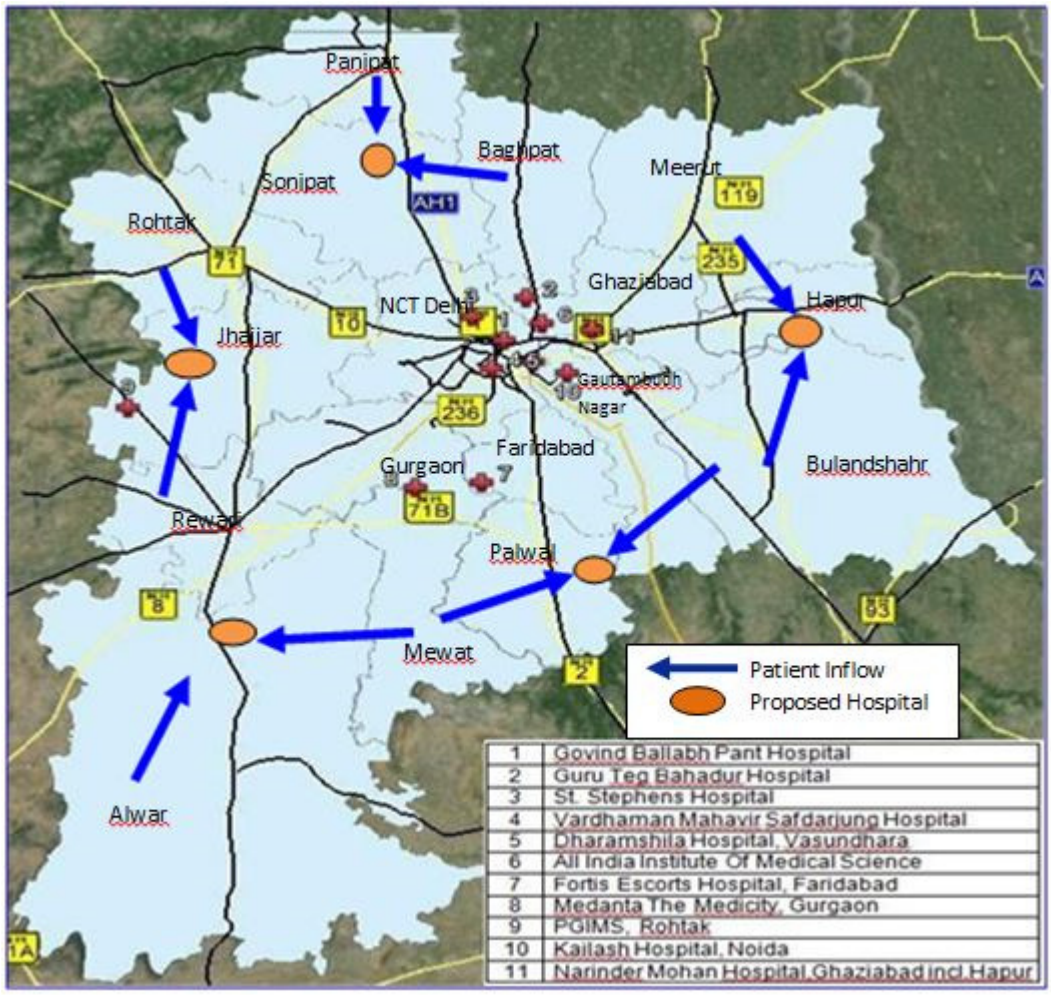
* Land cost is not included in the block cost and Block cost has been taken from State Project Management Unit, NRHM Haryana for year 2010-11

6.2.4.2 Ensuring specialisation in Government as well as in private facilities

Gap in specialised services like Paediatric Surgery, Neurological, Oncological, Orthopaedic, Cardiology etc. is also a major concern and augmentation of specialised services requires huge funds thus, such services could be made available following suggestions as mentioned below;

- Creating new hospital in PPP mode (details provided in above section) at district level with all required specialisations (details of PPP mode is provided below in Case Study 6.1).
- Upgrading district hospital to a multi-speciality hospital with some services outsourced in PPP and hiring specialist doctors on consultant basis
- By Building Public Private Partnership
  - Empaneling private doctors for providing specialty services at government facility on call/case & fixed day basis
  - Extending telemedicine (as operational presently at Sir Ganga Ram Hospital and Swami Dayanand Hospital New Delhi) (refer section below on telemedicine section 6.2.5)
  - Strengthening referral through partnerships on successful call centre approach (Mewat model)

Figure 6.1: Proposed multi-speciality hospitals in NCR



Source: Findings of this study

As per spatial analysis of available specialization in NCR, we suggest establishment of five super specialty hospitals in different locations including Sonepat, Palwal, Jhajjar, Alwar, and Ghaziabad including Hapur. Details are mentioned below in map and table

Name of State	Name of District	Type of Specialisation Required
Delhi	All districts	Facilities available
Haryana	Panipat	Can be catered from Sonepat Hospital
Haryana	Sonepat	**Oncological & Cardio-Thoracic Surgery**
Haryana	Gurgaon	Facilities available
Haryana	Palwal	**Cardio-Thoracic Surgery, Neurological ,Oncological and Paediatric**
Haryana	Faridabad	Facilities available
Haryana	Mewat	Can be catered from Palwal Hospital
Haryana	Rewari	Can be catered from Jhajjar Hospital
Haryana	Jhajjar	**Cardio-Thoracic Surgery ,Neurological ,Oncological and Paediatric**
Haryana	Rohtak	Facilities available
Rajasthan	Alwar	**Cardio-Thoracic Surgery ,Neurological ,Oncological and Paediatric**
UP	Baghpat	Can be catered from Sonepat Hospital
UP	Bulandshaher	Can be catered from Ghaziabad Hospital
UP	Meerut	Can be catered from Ghaziabad Hospital
UP	Ghaziabad(including Hapur)	**Neurological including trauma center, Oncological and Paediatric**
UP	Gautam Budhnagar	Facilities available

Source: Findings of this study

6.2.5 Extending Telemedicine

Information Technology can be used for making health care provision accessible to remote areas. As mentioned above many doctors are not willing to serve in the rural areas due to lack of facilities even if they are paid high salaries. However, as telecom network is spreading swiftly and the Government is keen to provide broadband connectivity to all parts of the country, information technology can effectively be harnessed to improve the delivery of health services.

In a situation where there is a paucity of qualified healthcare personnel, the most optimal solution is distance healthcare (also including telemedicine, tele-consulting, tele-counselling,) where expert advice can be made available at some central point and accessed as and when required by telephone or internet.

Tele-Preventive Medicine can also be used, the term 'tele-preventive medicine' is defined as the use of the internet to collect information from large number of people (both healthy and sick) to prevent outbreak of disease. Though health concerns are increasingly crossing geographical boundaries (bird flu, HIV, and so on), training of students in epidemiology/prevention is still a very local phenomenon.

The internet can help change this. With simple online databases on the one hand and sophisticated GIS databases on the other that map the relationship of disease to the landscape, the pattern, incidence and spread of disease can be recorded, monitored and hopefully arrested. A UNICEF sponsored study in West Africa used GIS to map villages with high rates of Guinea-worm disease and evaluate the effectiveness of policies designed to combat its spread (*http://home.myuw.net/bjtemp/afr.html*). The National Institute of Epidemiology in India has done similar work in using GIS to map the effect of leprosy vaccine trials. Most of the technologies indicated are accessible, inexpensive, and easy to use. Many of them have demonstrated success in pilot projects. The Government needs to initiate actions to implement these and provide finances for equipment and trained manpower and so on.

6.2.5.1 Primary Care

At primary care, the objective would be to equip PHCs with basic diagnostic equipment that can be operated by paramedics or ANMs, with doctors providing expert interventions from a distance.

Remote diagnostic devices allow all to measure and record basic parameters like blood pressure, temperature, and chest sounds. The device has a stethoscope, sphygmomanometer, and thermometer, along with a simple video-conferencing application that can connect over even a basic dial-up line. The patient's medical history and a record of every consultation is stored, thus building up a patient database for future reference. The patient can get a printed registration card as well as a record of his consultation and the test results. But a particularly useful mechanism would be a smart card (as used in RSBY scheme) with all data written onto it. This can then be used directly at a secondary care hospital. This activity can be outsourced to independent village entrepreneurs running village internet centres (like the ones being set up by n-Logue- *www.n-Logue.com*) and Drishtee (*www.drishtee.com*). There are also a number of other rural internet initiatives being rolled out like the Citizen Service Centres of the Department of IT, the e-Panchayat of Ministry of Panchayati Raj, and the Common Service Centres of Mission 2007, and some connectivity initiatives by the Universal Services Obligation Fund (USOF). All of these will eventually create a dispersed network of computerized, internet-enabled centres in rural areas, all managed by technically competent, functionally English-literate young men and women, who will form a resource pool through which such health services will flow. While villagers may initially be reluctant to visit such a centre for medical purposes, the stationing of the ANM or paramedic inside the centre will lend it credibility. The government thus needs to pay only for use of the kiosk infrastructure.

6.2.5.2 Secondary Care

At Secondary care, OPDs of all government hospitals, whether at the block or district level, are overcrowded. There are queues for registration, consultation with the doctor, undergoing diagnostic tests, meeting the doctor with test results and buying medicines. As is often the case, these take more than one visit and each visit is a loss of a workday for the patient and/or the attendant. Online connectivity of the hospitals to the PHC can reduce these queues, as primary diagnosis is completed at the village itself. Only patients referred to a doctor by the nurse/paramedic will need to visit the hospital. Registration can be completed at the village and the patient given an ID, in the form of a printed card or (preferably) a smart card (as used in Rashtriya Swasthya Bima Yojana Scheme), and thus the queues at the hospitals can be reduced. The patient directly visits a doctor with whom an appointment has already been fixed. If the preliminary examination by the nurse/paramedic has already established the need for additional tests, these can be booked online and the patient told how much money he needs to carry with him while visiting the hospital.

The Aravind Eye Hospitals are attempting a similar exercise in eye care, through their Vision Centres (*http://www.aravind.org/hospitals/visioncentres.asp*). These centres, which are run by trained ophthalmic assistants, are equipped with basic ophthalmic equipment and internet connectivity. All patients examined at the vision centre also consult with the ophthalmologist at the main hospital, when required. Only those patients who require procedural intervention are asked to come to the main hospital. Spectacles for refractive errors are provided at the Vision Centres themselves. Thus the hospital can utilize its resources in the treatment of more serious ailments and patients are saved the trouble of travelling to the hospital for small problems.

6.2.6 Policy level intervention for Infrastructure Augmentation Related Projects/ and encouraging PPP

There is some policy level decisions which State Government needs to take in order to ensure availability of recent technology in their health facilities. Some of these are listed below:

- Though public–private partnerships are growing, there are still financial as well as logistical constraints in initiating large scale ventures under such arrangements. The private sector is not only filling up the gaps left by the public sector but is also emerging as the key player in terms of service provision. Private sector can be attracted by influencing the coverage of mandatory insurance scheme similar to Rastriya Swastha Bima Yojana. Augmentation of

health Facilities (CHC/PHC/DH) at each level adhering to IPHS norms and inclusion of more functional beds in the facility at each level starting from Primary Health Centre to District Hospitals. For this, the State Governments need to take action and devise tailor made processes in order to attract private players.

- State Governments should place technical staff at district level for procurement of equipment's and infrastructure support to their health facilities.
- Mostly, the State Governments procure improved and sophisticated equipment's for their health facilities but do not always allocate funds for maintenance of the equipment. Thus, funds should be allocated for maintenance of the equipment's so that desired services could be provided to the patients.
- The private sector can be encouraged to participate in procurement and operation of sophisticated equipment's in various Government hospitals, thereby enabling PPP by incentivising them in lowering/ exemption of excise /customs duty while procuring of equipment's and allowing them to operate the equipment's beyond a certain number to earn revenue (details provided below in Case Study 6.2)
- Government can provide exemption in excise/ customs duty on purchase of sophisticated/ advanced equipment's so that it could be cost-effective for a private player to purchase equipment's and the cost of services will also be affordable.
- Exemption in tax can also be provided for the medicines such as lifesaving and specific/terminal diseases
- Government to fix the costs of certain medical facilities/ tests (create a band) so that the private players cannot charge any arbitrary rates. For fixing rates, a study should be initiated based on which action can be taken.

Case Study 6.1: A note on Public Private Partnership

Ideally the presence of public health care should take care of both the ability to pay and ability to process information on the quality of health care. But it so happens that especially for those residing in the smaller and far off villages, many public services are out of reach geographically and often such consumers are left with their needs unmet. The private sector cannot emerge in such areas because of lack of adequate scales.

In other words, more important than the price is the issue of geographical accessibility for many rural residents. Lack of physical infrastructure and staff both contribute to this problem of access. While economic history is full of examples of how in such situations some market solutions emerge that are in the interests of both providers as well as consumers, we do not have to wait for such solutions to emerge by themselves, where there are broadly three areas where proactive policy-making can make a difference.

An important policy innovation could be to enable greater private sector involvement in the sector, while directly subsidizing the poor through health care stamps etc to transfer resources to the poorest segments. Since the private sector is already the dominant force, the critical issue here would be to find a viable and sustainable system of monetary transfers to the identified poorest target group.

The call for public-private partnerships in the health infrastructure sector is an urgent one. A public-private partnership of sorts has been prevalent in the health care sector from the pre-independence period where land is allocated and credit provided at submarket rates to private players to build healthcare facilities in return for making a few services available to the poor free or at nominal prices. Other types of public-private partnerships such as government financing and private provision are still largely absent in India. Any institutionalized expansion of the role of the private sector will entail some form of least intrusive regulation, along with a strong consumer redressal mechanism. While it is difficult enough to foresee large-scale competent governmental administration of an expanded healthcare mechanism, it is even more difficult to foresee effective regulation of private sector activities.

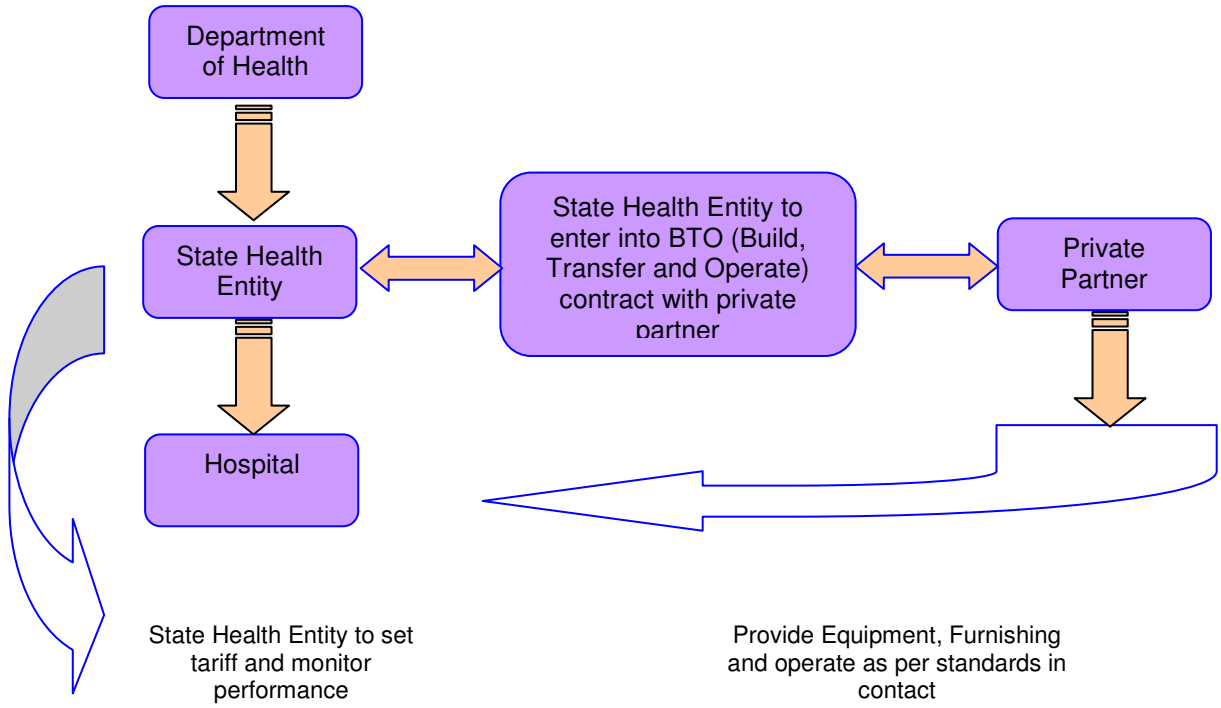
The introduction of adequate numbers of mobile vans could solve the problem of accessibility to a great extent as Delhi Government Health Services is doing in Public Private Partnership Mode. Through this more efficient and quality services could reach the grass root level.

The quality of service can also be improved by increasing the awareness level of the users through involving community based advocacy Non-Government Organisations (NGOs). Though the government runs many Information, Education, and Communication activities, it has failed to raise the awareness levels. Government along with private providers should try to establish the consumer information and redressal cells more effectively. Dissemination of information should be computerized and there should be an online grievance redressal forum. The users should have access to any information on health and other issues and similarly be empowered to post their grievances online to the designated authority. This will not only improve the quality of service but also increase the accountability of the service provider.

It is important that the state takes overall responsibility to implement the PPP project and has full control over the activities a model implementation plan for Establishment of Hospital in **PPP Mode** is provided in the following figure.

Implementation Framework for PPP Hospitals

Figure 6.2: PPP Project Implementation Model



Apart from the formulation of implementation structure it is important that roles and responsibility of each party is defined and documented properly as provided in table below;

Sl.No.	Role of State Health Entity	Role of Private Player
1.	Provide land	Design, Build, Transfer the building to BOT trust and also enter into a Memorandum of Understanding
2.	Approve the design of building within stipulated time	
3.	Reimburse the Private player as per contract	Furnish the Hospital

4.	Fix the subsidy	Provide medical and non medical equipment
5.	Pay variable fee per patient as per benchmark of CGHS/ other scheme	Recruit all the staff (medical & non medical)
6.	Can revise the pay per patient as per set norms	Commercial operation of hospital within 18 month to 24 months of establishment
7.		Operate and maintain the hospital as per IPHS norms

Introducing Mobile Vans

Introducing mobile medical vans in the rural areas can solve the problem of accessibility. Mobile vans equipped with basic medical facilities could supplement a primary health centre and travel to those areas where the primary health centers do not exist or have failed to meet the requirements of the people. These vans could have a schedule of visits in particular areas and could also be called in times of emergency. The introduction of adequate mobile vans could enable to solve the problem of accessibility to a great extent and more efficient and quality services could reach at the grass root level.

Mobile Healthcare can also be introduced for getting a blood test, an ultrasound or an X-ray done invariably requires a visit to the nearest large town. Philips India has started an innovative project called DISHA (*http://www.wbcsd.org/web/publications/case/philips_disha.pdf*) to provide high quality consultation and diagnostic services in rural India. They utilize a mobile diagnostic Clinic equipped with X-Ray, ultrasound, pathology lab (for blood and urine tests) and echo cardiogram. The Mobile Clinic also has the facility to dispense medicines. Electronic patient records are stored in a database and every patient gets a photo-ID card. A doctor travels along with the Mobile Clinic providing up to secondary level consultation. Only those patients who require specialist consultation are referred to a tertiary care hospital.

The advantage of such a mobile clinic is that doctors are not required to live in the villages in order to practice there (the clinic travels from the district headquarters where it is stationed to the villages) and the doctor has the equipment he/she requires to provide an informed diagnosis. Thus the two most common frustrations expressed by doctors required to work in villages are eliminated. On the same lines, the Christian Medical College, Vellore, has developed a mobile blood donation unit that can travel to the villages and accept voluntary donations at the doorstep of the donors themselves. Such methods to increase voluntary blood donations will find favour among hospitals if a simple policy decision is made to shift the onus of providing blood for patients from patient (as is currently the case in India) to hospital (as is the case in developed countries). Delhi Government is successfully implementing mobile vans on Public Private Partnership's mode and the same model could be implemented in other NCR districts and sub regions.

Case Study 6.2**:** NGOs in Managing Health Services

Karuna NGO, was established in 1980 and is administered by Western Buddhists, but the projects are open to anyone regardless of background. The projects promote dignity and self-confidence, and the breaking down of caste and religious barriers. Karuna is a Sanskrit word meaning 'Compassionate Action Based on Wisdom'. The trust is managing 25 PHCs in Karnataka and 9 PHCs in Arunachal Pradesh. The PHC's run by Karuna Trust are practicing models of innovative and novel approaches to deliver primary health care. These innovative are in place in all the PHC's run by Karuna Trust.

a. Strengthen community participation through village health committees with CNA and PRA.
b. 24-hour PHC with all staff staying at the PHC & sub-centre headquarters.
c. Gender - sensitive primary Health care.
d. Integration of community mental health care in PHC's.
e. Epilepsy control programme including documentation & treatment of hot water epilepsy in Yelandur Taluk. Over 2000 patients registered till date.
f. Mainstreaming of HIV/AIDS in primary health care.
g. Essential obstetric care & new born care.

While visiting PHCs run by Karuma Trust, one can find following things;

h. Clean campus with gardens
i. Increased number of staff quarters with improved maintenance
j. Improved water/electricity supply with provision of generators
k. Revival/improvement of sub-centers, acquisition of new buildings
l. Full functionality of essential equipment (oxygen cylinders, autoclave, centrifuge, etc.) and provision of deep freezers
m. New ambulances for four PHCs and four motorcycles to others
n. Staff (Medical officer and nurses) staying in the PHC area and available on a 24x7 basis for emergencies
o. Regular outpatients service 6 days a week
p. Inpatient facilities of 5 – 15 beds per PHC
q. Adequately stocked pharmacy in each PHC with at least 200 drugs available 24x7
r. Delivery room and minor operation in every PHC
s. Properly equipped lab in each PHC doing all routine tests
t. Regular training program for the PHC staff
u. Effective implementation of immunization and the various national health programs
v. Improved documentation and maintenance of registers
w. Special health camps and Accredited Social Health Activist training programs
x. A new X ray facility covering Wakka, Dambuk and Bordumsa PHCs added during this period.

They also organize village health and nutrition days. About 20 to 25 staff has been specifically hired throughout these centers to implement the various national preventive programs such as the National Rural Health Mission. All Karuna Trust PHCs and SCs have also become centers for tuberculosis control Program.

Action Plan for above recommendations is tabulated in the subsequent chapter.

7. Action Plan

The following table elicits the action plan for making the health system and infrastructure of NCR more effective and efficient. This is based on the gaps as have been discussed in the earlier section for each of the sub region. Table 6.5 provides information on number of health facilities required and the block cost for the same have been calculated as per norms/basis mentioned earlier in chapter 4.

Table 7.1: Action Plan

Sub Region	Critical Gap to be Addressed (What)	Actions Points (How)	Responsibility (Who)	Time frame (When)	Block Cost
Effective functioning of the 3-tier Health system					
▪ Haryana ▪ Uttar Pradesh ▪ NCT Delhi ▪ Rajasthan	▪ Three tier system is not functioning as desired due to lack of efficient monitoring system	▪ Strengthening M&E – Strengthening HMIS, developing software & reporting formats – Review Meetings – Monthly State & District level meeting – Monthly respective programme review meetings – Physical Verification – Baseline Surveys – Deliverable based monitoring – Outcome evaluation surveys & studies – Sample checks by State & District teams – Community Monitoring ▪ By Introducing Health Management Information System at State Level – Induction of specialists from Health Economics, Public Health, IT, Statistics and Demography – HMIS Cell at field level – District MIS Officer – Information Assistant at CHC & PHC – Developing integrated HMIS formats & software – Capacity building on integrated HMIS – District Programme Officers, SMOs, MOs, ANMs – External evaluation on HMIS reporting & Programmes – Checklist-based Field Visits ▪ Restructuring Programme Management – Establishing of	▪ Ministry of Health & Family Welfare ▪ Department of Health of respective State Governments	Immediate action desired	This is a part of the Government's NRHM activity- this needs to be taken up by the respective State Governments at the earliest.

Sub Region	Critical Gap to be Addressed (What)	Actions Points (How)	Responsibility (Who)	Time frame (When)	Block Cost
		specialized units – Programme Planning – Programme Implementation – Programme Monitoring – Financial Management – Revising ToRs based of SMPU & DPMU – Setting-up State Health Resource Centre			
Availability of adequate Human Resources					
▪ Haryana ▪ Uttar Pradesh ▪ NCT Delhi ▪ Rajasthan	▪ It was reported by most of the administrative health Officials that in Government health facilities the medical staff posted at distant/difficult places/regions do not continue their services	▪ Ensuring availability of Health Staff in Government Health facilities – As a part of the award of the MBBS degree in the country, it should be made mandatory that all doctors would have to serve the Government facilities in the underserved areas for minimum time period of 3 years – A plan can be chalked out at State level so as to depute all medical staff (doctor/paramedical) to the different locations on rotation basis. Thereby it will be mandatory for each medical staff to serve the difficult regions of the state. – Attractive remuneration for doctors/ specialists under state budget	▪ Ministry of Health & Family Welfare ▪ Department of Health of respective State Governments	Appropriate action to be taken up immediately with phased implementation	Policy intervention- Block costs not required
▪ Haryana ▪ Uttar Pradesh ▪ NCT Delhi ▪ Rajasthan	▪ Non-availability of required number of medical and paramedical staff – Posts of medical /paramedical staff are lying vacant – Actual shortage of medical /paramedical staff due to low intake of students in existing medical colleges	▪ Augmentation of medical staff – Filling up of vacant posts of medical/paramedical staff – Increasing number of posts under state budget and creating posts for specialists – Skill up-gradation & training – on key focus areas and Performance based hike/incentive for contractual staff – Placement policy based on skill/ training – Specialist doctors to be hired on consultant basis – call/case basis & fixed-day approach-gynaecology, paediatric & anaesthetist – Extend hiring other specialists as per IPHS	▪ Ministry of Health & Family Welfare ▪ Department of Health of respective State Governments	2015	Certain Policy level initiatives and others based on IPHS guideline and the same is being followed under the NRHM.

Sub Region	Critical Gap to be Addressed (What)	Actions Points (How)	Responsibility (Who)	Time frame (When)	Block Cost
	– Due to less pay package and high rate of migration to other countries	norms on fixed day approach – Inclusion of more seats in government/private colleges (medical & paramedical) increase the supply of health staff – Opening more institutes for providing training to medical and paramedical staff – Converting multi speciality hospitals having requisite infrastructure into medical colleges – Study to be instituted to identify the appropriate pay package for the medical staff of the Government Health facilities			
Infrastructure Augmentation Related Projects/ Policy level intervention and encouraging PPP					
▪ Haryana ▪ Uttar Pradesh ▪ NCT Delhi ▪ Rajasthan	▪ Three tier health system (PHC-CHC-DH) Lack of health facilities (CHC/ ▪ PHC/Sub-DH) – Less number of health facilities as per IPHS norms – Less number of functional beds – Lack of faith on primary and secondary health care system	▪ Augmentation of health Facilities (CHC/PHC/DH) – Establishment of more PHCs, CHC and sub divisional hospitals adhering to IPHS norms (refer Section 6.2 for type of facilities) – Upgradation of existing health facilities adhering to IPHS norms and inclusion of more functional beds in the facility at each level starting from Primary Health Centre to District Hospitals – Running mobile health facilities in Public Private Partnerships Mode – Establishing multi speciality hospitals at district/cluster (group of district) level in Public Private Partnerships Mode	▪ Ministry of Health & Family Welfare ▪ Department of Health of respective State Governments	Immediate action and upscale on yearly basis	Block cost for creation of additional facility can be considered based on the block costs for PHC, CHC and District Hospital
▪ Haryana ▪ Uttar Pradesh ▪ NCT Delhi ▪ Rajasthan	▪ Non-availability of required medical equipment's in Government health facilities – Non procurement of equipment's due to lack of staff or infrastructure/building	▪ Ensuring improved medical equipment's in government as well as in private facilities – Placement of technical staffs at district level for procurement of equipment's and infrastructural support. – State Governments procure improved and sophisticated equipment's for their health facilities but do not always allocate funds for	▪ Ministry of Health & Family Welfare ▪ Department of Health of respective State Governments	Policy level guidelines to be formulated within next one year-followed by implementation	Policy intervention- Block cost not required

Sub Region	Critical Gap to be Addressed (What)	Actions Points (How)	Responsibility (Who)	Time frame (When)	Block Cost
	– Equipment's are non functional due to lack of proper maintenance. – Non availability of advanced technology/ equipment's at district level and above – Affordability of advanced technology in health is less because a big share of the services is made available through private players at expensive rates	maintenance of the equipment. Thus, funds should be allocated for maintenance of the equipment's so that desired services could be provided to the patients. – Private sector can be encouraged to participate in procurement and operation of sophisticated equipment's in various Government hospitals, thereby enabling PPP by incentivising them in lowering/ exemption of excise /customs duty while procuring of equipment's and allowing them to operate the equipment's beyond a certain number to earn revenue – Government can provide exemption in excise/ customs duty on purchase of sophisticated/ advanced equipment's so that it could be cost-effective for a private player to purchase equipment's and the cost of services will also be affordable. – Exemption in tax can also be provided for the medicines such as lifesaving and specific/terminal diseases – Government to fix the costs of certain medical facilities/ tests (create a band) so that the private players cannot charge any rates at their will – a study should be initiated based on which action can be taken			
▪ Haryana ▪ Uttar Pradesh ▪ NCT Delhi ▪ Rajasthan	▪ Gaps in specialised services – Oncology – Paediatric Surgery – Cardiology – Neurology	▪ Gap in specialisation could be overcome by following; – Creating new hospital in PPP mode at district level with all required specialisation – Up grading district hospital to a multi speciality hospital with some services outsourced in PPP and hiring specialist doctors on consultant basis – By Building Public Private Partnership – Empaneling private doctors for providing	▪ Ministry of Health & Family Welfare ▪ Department of Health of respective states	2015	Block cost is not required as this has to be included in Governmental policy

Sub Region	Critical Gap to be Addressed (What)	Actions Points (How)	Responsibility (Who)	Time frame (When)	Block Cost
		specialty services at government facility on call/case & fixed day basis – Extending telemedicine as operational presently at Sir Ganga Ram Hospital, Swami Dayanand Hospital New Delhi) (refer section 6.3) – Strengthening referral through partnerships on successful (Mewat model) on call centre approach – Mainstreaming Voluntary Sector (NGOs) through increasing outreach services through partnership			

Source: Findings of this study