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HEALTH FACILITY MAPPING

IN RAJSHAHI & NARAYANGANJ CITY CORPORATIONS, BANGLADESH

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HEALTH FACILITY MAPPING

IN RAJSHAHI & NARAYANGANJ CITY CORPORATIONS, BANGLADESH

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Contents

Acronyms

ANC	Antenatal Care
BBS	Bangladesh Bureau of Statistics
BEmOC	Basic Emergency Obstetric Care
CCU	Coronary Care Unit
CEmOC	Comprehensive Emergency Obstetric Care
CRHCC	Comprehensive Reproductive Health Care Centre
DGFP	Directorate General Family Planning
DGHS	Directorate General Health Services
DIC	Drop in Centre
DOTS	Directly Observed Therapy Short-course
EPI	Expanded Program on Immunization
FSW	Female Sex Workers
GIS	Geographic Information System
GPS	Global Positioning System
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
ICU	Intensive Care Unit
IDU	Intravenous Drug Users
MSM	Men Who Have Sex With Men
NCC	Narayanganj City Corporation
NGO	Non Government Organization
NHSDP	NGO Health Services Delivery Project
PNC	Postnatal Care
RCC	Rajshahi City Corporation
UPHCSDP	Urban Primary Health Care Services Delivery Project
WHO	World Health Organization

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Introduction

Background

Urbanization is a global phenomenon, with over five billion people expected to reside in urban areas by 2025. [1] With rapid urbanization, public services in urban centres are struggling to keep pace with the needs of their growing populations. Rural migration is an important driver of rapid urbanization, with the large majority of recent migrants settling in poor urban settlements that constitute almost one third of the urban population. [2]

Growing at a rate of 2.4% per annum [3], Bangladesh's cities are confronting service delivery challenges associated with increasing demand and the changing nature of health problems accompanying urbanization. The rise of non-communicable disease, as well as environmental hazards such as poor air quality, and inadequate sanitation and living conditions have particularly harsh health impacts on the urban poor. [4, 5] In face of limited resources, understanding geographic disparities in service availability and other inequities in access are critical to the work of urban planners and policy makers. With this information, rational allocation of health services can occur in a manner that optimizes effective coverage. [6, 7]

In efforts to strengthen urban health governance, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, a global service provider in the field of international cooperation for sustainable development, is supporting the institutional and organization development of the Bangladesh health system in the areas of governance, quality improvement and health information systems, among others. As part of their work GIZ, commissioned icddr,b to conduct health facility mapping in three City Corporations- Sylhet[1], Rajshahi & Narayanganj. According to WHO, master health facility listing is the preparation of a comprehensive list of all public, private, NGO and public-private partnership health service points in a specific area or country with along with key attributes that can identify each health facility including basic health services and capacities. [8] Master facility lists and maps serve to make integrated health information more accessible and available for planning, effective coordination and monitoring of health systems, particularly in low-and middle-income countries. [8, 9]

This report presents the results of facility mapping work in Rajshahi and Narayanganj City Corporations (RCC and NCC) in two separate sections following the presentation of a common background and methodology.

[1] The Sylhet City Corporation report is available at http://hpnconsortium.org/dppanel/materials/2014_01_16_Mapping_health_facilities_in_Sylhet_CC.pdf

Objectives

The study aims to improve the coverage of quality health services with special attention to the urban poor and disadvantaged in RCC and NCC. Its specific objectives are to:

1. Collect geospatial data of all health facilities in RCC and NCC (public, NGO and private for profit - formal and informal)
2. Digitize the city road networks
3. Collect general and service attributes to all the mapped health service providers
4. Produce GIS maps of health facilities and share with DGHS and Local Government.

Methodology

Study Period & Site

The health facility mapping exercise was executed in RCC between May 2014 - October 2014 and in NCC between July 2014 - December 2014.

Preparatory Work

Permissions

Prior to field level activities, permission from respective City Corporation authorities was obtained including the Mayors, Civil Surgeons, Directorate General of Health Services, Directorate General of Family Planning. Written confirmation was also obtained from the NGO partners functional in these city corporations.

Secondary lists

In efforts to ensure data validation and minimize the risk of missing health facilities during facility listing and survey, a comprehensive list of health facility was prepared through continuous communication with respective NGOs and organization authorities. It included lists of EPI centres, DOTS centres, DIC centres, static and satellite clinics of Marie Stopes clinics, UPHCSDP and NHSDP, BRAC delivery centre etc. Moreover, to further strengthen the data authentication process, a secondary list of trade licenses from City Corporation, registration information from DHGHS and drug licenses from drug administration were collected.

Base Map Preparation and Processing

Existing administrative boundaries and road network shape files were available for RCC and were used as the base map after ground-truthing. No similar geo-referenced maps could be located for NCC except for an AutoCAD (.dwg) file with administrative boundaries. Hence, for NCC the in-house GIS team at Centre for Equity and Health Systems (CEHS) created the base map that required a longer preparatory time. Following the preparation of base maps, satellite images of both City Corporation areas were downloaded at zoom level 18 (scale 1:4513.98880)

for better visualization by using *'gMapMaker-v0.7.3.7'.* The latitude and longitude of images was fixed to 88.53 E to 88.68 E and 24.48 N to 24.33 N for Rajshahi and 90.44 E to 90.59 E and 23.72 N to 23.57 N for NCC. Compiling all secondary data and downloaded satellite images, the shape files of administrative boundary were produced, which were later converted into Simple Vector Graphics (SVG) format to export to tablet computers. For study purposes, the area within the administrative boundary of RCC and NCC was divided into 30 and 27 study areas respectively defined by road networks. This avoided the risk of duplication i.e. listing the same facility. Each of the study areas was assigned to a field team and they were instructed not to work beyond the boundary.

Tool Development

The development of questionnaires and software and took place in several steps:

1) A semi-structured facility survey questionnaire was developed by incorporating features from the master health facility listing guideline prepared by WHO and previous survey elements used in Sylhet and Dhaka. The questionnaire was improved and modified through field testing, then transformed into a digital version using HTML script.
1) A web based facility listing software called the SurveyZapp (listing and survey app) for UHA was developed for tablet computers. Features included in the app were the ability to record and track GPS coordinates, capture road networks (including the type and width), insert facility locations, perform survey on the inserted facilities using the digital version of the questionnaire, insert key landmarks. The app included ward boundaries/study boundaries and also satellite images for accurate GPS tracking and survey. All recorded data were saved locally on the tab either in MySQL database or in JSON (Javascript Object Notation Format) so that the app can work without any active internet connection. The generation of unique facility IDs and other GIS features attached with each facility, follow the recommendations/ guidelines prepared by WHO.
   The listing and survey questionnaire comprised the following parameters:
   → Facility name
   → Facility address
   → Facility category by nature and management entity
   → Facility types
   → Human resources
   → Facility focus
   → Service pattern
   → Service provision
   → Cost of services (in BDT) and
   → Provision for the poor

Team Composition

Working in an integrated manner, the urban mapping project was divided into five specialized teams: a) the GIS and IT team (12 in number included geographers, computer programmers, web designers, network experts, b) the data collection and mapping team (28 in number) comprised of research assistants, senior research assistants, research officers, and senior research officers c) the data management and analysis team (6 in number) involving statisticians and data managers and operators, d) the administrative team (8 in number), and e) the core or oversight team (8 in number) of mid and senior level researchers and scientists. The core team was responsible for the overall functioning of the study and its scientific outputs.

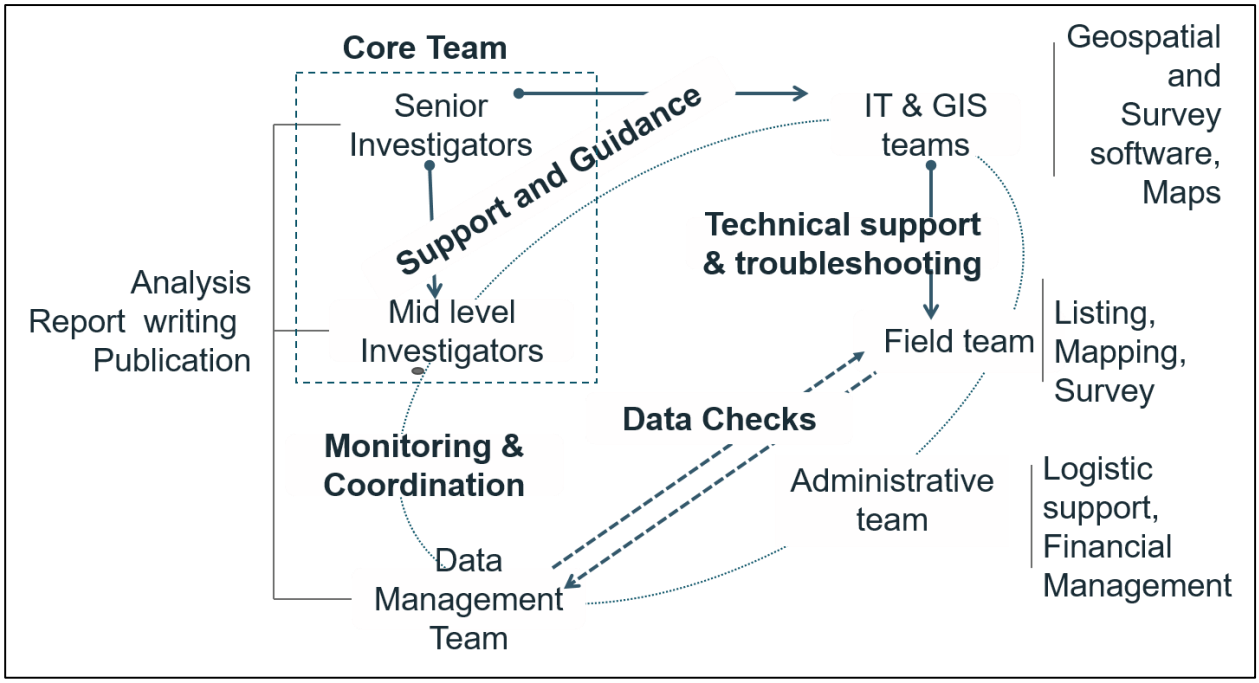


Figure 1 Team structure and responsibilities

Recruitment, Training and Pretesting

A 28 member field team was formed with postgraduate level education in anthropology, nutrition, and geography. A week-long training was organized for data collectors to clarify study objectives, goals and procedures, and to provide necessary context regarding urban health systems and the respective City Corporations. Demonstrations of GIS applications, and hands-on practice sessions with Samsung Galaxy tablets 2 and 3 were conducted to familiarize the team with how to update existing road networks and to enter spatial locations of health facilities. Field testing of the apps was performed in Dhaka to identify problems and troubleshoot accordingly.

Field Activities and Challenges

From June to August 2014, an 11-member team was deployed to do health facility listing and survey activities in (RCC) and from August 2014 to November 2015 a 20-member team worked in NCC. In the listing phase, surveyors collected spatial location including facility entrance and basic information of health facility. In addition, they also updated the existing road networks within the CC boundaries via walking or riding in rickshaw. A work plan was developed by team supervisors and each surveyor was assigned daily responsibilities by them. Each surveyor was given a staff ID that was used to track their work progress.

A number of challenges were faced during the fieldwork. Political turmoil and frequent strikes hindered mapping activities; and hence, the survey team had to work long hours each day and on weekends. It was difficult to map the satellite clinics that changed service spot frequently, and had to be more vigilantly checked so that duplication did not occur and the latest recorded spot was only retained. Other challenges related to respondent time and availability. Many hours were spent waiting for respondents to finish their business and make themselves available for interview. Multiple visits were made to some facilities where respondents were not available the first time. An unforeseen technical problem arose while using Samsung Galaxy Tab 3. The tabs had difficulty in taking GPS readings without any mobile network SIM. This was solved by providing each tab with a Grameen mobile network SIM.

Data Quality Assurance

Our aim was to obtain facility health information from the owner or manager of the facility/chamber, or in the case of private chambers, the doctor him/herself, in an effort to ensure data correctness. However, in many cases owners or managers designated some other staff to respond to the survey.

A two-member supervision team in each site was formed to ensure routine data check-up for data quality purposes. In addition, research investigators and senior research officers monitored fieldwork through random site visits and direct observation. Team meetings took place periodically to share progress of activities, and field challenges were solved through open discussion. IT and GIS teams provided technical support and troubleshooting when necessary.

For GIS data, the team split the area of RCC into 374 grids and among them, 30 grids for 30 wards representing 10% of RCC total area, were verified including spatial location (17%) information. In addition, 14% of the total road network drawn during listing was verified. The GIS team split the entire area of NCC into 360 grids and among them. Twenty-seven grids for 27 wards that comprised around 10% of total area, were verified including spatial location (18%) information. Thirteen percent of the total road network drawn during the listing was verified.

As an added validation of the collected data, the location of static and satellite clinics of NGO facilities were matched and verified by clinic mangers.

Data Processing and Analysis

Collected data was routinely preserved in MySQL database to avoid loss, and the data management team regularly cross-checked collected data for any inconsistencies. Data flow is shown in the figure below. Health facility data was analyzed using STATA and MS excel and ArcGIS software was used to analyze geospatial data.

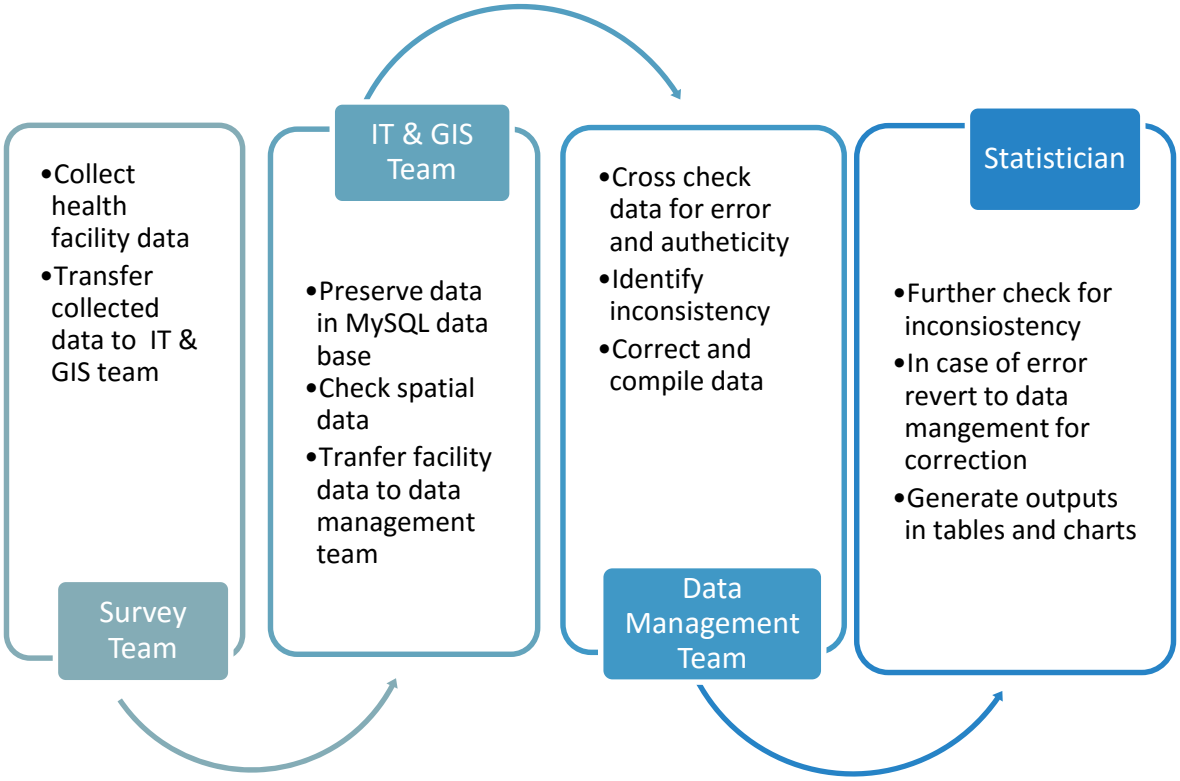


Figure 2 Data Management Process

Ethical Considerations

A signed consent was obtained from each respondent at health facilities prior to participation in this study. Participation was completely voluntary and each participant was given the right to withdraw at any moment of the survey. Health facility service information was collected at a time specified by the respondent to minimize disruption of normal business activities.

Operational Definitions

Due to the pluralistic health market and lack of uniform terminology across health facilities we, operationalized commonly used terms for clarity and consistency. Box 1 presents the operational definitions of health facilities.

Box 1. Health facility type and definition

Facility Type	Definitions
Hospital	Any formal institution providing both outdoor and indoor services with more than 30 beds (≥31).
Clinic	Any formal institution with or without indoor services having less than or equal 30 beds (≤30).
Diagnostic Centre	Facilities that provide medical testing and imaging facilities. In addition some also provide out-patient services.
Drop in Centre (DIC)	A facility that serves only specific groups of people such as sex workers, intravenous drug users, street children. Services are largely focused on health education, with clinical care available only 1 or 2 days a week. It can be either static or satellite.
Blood Bank	A facility whose primary function is blood collection, preservation and sometimes transfusion service. Clinical services are not provided in this facility. [2]
Delivery Centre (DC)	Informal MNCH facilities run by BRAC and Caritas providing ANC and PNC services and normal deliveries assisted by trained birth attendants or midwives to poor women receive.
EPI centre	These facilities only provide immunization services for children under the Government's Expanded Program of Immunization.
Satellite clinic	Limited services offered by NGOs at the community level during particular hours and days in a week at a location which might not be specific.
Doctor Chamber	Private practice by doctors not attached with any larger institute like hospital or clinic.
Pharmacy	A facility that sells drugs as its primary service.

[2] Some hospitals/clinics may have blood bank facility at their premises but to avoid duplication and over counting facilities it is considered as a service in that facility.

Some other pre-defined terms were:

Specialists: All allopathic practitioners who have a MBBS degree and also have completed all parts of FCPS /FRCS/ MD/ M.Phil/ MS/ MRCP/ MRCS degree were considered specialists in a specific sector. Dentists who possess a BDS degree and in addition FCPS/ DDS/ MS degree on Maxillofacial/Children/ Conservative/ Orthodontics/ Prosthodontics were recognized as Dental Surgeons (Specialists). Diploma or short course degree or medical diploma holder were not considered a specialist.

Limitations and Challenges

Due to time and resource limitations, a strategic decision was made to collect basic health service information only. It was not possible to observe and verify all services in each facility. We recorded reported data only.

Section 1: Rajshahi City Corporation

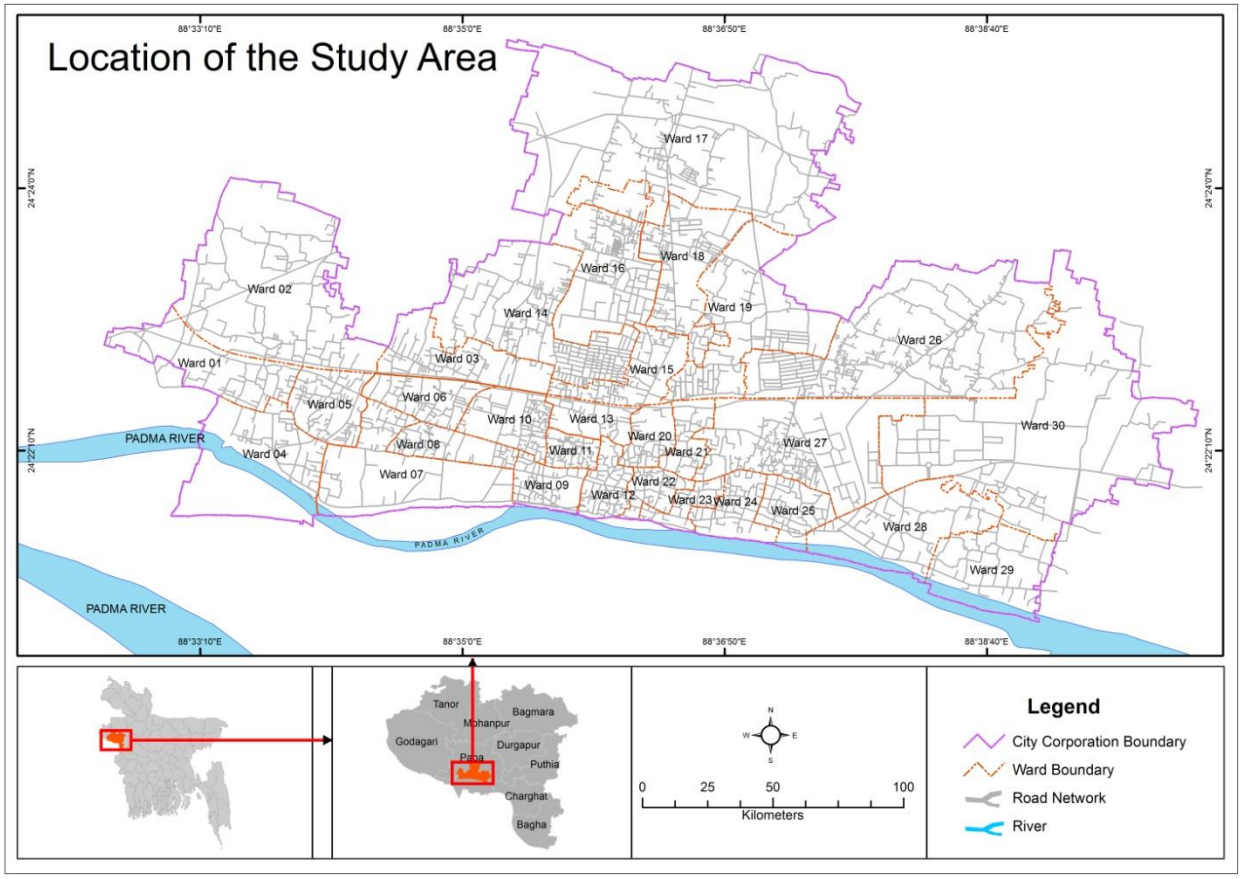
Key Findings

- In total, 1304 health facilities were surveyed in Rajshahi City Corporation (RCC).
- Reflecting the population density, health facilities clustered around the central southern part of the city.
- Seventy-five percent 75.3% (982) of total facilities were private, mostly pharmacies and doctors' chambers.
- UPHCSDP provided primary health care services through 132 service points, static and satellite clinics, and delivery services through 2 comprehensive reproductive health care centres in 20 wards of RCC.
- A total of 7,172 staff was identified in 522 health facilities.
- The total number of physicians in private facilities was about 3 times higher than the sum of total physicians in both public and NGO health facilities.
- There were 109 physicians in General Surgery and 114 in OB/GYN.
- There were few specialists in Diabetes, Endocrinology, Rheumatology and Oncology.
- The total number of beds was 2215, and among them 1977 were general beds and 238 were devoted to maternal services.
- Two NGO facilities provided HIV health services and 3 NGO facilities, provided specialized health services for MSM, FSW and IDUs respectively.
- Doctors were available 24 hours in 54 health facilities in RCC.
- Only 3 facilities in RCC had Intensive Care Units.
- Sixty-three facilities offered 24/7 services and majority of them were clustered around the central southern part of RCC.
- Most NGO health facilities offered health cards, free services and subsidies for the poor.
- Two private health facilities offered free clinic days.

A Brief Overview of Rajshahi City Corporation

Rajshahi, often referred to as the Silk City, is the north-west divisional headquarters of Bangladesh. Rajshahi City Corporation was established in 1987 and is surrounded by the Paba Thana on the north, east and west sides and on the south by the Padma River. [10] RCC measures 48 sq. km as per our GIZ team, which is recognized by Rajshahi Development Authority (RDA) but differs from the official record of 96.6 sq. km as per the Bangladesh Bureau of Statistics (BBS). [11] Rajshahi City Corporation has 30 wards, a population size of 449,756 and 99,545 households.

Map 1: Location of Rajshahi City Corporation



Rajshahi Division Health Facts

- Rajshahi had the highest immunization coverage, 91% of 12 month olds, in 2013. [12]
- Current total fertility rate (TFR) of Rajshahi is 2.1 births per woman. [12]
- Contraception Prevalence Rate in Rajshahi (67%) is higher compared to the national contraception prevalence rate (61%).
- Fifty-six percent of women in Rajshahi received ANC service from medically trained provider, which is better than the national rate of 54.6%. [12]
- The infant (51 deaths per 1,000 live births) and under-5 mortality (63 deaths per 1,000 live births) rates are still high.

Study Findings

Response Rate

- In total, 1359 health facilities were identified in RCC and their geospatial locations recorded.
- Among the facilities listed, 16 health facilities were permanently closed during the facility survey and 12 were located just outside the City Corporation boundary.
- 1331 facilities were approached for survey, and 98% complied with our data request.
- 1304 facilities were finally surveyed (Figure 3).

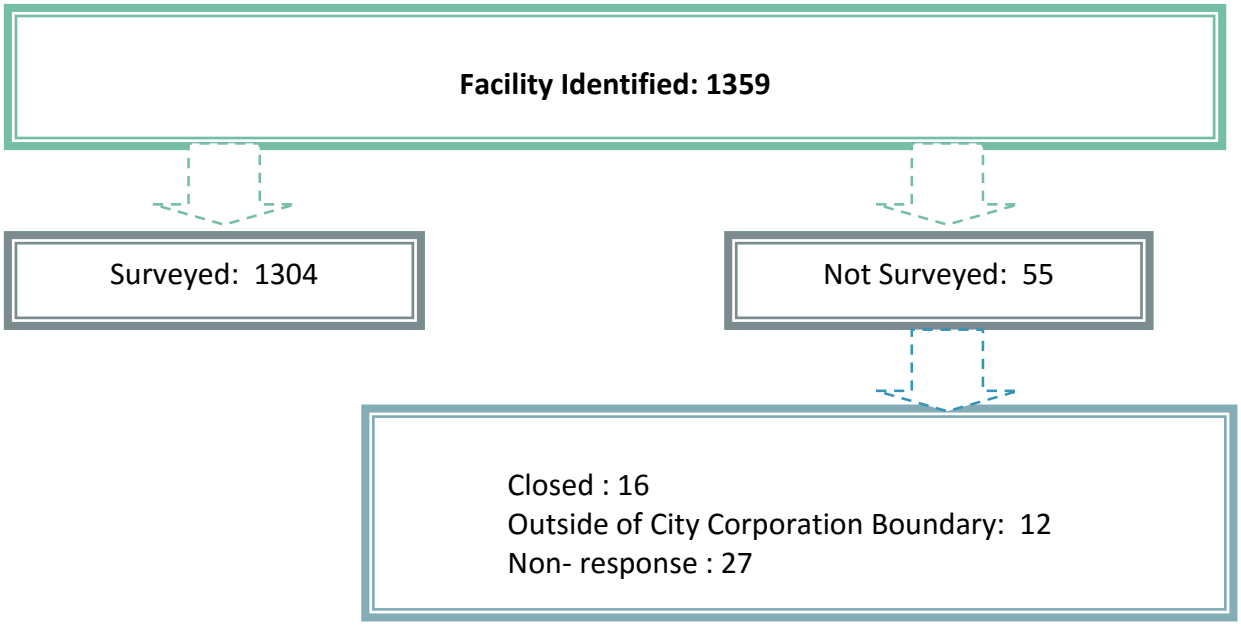


Figure 3 Number of facilities enlisted and surveyed

Type and Distribution of Health Facilities

The distribution of health facilities in relation to the population density per km^2 is found in Annex 2: facility types indicated by different symbols, and population density by increasing intensity of grey shading. Due to their large number, pharmacies and optical shops were excluded for presentation purposes. It is evident from the map that:

- Health facility concentration closely corresponds to population concentration, i.e. the dark grey areas.
- Facility concentration was less in the northern and north-eastern areas of the city where population density was also low.

The distribution of NGO health facilities, including static and satellite clinics are depicted in the map in Annex 3. A map of poor settlements in RCC was provided by UPPR and overlaid on the spatial distribution of NGO run health service points. The dark green color represents the highest density of poor urban settlements. The map indicates the following:

- Twenty-seven static clinics, 12 delivery centers and 5 drop in centres, all of which were NGO managed, are positioned closed to poor settlement areas.
- Satellite clinics showed a more dispersed distribution across RCC.

Table 1.1 delineates the number and types of facilities by management entity:

- There were 1304 static facilities of which 40% were pharmacies and 21.3% were doctors' chambers.
- There were 3 publicly owned doctor's chambers; two of them had attached phramacies.
- There were 2 hospitals and 7 clinics owned by the government.
- Six hospitals and 57 clinics were managed by the private sector.
- There were 27 NGO managed clinics.
- There were 265 satellite clinics: 125 EPI centres were run solely by city corporation's staff whereas, 140 satellite clinics were administered by NGOs.
- There was one publicly run diagnostic centre (nuclear medicine) and 49 were managed by the private sector.

Table 1.1 Number of facilities by management entity in RCC

Facility type	Public (n=138)	NGO (n=184)	Private (n=982)	Total	
Static				**n=1304**	%
Hospital	2	--	6	8	0.6
Clinic	7	27	57	91	7
Diagnostic Centre	1	--	49	50	3.8
Doctors' Chamber	1	--	277	278	21.3
Doctor's Chamber attached with Pharmacy	2	--	40	42	3.2
Delivery Centre	--	12	--	12	0.9
Blood Bank	--	--	1	1	0.1
Pharmacy	--	--	522	522	40
Optical shop	--	--	28	28	2.1
Drop In Centre (DIC)	--	5	--	5	0.4
Total	13	44	982	1039	**79.7**
Satellite					
Clinic	--	140	--	140	10.7
EPI centre	125	--	--	125	9.6
Total	125	140	--	265	**20.3**

Figure 4 shows the different types of doctor's chambers available in RCC, and categorizes them into formal and informal based on the doctor's academic qualification. The following academic degrees were considered formal: MBBS[3] for allopathic practitioners, BHMS[4] for homeopathic practitioners, BUMS[5] for Ayurveda or Unani practitioners, and BPT[6] for physiotherapists. Key observations are the following:

- The majority of doctor's chambers were homeopathic: 168 out of 320.
- The majority of homeopathic providers and 78% of Unani practitioners did not report any relevant formal education.
- In total, 65% of all doctor's chambers had unqualified providers.

[3] Bachelor of Medicine and Bachelor of Surgery
[4] Bachelor of Homeopathic Medicine and Surgery
[5] Bachelor of Unani Medicine and Surgery
[6] Bachelor in Physiotherapy

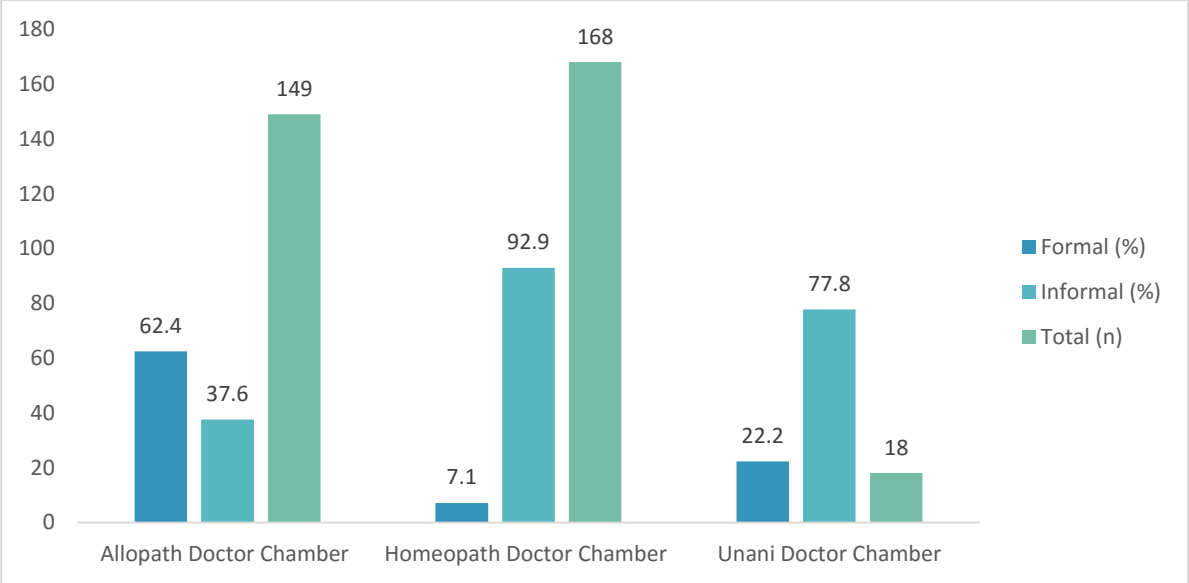


Figure 4 Types and qualification of doctor's chamber (n=320)

Table 1.2 shows the number of facilities running special health programs that are initiated by Government in collaboration with international and local NGOs. These are: the Urban Primary Health Care Service Delivery Project (UPHCSDP), Govt. EPI, Govt. TB or DOTS, the NGO Health Service Delivery Project (NHSDP) and Brac Manoshi (maternal and newborn health care) programs. Mapping data indicate the following:

- One hundred thirty-two PHCCs, including satellite clinics, provided primary health care services and 2 CRHCCs provided delivery services under UPHCSDP.
- One hundred twenty-six Govt. EPI service points provided immunization services by the health staff of City Corporation.
- In total, 6 DOTS centres were found in RCC: 3 were run by the City Corporation and the other 3 by NGOs involved in UPHCSDP.
- NHSDP had 23 health services points including satellite spots.
- BRAC provided maternal health services through 12 service points in RCC under their Manoshi project.
- Eight pharmacies were operating under the Blue Star program by SMC.

Table 1.2 Service delivery points providing special health programs

		Frequency	Percentage
UPHCSDP	Primary Health Care Centre (PHCC)	132	43.4
	Comprehensive Reproductive Health Care Centre (CRHCC)	2	0.7
	Primary Eye Care Centre (PECC)	11	3.6
	DOTS	3	1
	Govt_EPI	126	41.4
	Govt_TB or DOTS	3	1
	NGO Health Service Delivery Project (NHSDP)	23	7.6
	Manoshi	12	3.9
	Blue Star	8	2.6

Service Pattern

This subsection details the service pattern in terms of mode of service and business hours. Analysis for this section excludes pharmacies and optical shops.

- Given the large number of doctors' chambers, outdoor services were the main mode of service delivery.
- A large number of satellite clinics provided outreach services as seen in Table 1.3.
- Fifty-nine facilities(d+e+f) provided some in-patient services
- Ninety-seven (c+e+f) facilities offered surgical services of which 40 (c) were minor out-patient based surgeries.

Table 1.3 Mode of health service delivery

Mode	Public (n=138)	NGO (N=184)	Private (n=434)	Total (n=756)	
	% (n)	% (n)	% (n)	Frequency	Percentage
a.Outdoor services only	3.6 (5)	20.1 (37)	80.4 (349)	391	51.7
b.Outreach services only	91.3 (126)	76.1 (140)	0 (0)	266	35.2
c.Outdoor services with surgery*	0.7 (1)	1.6 (3)	8.3 (36)	40	5.3
d.Indoor service only without surgery	0.7 (1)	0 (0)	0.2 (1)	2	0.3
e.Indoor service with surgery	0 (0)	0 (0)	1.8 (8)	8	1.1
f.Outdoor and indoor services with surgery	3.6 (5)	2.2 (4)	9.2 (40)	49	6.5
Total	100 (138)	100 (184)	100 (434)	756	100

*Dental clinics

Tables 1.4 & 1.5 indicate the business days and service hours of health facilities. Key findings are the following:

- Most public and approximately half of the private static facilities remained open 7 days a week.
- The public facility that serves only 1 or 2 days a week was a UPPR health centre.
- NGO clinics/centres dealing with delivery services were open throughout the week, 20 in number.
- Other NGOs provided services 5-6 days a week.
- Most satellite clinics operated by NGOs (126) provided services only 1 to 2 days per week for limited hours.
- Publically run EPI centres also provided immunization services for 1 to 2 days in a week for few hours a day.
- 24 hour services were available in 72 facilities.
- Forty-one percent of static health facilities in RCC remained open from morning (8 am- 2 pm) through evening (5 pm- 12am), however these were mainly doctor's chambers and diagnostic centres.
- In the case of NGO health facilities, more than half of the static (25) and all satellite clinics (140) provided services between morning and afternoon i.e. from 8 am to 4 pm.
- Some NGO clinics, especially those providing delivery services, were open 24 hours.

Table 1.4 Days of service by management entity

Days	Public (n=138)	NGO (N=184)	Private (n=434)	Total (n=756)
Static				
All week	8	20	238	266
1-2days	1	0	13	14
3-4days	0	0	1	1
5-6days	4	24	180	208
Total	13	44	432	489
Satellite				
All week	1	2	--	3
1-2days	109	126	--	235
3-4days	2	4	--	6
5-6days	13	8	--	21
Total	125	140	--	265

Table 1.5 Hours of service by management entity (n=756)

Time	Public (n=138)	NGO (N=184)	Private (n=434)	Total (n=756)	
Static	% (n)	% (n)	% (n)	Frequency	Percentage
Morning-Evening	0(0)	2.3(1)	46.8(202)	203	41.5
Evening Only	0(0)	0(0)	23.4(101)	101	20.7
Morning-Afternoon	53.8(7)	56.8(25)	9.5(41)	73	14.9
Afternoon-Evening	0(0)	0(0)	9.3(40)	40	8.2
24 hour	46.2(6)	40.9(18)	11.1(48)	72	14.7
Total	100(13)	100(44)	100(432)	489	100
Satellite					
Morning-Afternoon	100(125)	100(140)	--	265	100

The map in Annex 4 shows the distribution of health facilities that offered health services twenty-four hours for 7 days in RCC; this excluded pharmacies:

- Out of 63 facilities, 12 facilities were NGO run delivery centres which were quite strategically placed within RCC.
- There were 8 hospitals and 43 clinics, and most of these facilities clustered around center of the southern part of RCC, especially in wards 6 and 8.

Table 1.6 shows the availability of doctors at the facilities that had physicians in their staff list:

- Very few facilities had a doctor around the clock: only 6 public facilities, 7 NGO facilities, and 41 private facilities.
- Doctors provided health services in around one-third of health facilities (472).
- Among 418 private facilities, doctors provided treatment only in the evening (5 pm onward) in 28% (120) of these.
- In the majority of private health facilities (151), doctors were available between morning and evening (8 am – 4pm) (mainly homeo chambers).

Table 1.6 Time of the day when doctors are available, by management entity (n=472)

Doctor's availability	Public n=12	NGO n=29	Private n=431	Total n=472	
				Frequency	Percentage
Afternoon Only	--	7.1 (3)	0.7 (3)	6	1.3
Evening Only	--	2.4 (1)	28.5 (119)	120	25.4
Morning-Afternoon	50 (6)	66.7 (28)	12.2 (51)	85	18
Afternoon-Evening	--	--	12.7 (53)	53	11.2
Morning-Evening	--	7.1 (3)	36.1 (151)	154	32.6
24 hour	50 (6)	16.7 (7)	9.8 (41)	54	11.4
Total	100 (12)	100 (42)	100 (418)	472	100

Service capacity- human resource and bed numbers

Table 1.7 presents the type and number of health human resources in RCC excluding pharmacies. Staff at satellite clinics have been counted under the parent institution:

- A total of 7172 staff were reported in 522 health facilities, however this may be an overestimate since it was not possible to identify staff working at multiple facilities which is a common practice in Bangladesh.
- The median number of staff was 2 i.e. half of the facilities were staffed by 2 persons only.
- In general, the highest number of physicians were working in the private sector.
- The nurse to physician ratio was the highest in the public sector.
- NGOs ran the large number of satellite clinics within RCC at which health services were mainly provided by paramedics.
- Non-physician clinicians are those not trained as a physician but capable of performing many of the clinical functions of a medical doctor in diagnosing and managing common conditions, and preventing disease. In this cadre are medical assistants, nurse aids, lab technologists, community health workers etc.,
- Other staff include urban birth attendants, vaccinators, and health assistants etc. who are also primarily found in the private sector.
- The majority of non-physician clinicians and other staff worked in the private sector, however, they were also quite numerous in NGO sector.

Figure 5 depicts the number of specialist doctors available in RC in 2014. For the definition of specialism please refer to the section on operation definitions. While this figure is subject to double-counting, it provides a rough estimate of total numbers:

- In RCC, the highest numbers of specialists were in Obstetrics and Gynaecology (OB/GYN) and General Surgery, around 120 each, followed by medicine specialists.
- Very few Nephrologists, Diabetologists, Endocrinologists, and Psychiatrists were reported.

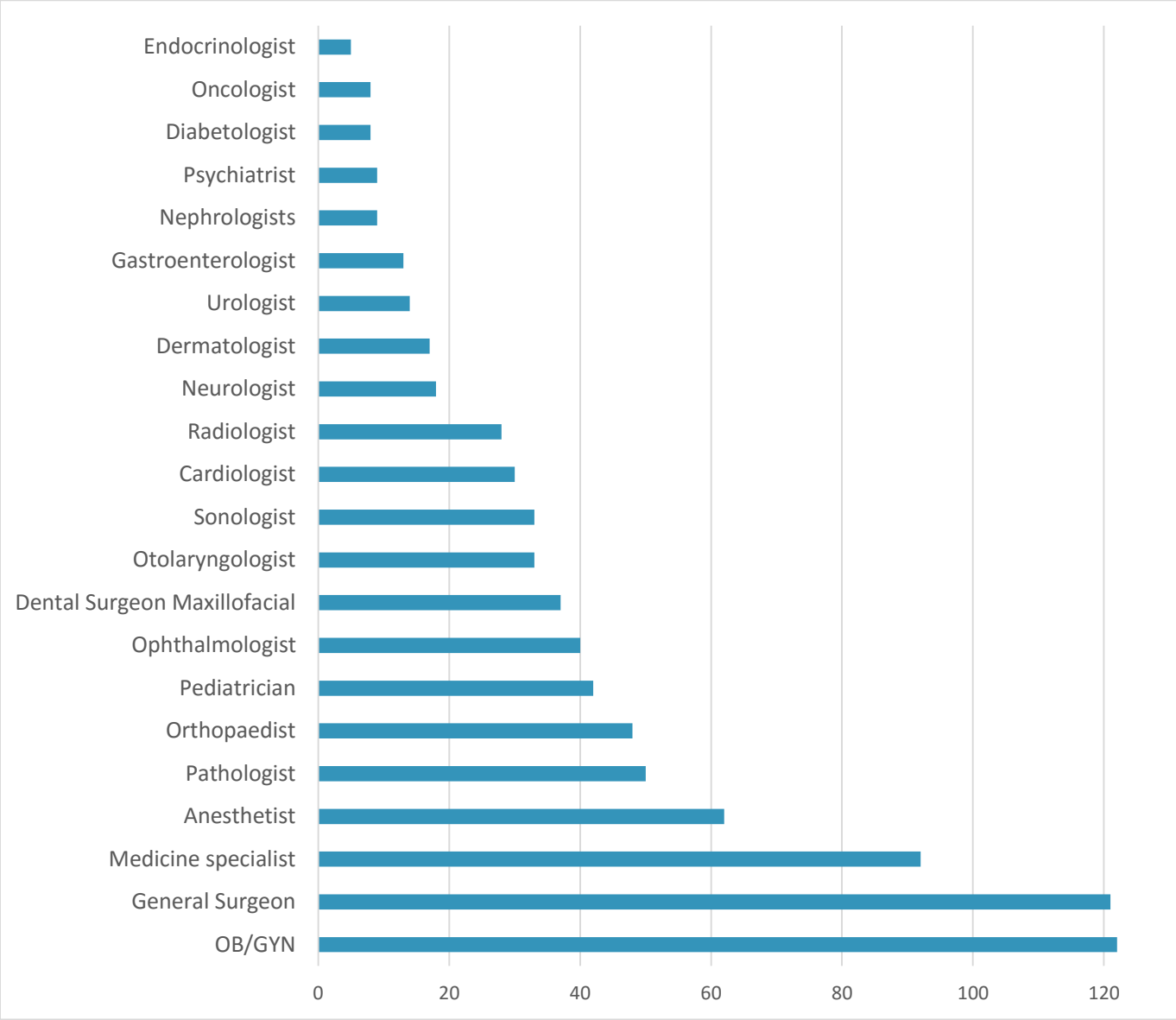


Figure 5 Number of specialist doctors in RCC

Table 1.7 Number of staff by management entity (n=522) *

Staff type	Public (n=13)				NGO (n=44)				Private (n=465)				Overall (n=522)			
	Total	Mean	Median	Range	**Total**	Mean	Median	Range	**Total**	Mean	Median	Range	**Total**	Mean	Median	Range
Physician	392	32.7	3	1-336	55	1.8	1	1-8	1398	6.7	2	1-124	1845	7.3	2	1-336
Nurse	449	74.8	6	2-343	21	3	3	1-7	466	8.9	6	1-51	936	14.4	6	1-343
Midwives	5	5	5	--	10	2	2	1-3	19	1.7	1	1-5	34	2	2	1-5
Pharmacists	23	4.6	1	1-17	--	--	--	--	19	1.5	1	1-3	42	2.3	1	1-17
Paramedics	6	2	2	1-3	58	1.9	1	1-7	95	1.9	2	1-4	159	1.9	2	1-7
Non-physicians clinicians	81	11.6	4	2-47	100	3.3	2	1-15	573	2.9	2	1-30	754	3.3	2	1-47
Other staff	4	4	4	--	112	5.1	4	1-23	332	1.7	1	1-33	448	2	1	1-33
Support staff	682	52.5	7	1-528	243	6.8	4	1-29	2029	9.1	3	1-192	2954	10.9	4	1-528
Total Staff	**1642**	**126.3**	**20**	**1-1271**	**599**	**13.6**	**11**	**2-41**	**4931**	**10.6**	**2**	**1-362**	**7172**	**13.7**	**2**	**1-1271**

*Excluding pharmacies

Table 1.8 shows the number of in-patient beds available in health facilities in RCC:

- Among the 1349 health facilities surveyed, 59 housed in-patient services and had capacity for 2215 patient beds altogether.
- Two hundred thirty-eight were allocated for maternal services and the rest (1977) were general beds.
- In absolute terms, the private sector had the highest number of beds (1420), however a low mean value indicates that the capacity of public facilities was much larger.
- NGO health facilities exclusively provided maternity beds.

Table 1.8 Number of patients' beds by management entity (n=59)

Bed type	Public	NGO	Private	Total
Maternity Bed	*n=3*	*n=5*	*n=8*	*n=16*
Total	83	65	90	**238**
Mean	27.7	13	11.3	14.8
Median	10	10	5.5	10
Range	10-63	5-10	2-45	2-63
General Bed	*n=4*	--	*n=47*	*n=51*
Total	647	--	1330	**1977**
Mean	161.7	--	28.3	38.8
Median	85	--	10	10
Range	10-467	--	3-250	3-467
Total	*n=6*	*n=5*	*n=48*	*n=59*
Total	730	65	1420	**2215**
Mean	121.6	13	29.6	37.5
Median	15	10	10	10
Range	10-530	5-20	6-270	5-530

Health Services

Tables 1.9 and 1.10 present the distribution of selected health services:

- Maternal health services were offered in all types of facilities, however basic and comprehensive emergency obstetric care were available in 41 facilities.
- Critical care services such as Intensive Care (ICU) and Neonatal ICU (NICU) were rare in RCC; only 3 or 4 facilities have this capacity.
- No Cardiac Care Units were found.
- NGOs have an important role in Health Education as very few public and no private facilities report offering this service.

- Diagnostic and ambulance services are the niche of private facilities.

Table 1.9 Reported availability of select health services by management entity*

Service Type	Public	NGO	Private	Total
Maternal and women health				
NVD	4	20	37	61
Basic Emergency Obstetric Care	2	2	0	3
Comprehensive Emergency Obstetric Care	2	1	35	38
Menstrual Regulation (MR)	3	6	40	49
Dilatation and Curettage (D&C)	3	11	24	37
Family Planning				
Long term	5	13	10	28
Permanent	3	8	8	19
General Surgery	2	1	40	43
Diabetes	4	10	134	148
Critical Care				
Intensive Care Unit	1	--	2	3
Neonatal Intensive Care Unit	--	--	1	1
Blood Transfusion	1	--	15	16
Ambulance Service	3	5	12	20
Health education				
Adolescent	3	28	--	31
Elderly	1	8	--	9
Sexual & Reproductive	2	23	--	25
Maternal	3	53	--	56
Family Planning	3	60	--	63

*multiple response

One of objectives in this survey was to document service provision for vulnerable groups. Table 1.11 presents the number of facilities that worked with a specific focus on disadvantaged populations, and also identifies facilities that had very specific service focus.

- As many as 14 to 15 NGO facilities had a maternal and child health focus.
- Work with vulnerable populations such as female sex workers (FSW), men who have sex with men (MSM), and intravenous drug user (IDU) was largely provided by NGOs.
- Two NGO facilities, and 3 facilities provided drug rehabilitation services.
- Two NGOs focused solely on HIV treatment.

Table 1.10 Diagnostic services by health facility management entity*

Diagnostic service	Public	NGO	Private	Total
Biochemical				
Random blood sugar	2	35	117	154
Imaging				
X-ray chest	2	1	49	52
MRI	1	--	3	4
CT scan	1	--	7	8
Ultrasound	3	4	61	68
Dental x-ray	--	--	30	30
Cytology/pathology				
Complete blood count	1	14	71	86
Urine routine test	1	14	71	86
Stool routine test	1	7	67	75

*multiple response

Table 1.11 Facility focus based on target population and service*

Focus	Public	NGO	Private	Total
Population				
Maternal health	3	14	0	17
Child health	3	15	3	21
FSW health	0	1	0	1
IDU health	0	1	0	1
MSM health	0	1	0	1
Other[1]	1	1	0	2
Service				
Drug rehabilitation	0	2	1	3
Eye	0	0	3	3
Infectious diseases	1	0	0	1
Kidney	1	0	0	1
Dental	0	0	22	22
Diabetic	0	0	3	3
HIV	0	2	0	2

* Multiple responses recorded

[1] poor, paralyzed

Figure 6 shows the number of facilities with special service provision for the poor. This analysis only includes NGOs and private facilities as public facilities generally provided free services or offered a nominal registration fee. The following should be noted:

- NGO health facilities make health services affordable to poor people by means of subsidized or free services and health cards, along with the provision regular services.
- Two private facilities reported free clinic days.
- Many private facilities (pharmacies) reported providing discounted medicine to the poor.

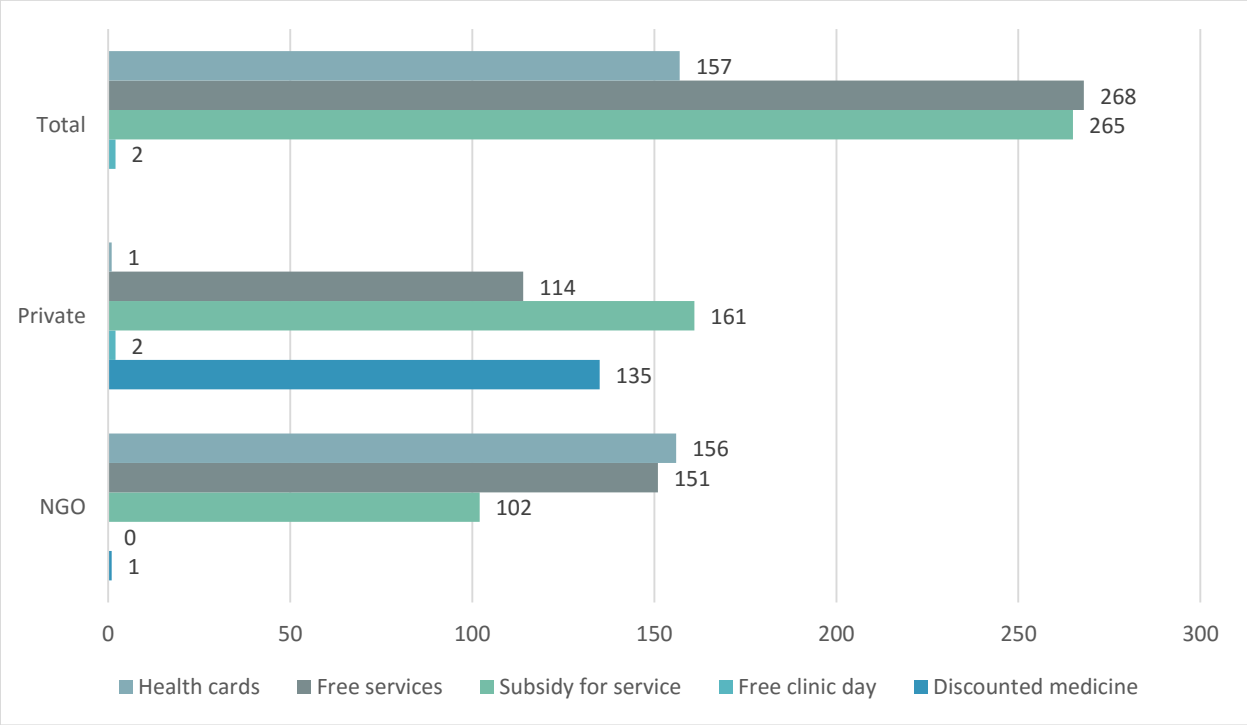


Figure 6 Service provision for the poor

Cost of Health Services

Table 1.12 shows the comparative prices of select services:

- There is huge variation in pricing among public, private and NGO sectors i.e. a normal vaginal delivery (NVD) could cost 200 taka in an NGO and up to 6000 taka in a private facility.
- The mean price for an NVD was 900, 1000, and 2900 BDT in public, NGO and private facilities respectively.

- A patient would have to pay an average of 140 BDT for blood grouping, which was nearly 3 times higher than the average cost in a public facility (48 BDT).
- Within private facilities, wide variation was seen between the highest and lowest cost for a specific service i.e. a simple chest X-ray can be done for anywhere between 70 to 400 taka in private facilities.
- The lowest average consultation fee in private doctors' chamber was around 226 BDT but could be as high as 438 BDT.

Table 1.12 Cost of select health services in BDT (n=477)

	Public (n=8)			NGO (n=162)			Private (n=307)		
Service	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range
Blood Grouping	48	48	35-60	69	60	20-110	142	150	50-200
Random Blood Sugar	66	43	30-150	55	60	20-110	50	30	20-250
Blood Routine Test	63	63	50-75	128	120	60-260	297	300	70-750
Urine Routine Test	22.5	22.5	20-25	55	47	15-100	136	150	50-200
USG (pregnancy)	237	300	110-300	311	350	100-500	487	500	200-700
USG (whole abdomen)	390	450	220-500	463	400	350-700	596	600	250-800
Chest X-ray	135	135	70-200	120	120		263	250	70-400
ECG	200	200	--	207	200	200-220	250	250	100-335
C-section (package)	7500	7500	--	8333	9000	6000-10000	9213	10000	5900-18000
NVD (package)	1200	1200	--	900	1000	200-2000	2883	2750	300-6000
Blood Transfusion	250	250	--	--	--	--	710	205	125-1800
Registration Fee	16	15	10-25	30	30	5-50	138	100	10-300
Consultation Fee (min)	10	18	10-35	55	35	30-125	226	200	20-600
Consultation Fee (max)	--	--	--	130	130	--	438	500	50-1000

Section 2: Narayanganj City Corporation

Key Findings

- Narayanganj City Corporation (NCC) had 1802 health facilities in total.
- Most facilities clustered around the densely populated south-western wards.
- There were 20 public static facilities, many more than in Sylhet or Rajshahi City Corporations.
- Eighty-five of the facilities were privately owned; the majority were pharmacies (51%) and doctor's chambers (24%).
- A total of 150 satellite clinics were in operation.
- Ninety percent of allopathic doctors' chambers were formal providers.
- Among 126 homeopathic providers, 105 were informal.
- Sixty-one facilities were open 24 hours a day but mostly clustered around wards 12, 13, 14, and 22.
- Thirty-seven private facilities, and 3 public and NGO facilities provided 24 hour services by doctors.
- A total of 86 physicians were working in public facilities, 35 in NGOs, and 1544 in private facilities.
- The nurse to doctor ratio was highest in public facilities and lowest in private ones.
- Gynecologist and Obstetricians were most available followed by General Surgeons and Medicine Specialists.
- There was in patient capacity of 1096 beds in NCC, with more than half in the private sector.
- Twenty-eight facilities reported all the components of CEmOC and 8 facilities were classified as BEmOC.
- Critical care services like CCU and NICU services were only found in one privately owned facility.
- Other than 2 public facilities, General Surgery was only conducted in private facilities.
- Imaging services were mostly available in private facilities. Newer technologies like MRI and CT scan were not available in any public facility in NCC.
- Vulnerable populations like FSW and MSM were only served by 1 NGO.
- Considerable variation in cost of services was observed; an ultrasound pregnancy profile can cost as low as Tk 100 but some private facilities may charge up to 8 times more.

Narayanganj– An Overview

Situated to the south of Dhaka city, the district of Narayanganj is part of Dhaka Division. The District has one of the oldest and the most prominent river ports of the country which makes it the centre of business and industry particularly for jute and textiles. The total area of the district is 684.37 sq. km. With a population of approximately 3 million, this brings the population density to approximately 5,266 people per sq. km. [13] It lies between 23 o 33´ and 23 o 57´north latitudes and between 90 o 26´ and 90 o 45´ east longitudes. The district consists of 5 upazila, 41 union, 619 mauza, 1204 villages, 6 pourashava, 54 wards and 282 mahalla. Within this district lies Narayanganj City Corporation (NCC), the country's 7th largest city corporation, established on 21st March 2011. Comprised of 27 wards, the city is approximately 72.43 sq. km, unifying three former municipalities: Narayanganj, Siddhiraganj, and Kadam Rasul. [13]

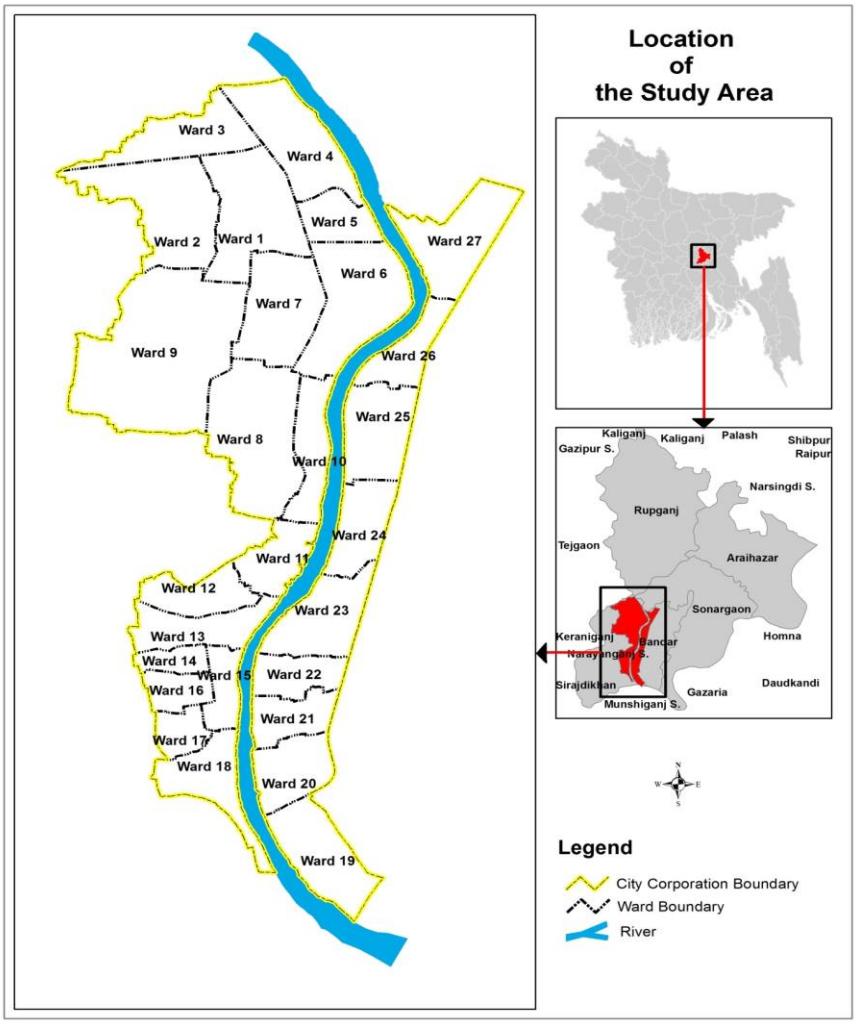


Figure 7 Location of the study area, Narayanganj City Corporation

Narayanganj Health Facts

Data from the Narayanganj Sadar Upazilla suggest promising health indicators as indicated below:

- Neonatal mortality rate: 9.29 per 1000 live births
- Under 5 morality rate: 12 per 1000 live births
- Maternal mortality rate: 69.7 per 100,000 live births.
- Vaccination coverage: 96% for children under five. [14]

However, despite such indicators, data from poor urban settlements within the wards of NCC suggest that this scenario might not be reflected in lower socioeconomic households, particularly in terms of water and sanitation. [15]

Study Findings

Response Rate

- A total of 1879 facilities were listed along with GPS coordinates.
- 67 facilities were later found to be outside the City Corporation boundary.
- It was possible to survey 1796 of the remaining listed facilities as some were found to be permanently closed, unreachable even after 3 visits, or refused to participate in the survey.

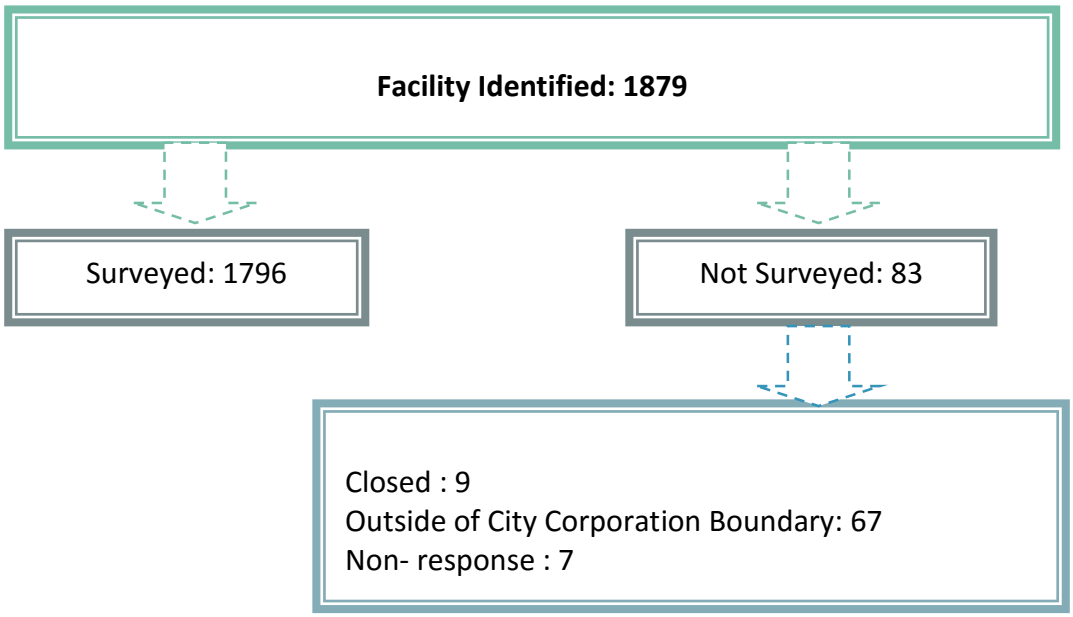


Figure 8 Survey summary, NCC

Types and Availability of Health Facilities

The map in Annex 5 shows the overall distribution of different type of facilities and the ward wise population density across NCC. It should be noted that:

- Pharmacy and optical shops were excluded due to their large number that cluttered the map.
- Each type of facility is indicated (see legend), and population density is shown in shades of grey.
- Although no pattern emerges from the distribution map, the density of health facilities is greatest in the south-western wards which also had the highest population density.

Table 2.1 shows the composition of health facilities mapped in NCC.

- Among the 1796 health facilities surveyed, the majority were pharmacies (51%, or 921 in number) and doctor's chambers (including doctor's chamber attach with pharmacy) (24.%, or 436 in number).
- There were 20 public static facilities, which is many more in comparison to Sylhet or Rajshahi City Corporations.
- There were only 4 hospitals i.e. facilities with more than 30 beds (as per operational definition).
- There were 89 EPI clinics from the public sector and 3 from NGOs.
- A total of 150 satellite clinics were operating all over NCC.
- The private satellite clinics were mostly eye camps by Bangladesh Eye Foundation & Research Hospital Ltd.

There were 436 doctors' chambers in NCC. The following academic degrees were considered formal: MBBS[7] for allopathic practitioners, BHMS[8] for homeopathic practitioners, BUMS[9] for Ayurveda or Unani practitioners, and BPT[10] for physiotherapists.

A type by type analysis of these service delivery points revealed (Figure 9):

- Most doctors were practicing allopathic medicine (279). Eighty percent of these doctors were certified allopathic practitioners; they had a minimum of MBBS degree.
- There were 124 homeopathic practitioners but 89% of them were informal and few had any formal education. This was also true of Unani practitioners, where approximately 80% were informal.

[7] Bachelor of Medicine and Bachelor of Surgery
[8] Bachelor of Homeopathic Medicine and Surgery
[9] Bachelor of Unani Medicine and Surgery
[10] Bachelor in Physiotherapy

- Some doctors' chambers reported multiple service types such a homeopathic and Unani, Allopathic and Homeopathic.
- In total 42% of all doctor's chambers had uncertified providers.
- One private practitioner provided both homeopathic and Unani services. Hence it has been counted twice in each category.

Table 2.1 Types of health facilities by management entity in NCC (n=1796)

Facility Type	Public (n=142)	NGO (n=148)	Private (n=1506)	Total	
				n=1796	%
Static					
Hospital	2	--	2	4	0.2
Clinic	18	19	53	90	5
Diagnostic Centre	--	1	41	42	2.3
Doctors' Chamber	--	--	311	311	17.3
Pharmacy attached with doctor's chamber	--	--	125	125	7
Delivery Centre	--	14	--	14	0.8
Blood Bank	--	--	2	2	0.1
Pharmacy	--	--	921	921	51.3
Optical shop	--	--	**35**	**35**	**1.9**
Drop In Centre (DIC)	--	2	--	2	0.1
Traditional/Spiritual	--	--	8	8	0.4
Total	20	36	1498	1554	86.5
Satellite					
Clinic	33	109	8	150	8.4
EPI	89	3	--	92	5.1
Total	122	112	8	242	13.5

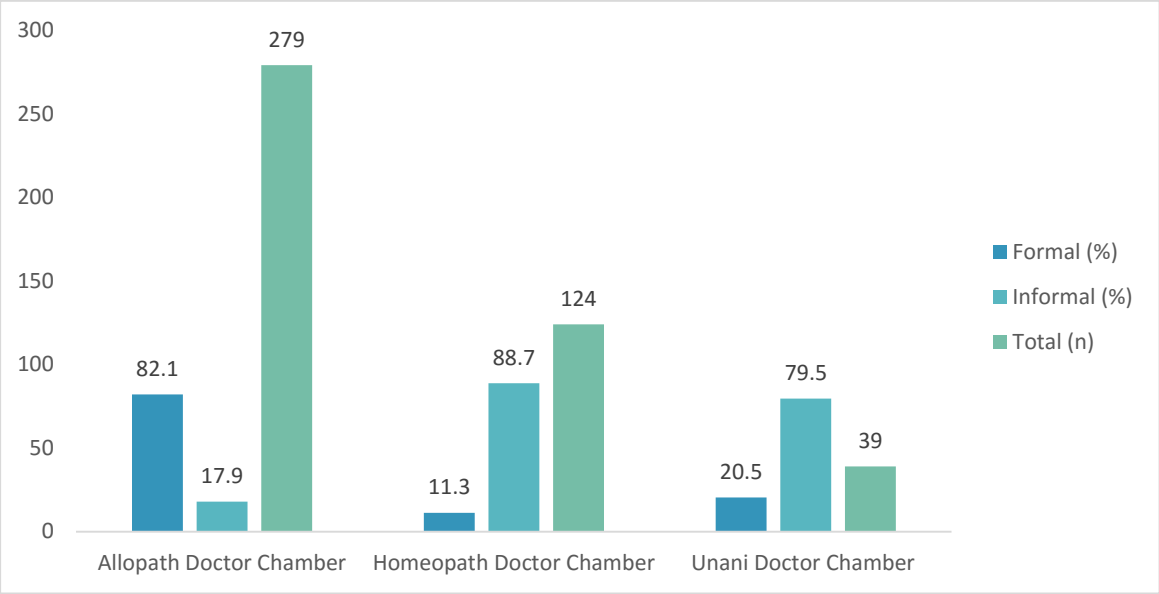


Figure 9 Types and qualification of doctor's chambers in NCC (n=436)

Table 2.2 indicates the number of facilities running Special Health Programs that are initiated by the Government in collaboration with international and local NGOs. These were mainly geared towards primary health care and included services such as EPI and maternal health care i.e. the Urban Primary Health Care Service Delivery Project (UPHCSDP), Govt. EPI, Govt. TB or DOTS, the NGO Health Service Delivery Project (NHSDP) and BRAC Manoshi (maternal and newborn health care) programs.

- Under the UPHCSDP program, 48 Primary Health Care Centres (PHCC) provided primary health care services and 1 CRHCC provided delivery services.
- Marie Stopes ran their own health program through 14 delivery points.
- In addition, there were 65 NGO facilities under the Health Service Delivery Project.
- Ninety-nine Government EPI service points provided immunization services by health staff from the City Corporation, and 30 were under the UPHSCDP program.
- In total, 4 DOTS centres were found in NCC.

Table 2.2 Frequency of service delivery points under each health program (n=237)

Health Program		Percentage (%)	Frequency (n)
UPHCSDP	Primary Health Care Centre (PHCC)	20.3	48
	Comprehensive Reproductive Health Care Centre (CRHCC)|	0.4	1
	Primary Eye Care Centre (PECC)	0.4	1
	VCCT	0.4	1
	EPI	12.7	30
Government _EPI		41.8	99
Government _TB or DOTS		1.7	4
NGO Health Service Delivery Project (NHSDP)		27.4	65
Manoshi		4.6	11
Marie Stopes		5.9	14

*multiple responses

Service Pattern

This subsection analyzes all data from all facilities except pharmacies and optical shops as their large numbers would skew results to their particular characteristics.

Many modes of service provision are reported in Table 2.3:

- Due to the large numbers of doctor chambers, outdoor services (b) were the most prevalent form of service provision () (55%).
- One hundred and twenty-six facilities (c+d+e) provided surgical services.
- Only 43 facilities (d+e) had in-patient services.

Table 2.3 Mode of service provision by management entity (n=840)

Mode	Public % (n)	NGO % (n)	Private % (n)	Total	
				n	%
a.Outreach services only	85.9 (122)	75.7 (112)	1.5 (8)	242	28.8
b.Outdoor services only	12 (17)	20.3 (30)	75.6 (416)	463	55.1
c.Outdoor services with surgery*	0 (0)	2 (3)	16.2 (89)	92	11
d.Indoor service with surgery	0 (0)	0 (0)	0.4 (2)	2	0.2
e.Outdoor and indoor services with surgery	2.1 (3)	2 (3)	6.4 (35)	41	4.9
Total	100 (142)	100 (148)	100 (550)	840	100

*Mostly dental clinics

Tables 2.4 and 2.5 describe the business days and hours of health facilities in NCC:

- Overall 352 facilities offered services throughout the week. These were mostly doctors' chambers. Three public facilities and 17 NGOs also operated the same way.

- In the public and NGO sector, most facilities operated 5-6 days in a week.
- Most satellite clinics were open only 1-2 days a week.
- Private facilities had the widest range of service hours.
- Three hundred-twelve private facilities were open from 8 am in the morning (8am- 2pm) to midnight (i.e. evening 5pm- 12am) and 164 facilities were open in the evening from 5 pm to midnight.
- Most of the public and NGO facilities operated between morning-afternoon (up to 4 or 5 pm) service hours.
- Sixty-one facilities were open 24 hours a day: 17 were NGOs, 3 public, and 41 private.

Table 2.4 Days of service provided in health facility by management entity (n=840)

Days	Public n=142	NGO n=148	Private n=550	Total n=840
Static				
All week	3	17	331	351
1-2 days	0	0	50	50
3-4 days	0	0	24	24
5-6 days	17	19	137	173
Total	20	36	542	598
Satellite				
All week	1	0	0	1
1-2 days	117	110	8	235
3-4 days	0	1	0	1
5-6 days	4	1	0	5
Total	122	112	8	242

Table 2.5 Hours of service by management entity (n=840)

Hours	Public	NGO	Private	Total
Static				
Morning-Evening	0	0	258	258
Evening Only	0	0	164	164
Morning-Afternoon	17	19	23	59
Afternoon-Evening	0	0	53	53
24 hour	3	17	41	61
Total	20	36	539	595
Satellite				
Few hours in morning or afternoon	122	112	8	242

The map in Annex 6 represents the ward wise distribution of health facilities open 24 hours a day and 7 days per week along with the population density in NCC:

- While a more or less even geographic distribution of facilities was apparent, facilities that provided 24 hour services were mostly clustered around wards 12, 13, 14, and 22.
- Areas on the east of the river lacked 24 hour service facilities, and those facilities on the map were mostly BRAC delivery centres.
- This is also true for the northward areas, with only few 24 hour clinics interspersed apart from BRAC delivery centres.

As shown in Table 2.6 doctors provided services in 366 facilities:

- Doctors in private facilities reported working variable hours of the day, but mainly conducted their chambers during the evening or morning-evening hours.
- In NGO facilities, doctor hours were almost exclusively in the morning-afternoon.
- Public facilities had doctor hours mainly during the morning-afternoon.
- Thirty-seven private and 3 public and 3 NGO facilities indicated 24 hour doctor availability.

Table 2.6 Time of the day when doctors are available, by management entity (n=366)

Doctor's availability	Public	NGO	Private	Total
Afternoon Only	--	--	12	12
Evening Only	--	--	140	140
Morning-Afternoon	3	12	39	54
Afternoon-Evening	--	--	28	28
Morning-Evening	--	--	89	89
24 hours	3	3	37	43
Total	6	15	345	366

Service Capacity- Human Resource and Bed Numbers

For each facility surveyed, we listed the number of "Health staff" - those who are involved in administration of health related services be it educational or clinical, physician or non-physician - and "Support staff" - those who are involved in facility management and maintenance. "Non-physician clinicians" provide health care services but are not medical doctors. The following tables exclude pharmacies from analysis.

Table 2.7 Staff category by type of management entity in NCC (n=640)*

Staff type	Public				NGO				Private				Overall			
	n=20				n=36				n=584				n=640			
	Total	Mean	Median	Range	**Total**	Mean	Median	Range	**Total**	Mean	Median	Range	**Total**	Mean	Median	Range
Physicians	86	14.3	2	1-45	35	2.3	1	1-10	1544	4.5	1	1-105	1665	4.5	1	1-105
Nurse	193	64.3	93	2-98	11	2.8	33	1-4	166	4.6	3	1-22	370	8.6	3	1-98
Midwives	2	1	1	--	19	1.2	1	1-2	8	2.7	1	1-6	29	1.5	1	1-6
Paramedics	5	1.3	1	1-2	48	2.3	2	1-4	35	2.1	2	1-10	88	2.1	2	1-10
Pharmacists	13	2.2	1	1-5	--	--	--	--	15	1.3	1	1-2	28	1.6	1	1-5
Non-physician clinicians	72	4.2	2	1-22	230	7.4	3	1-23	698	2.6	1	1-50	1000	3.2	1	1-50
Other staff	15	1.4	1	1-2	32	2.1	2	1-4	311	1.5	1	1-20	358	1.5	1	1-20
Support staff	228	17.5	2	1-142	143	5.5	4	1-15	1422	6.5	2	1-145	1793	6.9	2	1-145
Total staff	**614**	**30.7**	**5**	**1-308**	**518**	**14.4**	**14**	**1-34**	**4199**	**7.2**	**2**	**1-300**	**5331**	**8.3**	**2**	**1-308**

*Figures have been calculated for static facilities only.

Table 2.7 considers the number of staff by management entity:

- A total of 5331 staff were enumerated in NCC. It is likely, however, that this figure is an over-estimate due to double counting of physicians involved in dual practice.
- A total of 86 physicians were working in public facilities, 35 in NGOs, and 1544 in private facilities.
- The public sector had the highest average number of doctors available per facility i.e. each public facility employed more doctors than other entities.

- The nurse to doctor ratio was highest in public facilities and lowest in private ones.
- NGOs employed more midwives and paramedics than any other sector.
- Non-physician clinicians and other staff were more numerous in the private sector as they included medical assistants, nurse aid, lab technologists, community health workers, health assistants, urban birth attendants etc.

The types and numbers of specialist physicians are shown in Table 2.8:

- Gynecologists & Obstetricians appear to be the most available, followed by General Surgeons and Medicine Specialists.
- Private facilities appear to be employing the most number of staff, and the greatest diversity in terms of areas of specialty.
- NGO facilities had very few specialist doctors on staff.

Table 2.8 Number of specialists by management entity* (n=128)

Specialist type	Public n=2	NGO n=2	Private n=124	Total n=128
Gynecologist & Obstetrician	3	3	138	144
General surgeon	3	--	81	84
Medicine	2	--	78	80
Anesthetist	3	4	72	79
Pediatrician	2	1	55	58
Otolaryngologist	2	--	52	54
Orthopedist	1	--	46	47
Cardiologist	2	--	33	35
Diabetologist	--	--	21	21
Dermatologist	2	--	19	21
Sonologist	--	--	21	21
Pathologist	2	--	19	21
Gastroenterologist	--	--	20	20
Urologist	--	--	20	20
Radiologist	3	--	13	16
Nephrologists	--	--	15	15
Ophthalmologist	2	--	13	15
Neurologist	--	--	14	14
Hepatologist	--	--	9	9
Oncologist	--	--	4	4
Psychiatrist	--	--	4	4
Endocrinologist	--	--	2	2
Dental surgeon (maxillofacial)	--	--	2	2
Rheumatologist	--	--	1	1

*multiple responses

According to Table 2.9:

- In-patient beds were available in 44 facilities in NCC, and a total of 1096 beds were reported.
- In only 3 facilities, the public sector provided 420 patient beds.
- In absolute numbers, private facilities' combined capacity was 640 beds.
- NGO facilities, in keeping with their service focus, had 36 maternity beds.

Table 2.9 Number of patients' beds by management entity (n=44)

Bed type	Public	NGO	Private	Total
Maternity Bed	**n=3**	**n=3**	**n=12**	**n=18**
Total bed	97	36	81	214
Mean bed	32.3	12	6.7	11.8
Median bed	20	10	4	7
Range	39	6	18	56
General Bed	**n=2**	--	**n=35**	**n=37**
Total bed	323	--	559	882
Mean bed	161.5	--	15.9	23.8
Median bed	161.5	--	14	15
Range	161	--	48	240
Total bed	**n=3**	**n=3**	**n=38**	**n=44**
Total	**420**	**36**	**640**	**1096**
Mean bed	140	12	16.8	24.9
Median bed	100	10	16	16.5
Range	280	6	47	297

Health Services

Tables 2.10 and 2.11 show the availability of various health services, diagnostic tests, surgeries, and other amenities by management entity:

- Some general services like blood transfusion and ambulance services were available in a few government and NGO facilities; in absolute numbers, many more private facilities were offering these services.
- Twenty-eight facilities reported all components of CEmOC; 8 had BEmOC components.
- Interestingly, not all facilities conducting C-sections met the conditions for a CEmOC facility.
- Critical care services like CCU and NICU services were only found in one private facility.
- Other than 2 public facilities, General Surgery was only conducted in private facilities.

- NGOs were more involved in delivering Family Planning (FP) and health education in areas where few public and private facilities are available.
- Diagnostic tests were mainly provided in privately owned health facilities.
- Some NGOs were found to be providing a few cytological tests.
- Imaging services were mostly available in private facilities. Newer technologies like MRI and CT scan were not available in any public facility in NCC.

Table 2.10 Reported availability of different health services, family planning and health education by management entity

Service Type	Public	NGO	Private	Total
Maternal and women health				
NVD	5	17	39	61
BEmOC	--	--	8	8
CEmOC	3	1	16	20
C-Section	3	3	34	40
Menstrual Regulation (MR)	3	3	120	126
Dilatation and Curettage (D&C)	2	7	11	20
Family Planning				
Long Term methods	18	12	8	38
Permanent methods	2	5	11	18
General Surgery	2	--	35	37
Diabetes	2	6	282	290
Critical Care				
CCU	--	--	1	1
NICU	--	--	1	1
Blood transfusion	2	2	15	19
Ambulance service	2	1	8	11
Health Education				
Adolescent	19	56	--	75
Elderly	5	11	--	16
Sexual & Reproductive Health	11	43	1	55
Maternal health	24	69	1	94
Family Planning	23	68	2	93
Others	5	17	3	25

Table 2.11 Reported availability of different diagnostic tests by management entity

Diagnostic service	Public	NGO	Private	Total
Biochemical				
Random blood sugar	18	63	128	209
Imaging				
Chest X-ray	1		44	45
MRI	--	--	3	3
CT scan	--	--	3	3
USG	2	6	55	63
Dental X-ray	1	--	21	22
Cytology/pathology				
Blood CBC	2	9	64	75
Urine RME	2	9	64	75
Stool RME	2	4	59	65

Table 2.12 shows the reported population and service profile of health facilities in NCC. In total, 140 facilities in NCC (out of 1932 surveyed) reported some kind of population-specific focus:

- Twenty-two facilities had a specific focus on maternal health.
- Maternal care is provided by 3 public, 3 private and 16 NGO facilities.
- Seven facilities dealt with child health in particular.
- Especially vulnerable population like FSW and MSM were only served by 1 NGO facility.
- Specialized services such as eye, diabetic, heart, cardiology, are mostly provided by private facilities.

Table 2.12 Focus groups by management entity (n=140)

	Public(n=92)	NGO(n=26)	Private(n=22)	Total(n=140)
Population Focus				
Maternal health	3	16	3	22
Child health	3	1	3	7
FSW health	--	1	--	1
MSM health	--	1	--	1
Other	--	--	1	1
Service Focus				
Eye	--	--	13	13
Diabetic	--	--	3	3
Heart	--	--	1	1
Heart, Cardiology	--	--	1	1

*multiple responses

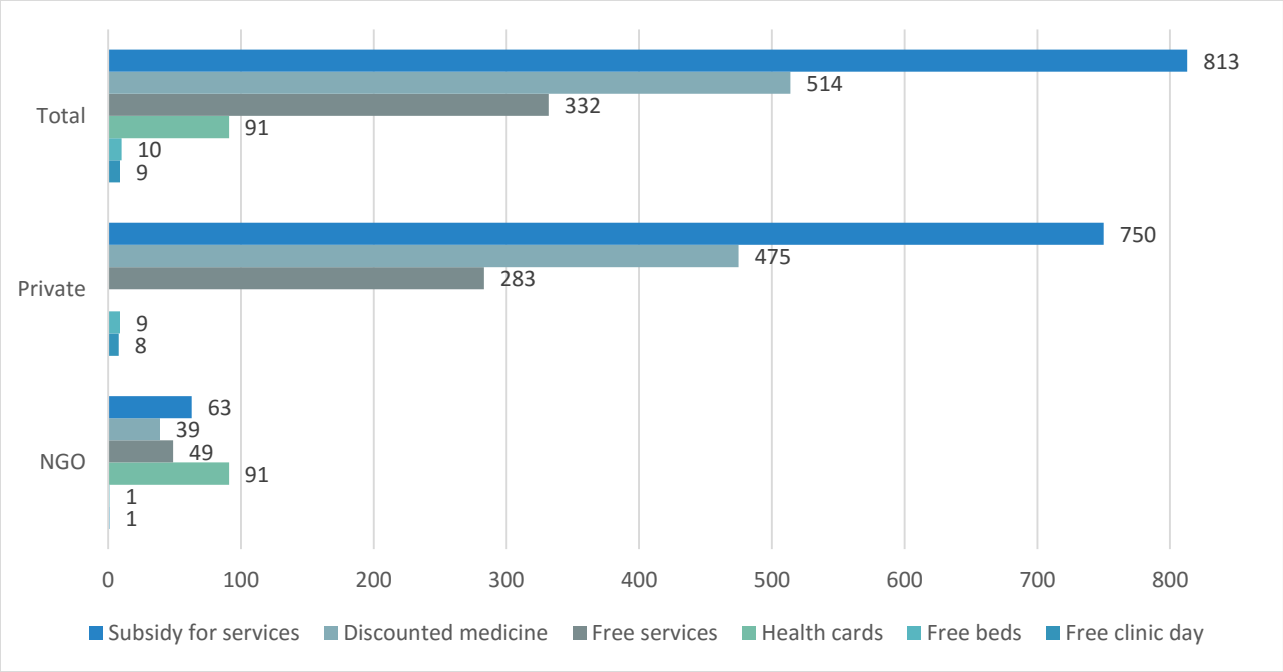


Figure 10 Provision for the poor

As far as special provisions for the poor were concerned, most private facilities (pharmacies and doctors chambers), reported that they provided discounted medicine and subsidized or free services (Figure 10). However these were not as systematically or officially offered as was done by NGOs. In addition, to these provisions, NGOs also provided health cards with special schemes to the poor.

Cost of Health Services

Significant variability in cost was observed depending upon the service and the management entity providing it. A look at the cost of available health services (Table 2.13) shows that:

- An ultrasound pregnancy profile can cost as low as Tk 100 but some private facilities may charge up to 8 times more.
- Package services are quite common and it usually includes the costs of particular services (i.e. MR, C-section, etc.) plus any other associated charged involved from surgery to recovery. Thus, doctor's fees, drugs, and OT charges are bundled together.
- A C-section package averaged Tk. 10,000 in private facilities in comparison to Tk. 1,000 in public facilities.
- Simple services such as blood grouping and random blood sugar testing have little variability in cost by management entity, but NGOs provided the lowest price.

Table 2.13 Service cost in BDT by management entity (n=564)

Services	Public (n=10)		NGO (n=121)		Private (n=433)	
	Mean	Range	Mean	Range	Mean	Range
Chest x-ray	200	--	--	--	287.7	200-400
ECG	150	--	200	--	238.8	150-350
Ultrasound (pregnancy)	110	--	350	100-500	533	100-800
Ultrasound (whole abdomen)	220	--	537.5	400-700	654.6	500-1000
C-section (package)	1000	--	9000	8000-10000	10803.6	6500-15000
NVD (package)	--*	--	2250	1500-3000	3425.9	1000-8000
Blood grouping	100	--	58.8	20-120	105.7	30-200
Blood transfusion	250	--	--	--	1233.3	300-3000
Random blood sugar	50	30-60	51.3	30-120	89.2	25-180
Blood routine test	150	--	146.6	100-200	264.3	100-450
Urine routine test	50	--	85.5	50-160	121.9	50-200

*Only has the option for NVD, not in package.

Conclusion

This report summarizes findings from a census listing of all health facilities in Rajshahi and Narayanganj City Corporations, which included geospatial coordinates, their location on updated road networks, and basic health service information. Visualization of health facility distribution with respect to population density, and the availability of services across a given area yielded several important insights.

In RCC, health facilities are reasonably distributed relative to population density. This was especially apparent in the NGO sector where collaborative efforts to keep clinic locations close to poor urban settlements were in evidence. However, even the least densely populated areas were accommodating populations as large as 11.000 per km^2, and require attention in terms of ensuring that services can meet population demand. For example, in the case of emergency care, only a handful of 24/7 health services were available in wards located on the periphery of the city which may hinder timely management. Additionally, there may be benefits to relocating some of the 43 clinics clustered around wards 6 and 8. As the city grows it will also be important to attract a more diverse array of specialist doctors than only Gynecologists and Obstetricians, General Surgeons, and Medicine specialists.

Although the above point holds true for NCC as well, its proximate location to Dhaka city gives it the advantage of close access to a wide array of specialist doctors. Of concern in NCC, however, was the availability of primary healthcare services, especially for the working poor. Due to lack of poor settlement maps for all of NCC, assessment of the proximity of primary care services for the urban poor was not possible. At first glance, health facilities across NCC appeared to be reasonably distributed across the city relative to population, suggesting that there is adequate coverage in terms of population density. However a closer look at 24/7 facilities showed that areas on the east of the river and facilities in the north part of the city were lacking. Furthermore, some critical services like ICU and CCU and modern diagnostic facilities like MRI and CT scan were absent in public facilities and were available only in a handful of private facilities. Infrastructural and technical investments in these facilities would be important to better serving the population of NCC.

As discussed above, facility maps can provide important evidence to guide decision-making about facility location and or the need to increasing certain kinds of service provision. Other uses in the areas of governance and accountability were also identified, such as identifying facilities that are not registered or licensed for purposes of monitoring and quality assurance, as well as revenue generation. Information on costs of basic services may also help to set new standards to control price gouging especially in the private sector. Finally, maps available online through smart phone apps or can be useful to the general public to locate a nearest specialist or 24/7 emergency service. All of these potential applications assume, however, that maps are

up to date. It is recommended that each City Corporation invests in building human resource and logistics capacity to maintain facility lists and applications, and that data is completely integrated into the Government's HMIS system. The development and implementation of an integrated mechanism to update maps by adding new facilities, or providing more comprehensive information on service availability, doctor qualifications and cost, will require important and needed collaboration between the Ministries of Health and Local Government, and the respective city corporations of RCC and NCC.

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Annex 1 Facility survey questionnaire

Health Facility Survey Form

Name of the data collector: Date:

Time: Start: End:

1. Health Facility:

1.1 Name of the Facility:	**Questionnaire ID Number**
1.2 Address of the Facility: House/Plot # Road/Lane/ Avenue # **Block: Sector/Section: Area Name:** **Ward# Postal Code:**	_CC _____ _____ ___ _____ Zone# Ward# SC XXXX **1.5 GPS Coordinate** Latitude N Longitude E Accuracy
1.3 Facility Contact: Telephone/ Mobile No: E-mail:	
1.4 Respondent Name, Designation & Contact number:	

1.6 Managed by	**1.8 Type of Facility**		**1.9 Status ***	**1.10 Special Programs***
❑ Government: Public/Autonomous ❑Private (Pls circle): ❑ For profit ❑ Not for profit ❑ NGO ❑ Other ❑ Public Private Partnership	❑ Hospital ❑Clinic ❑Diagnostic Centre ❑DIC ❑Blood Bank ❑Delivery Centre ❑EPI ❑Pharmacy (Pls circle):	❑ Doctor's Chamber (Pls circle): -Allopath -- Degree --No-Degree -Homeopath -- Degree --No-Degree -Unani/Ayurved -- Degree	❑ Operational ❑ Closed ❑ Licensed ❑ Pending licensing ❑ License suspended ❑ License cancelled ❑ Registered ❑ Pending registration	❑ UPHCSDP (if UPHCSDP select subtype*): -PHCC -CRHCC -PECC -VCCT -DOTS - EPI ❑ Govt. EPI (Organization Name)
1.7 Nature of Facility				

❑Static ❑Satellite (Pls circle): Fixed/Mobile	-Allopath -Homeopath -Unani/Ayurved - Blue Star ❑ Pharmacy attached -Select box ❑ Optical Shop ❑ Spiritual ❑ Others:	--No-Degree -Physiotherapy -- Degree --No-Degree -Dental -- Degree --No-Degree -Eye -- Degree --No-Degree	❑Not Registered	❑ Govt. TB/DOTS (NTP) (Organization Name) ❑ NHSDP (Organization Name) ❑ Manoshi (Organization Name) ❑ RCC (Organization Name) ❑ Modhumita (Organization Name) ❑ NMCP (Organization Name) ❑ Blue Star (Organization Name) ❑ Others (specify):

1.11 Types of Service*		**1.12 # of Beds**	**1.13 # of Staff**
❑Indoor ❑Outdoor ❑Outreach ❑Other:	- without surgery - with surgery	❑Not applicable ❑Maternity Bed:____ ❑General Bed: ____	Total- ❑ certified physicians- ❑ certified nurse-- ❑ certified midwives-- ❑ certified pharmacists-- ❑ non- physician clinicians[1]— ❑ Certified paramedics- ❑Other[2]

*** Multiple answers accepted**

[1]Non-physician clinicians: Lab technologists, medical/dental assistants, nurse attendants/aid, FWV, health assistant

[2]Village doctor (RMP), LMAF doctor, UBA, vaccinator, pharmacy owner, pharmacy assistant, CHWs (SS, SK)

<table>
<tr><td colspan="2">1.14 Facility Focus</td><td>1.16 Service pattern</td><td colspan="2">1.18 Hours of service - (approx.)*
Two additional Option</td></tr>
<tr><td>❑Sex*</td><td>❑ Male ❑ Transgender
❑ Female ❑ All</td><td rowspan="4">❑Weekly
❑Monthly</td><td>General/Indoor</td><td>Outdoor</td></tr>
<tr><td>❑Age*</td><td>❑Neonate (0-28days)
❑Infant (29 days-11months)
❑Children (1-under5)
❑Children (5-under 10)
❑Adolescents and teen (10-under 18)
❑Adults and middle aged (18 – 49)
❑Elderly (>50)</td><td>❑ 24 hours
❑ ____ am/pm to ____ am/pm.
❑____ am/pm to ____ am/pm</td><td>❑ 24 hours
❑____ am/pm to ____ am/pm.
❑____ am/pm to ____ am/pm</td></tr>
<tr><td>❑Population*</td><td>❑Pregnant Women and mother in postnatal period (40 days after delivery)
❑Children
❑MSM
❑FSW
❑IDU
❑Street Children
❑Transgender
❑Other-</td><td colspan="2">1.17 Days of Service*</td><td>1.19 Doctor Availability*</td></tr>
<tr><td>❑Service*</td><td>❑ Drug Rehabilitation
❑Eye
❑Infectious disease
❑ Kidney
❑Mental Health
❑Other-</td><td colspan="2">❑ All week
❑Su ❑M ❑Tu ❑W
❑Th ❑F ❑Sa
❑Variable</td><td>❑ 24 hours
❑____ am/pm to ____ am/pm
❑____ am/pm to ____ am/pm</td></tr>
<tr><td colspan="3">1.20 Specialists (ask number)*</td><td colspan="2"></td></tr>
</table>

❑Anesthsiologist- ❑Cardiologist- ❑Dermatologist- ❑Endocrinologist- ❑Gastroenterologist- ❑General Surgeon- ❑Gyn&Obs- ❑Hepatologist- ❑Oncologist- ❑Pediatrician-	❑Pulmonologist- ❑Nephrologists- ❑Neurologist- ❑Radiologist- ❑Rheumatologist- ❑Ophthalmologist- ❑Orthopedist- ❑ Internal Med- ❑Sonologist- ❑Urologist- ❑Otolaryngologist/ENT-	❑ Plastic surgeon ❑ Neuron surgeon ❑ Physiotherapist ❑ Hematologist ❑ Pediatric Surgeon ❑ Cardiothoracic Surgery/Chest Surgery ❑ Pediatric psychologist ❑ Clinical psychologist ❑ Nutritionist/dietician ❑ Pediatric cardiologist ❑ Psychologist ❑ Embryologist	❑ Neonatologist ❑Others (specify)-

*** Multiple answers accepted**

2. Service Provision*

2.1 List the available facility services in the table below:

Service Name			❑ In Patient departments*	❑ Out-patient departments*
❑Diagnostic	❑ Biochemical	❑Random blood sugar	❑ Anesthesiology ❑ Cardiology ❑ Colorectal Surgery ❑ Dental ❑ Dermatology/skin ❑ Diagnostic	❑ Neurology ❑ Neurosurgery ❑ Obstetrics and Gynae ❑ Oncology ❑ Ophthalmology
	❑ Radiology	❑X-ray chest ❑X-ray Dental ❑MRI ❑CT scan ❑USG		

Service Name			❑ In Patient departments*	❑ Out-patient departments*
	❑ Cytology/pathology	❑Blood CBC ❑Urine RME ❑Stool RME	radiology ❑ Dialysis Unit ❑ Endocrinology ❑ Geriatric Medicine ❑ Gastroenterology & Hepatology ❑ Haematology ❑ Infectious disease ❑ Internal Medicine ❑ Nephrology	(eye) ❑ Orthopedic Surgery ❑ Otolaryngology (ENT) ❑ Pathology ❑ Pediatrics ❑ Pediatric Surgery ❑ Physiotherapy ❑ Psychiatry/Mental Health ❑ Rehabilitation Medicine ❑ Renal Medicine ❑ Respiratory Medicine ❑ Rheumatology ❑ Urology ❑ No department
❑Surgery	❑Major	❑General ❑Laparoscopic ❑CS		
	❑Minor ❑Dental	❑Abscess drainage ❑D&C ❑MR		
❑Emergency & Critical care	❑ First Aid & Casualty			
	❑ EmOC ❑ CEmOC	❑ Treatment for Sepsis ❑Eclampsia ❑ Prolong or Obstructed labor Removal of retained products following miscarriage or abortion ❑ Manual removal of the placenta ❑ Assisted delivery using suction ❑ New born care and resuscitation ❑ C-section ❑ Anesthesia ❑ Safe blood transfusion		
	❑CCU ❑ICU ❑NICU ❑Burn unit ❑Ambulance service			
❑Blood Transfusion	❑ Yes ❑ No			
❑ Maternal Health	❑NVD			
❑Pharmacy/sell med	❑ Yes ❑ No			
❑Diabetes	❑ Yes ❑ No			

Service Name		❑ In Patient departments*	❑ Out-patient departments*
❑Arthritis	❑ Yes ❑ No		
❑Immunization	❑EPI ❑ Additional Vaccines		
❑Laser and cosmetic services	❑ Yes ❑ No		
❑Health Education	❑Maternal ❑FP ❑Adolescent ❑ Elderly ❑ SRH❑ others		
❑Blue Star Service	❑ Short acting methods including SOMAJECT ❑Refer clients for long acting contraceptives ❑Provide counseling, identify and refer suspected TB patients		

*** Multiple answers accepted**

2.2 Cost of services (in BDT)

Service Name	**Service cost in BDT**	**Guide for service cost**
Diagnostics		
BP measurement		**For pharmacies and chambers only**
Blood grouping		
Random blood sugar		
Blood routine examination		
Urine routine examination		
USG (pregnancy profile)		
USG (whole abdomen)		

Chest X-ray P/A view		
ECG		
Management		
C-section	❑ package ❑single	Non AC room fee
NVD	❑ package ❑single	
Blood transfusion		
Hospital/clinic registration	-1st shift -2nd shift:	
Consultation fee	-Min: -Max:	If provider's charge separately for visits like in private chamber or visit fee in outpatient department

3. Provision for the poor *

3.1 Special arrangement for poor patients: ❑ Yes ❑ No

3.2 If yes select*:

❑Discounted medicine
❑Free beds
❑Free clinic day
❑Subsidy for services
❑Health Cards (red, blue, green, health benefit, family health cards etc.)
❑UPPR card

Observation note

- Include: specific time surge (patient flow), Privacy during consultation and medical check-up, kind of people going there for treatment (male/female, children/adults/elderly). Note down if the informant was hostile or friendly for later reference.

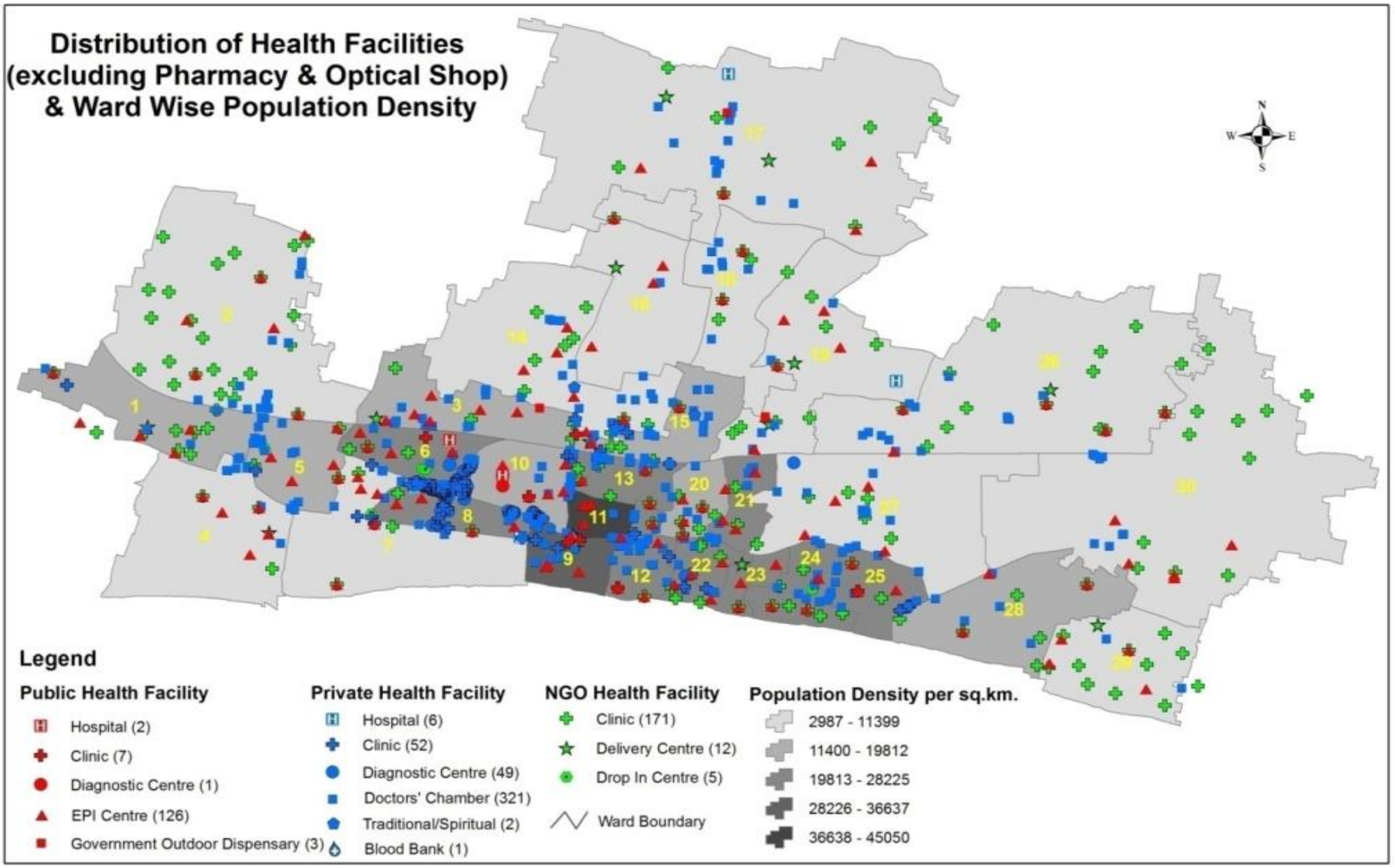
- Any other incidental observation during field stay

*** Multiple answers accepted**

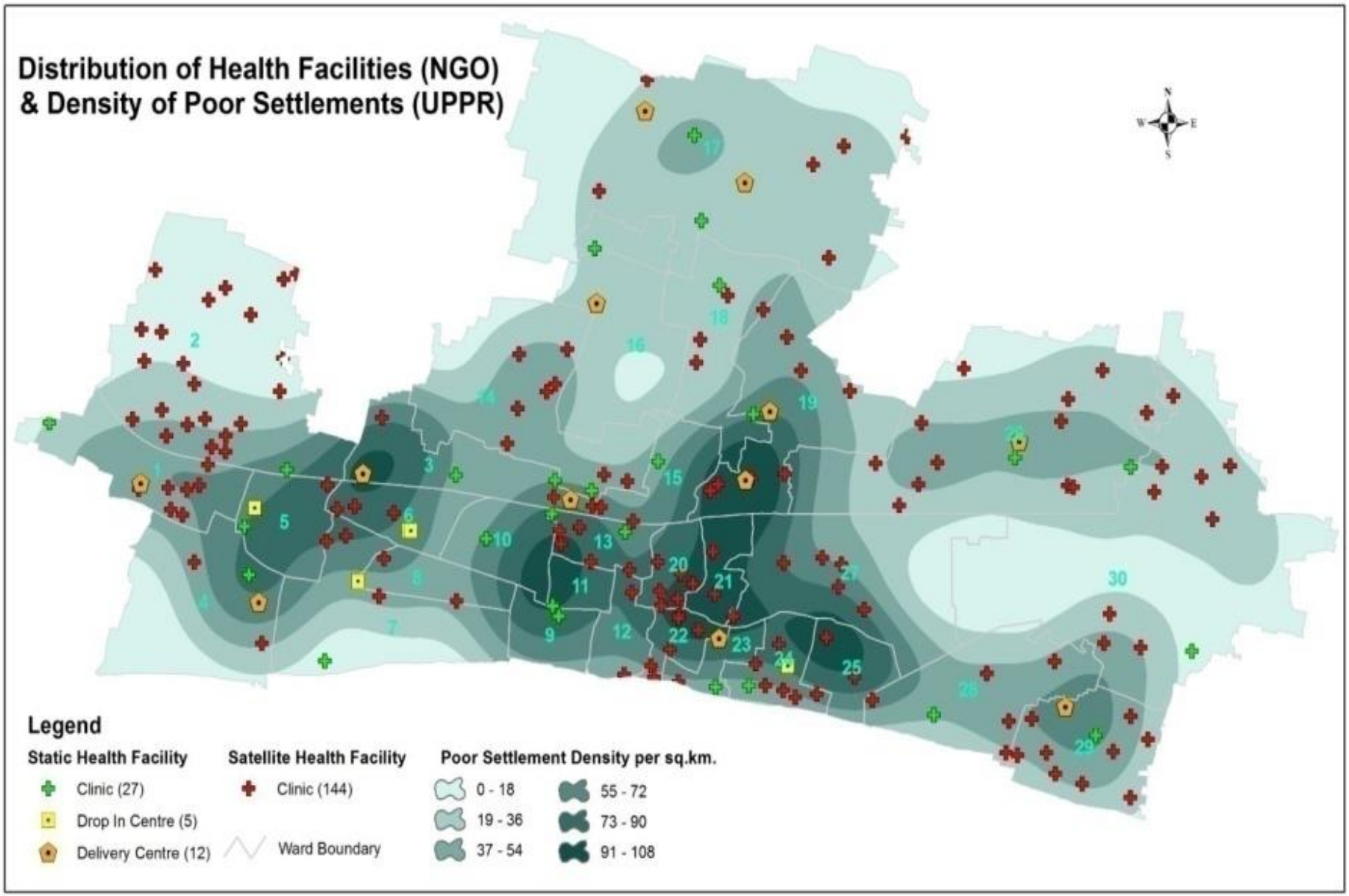
Note: If the survey was ❑Incomplete ❑Not done (**write down the reason and how many visits were made to the facility**):

Date of Data Entry: **Data Entry Operator Name:**

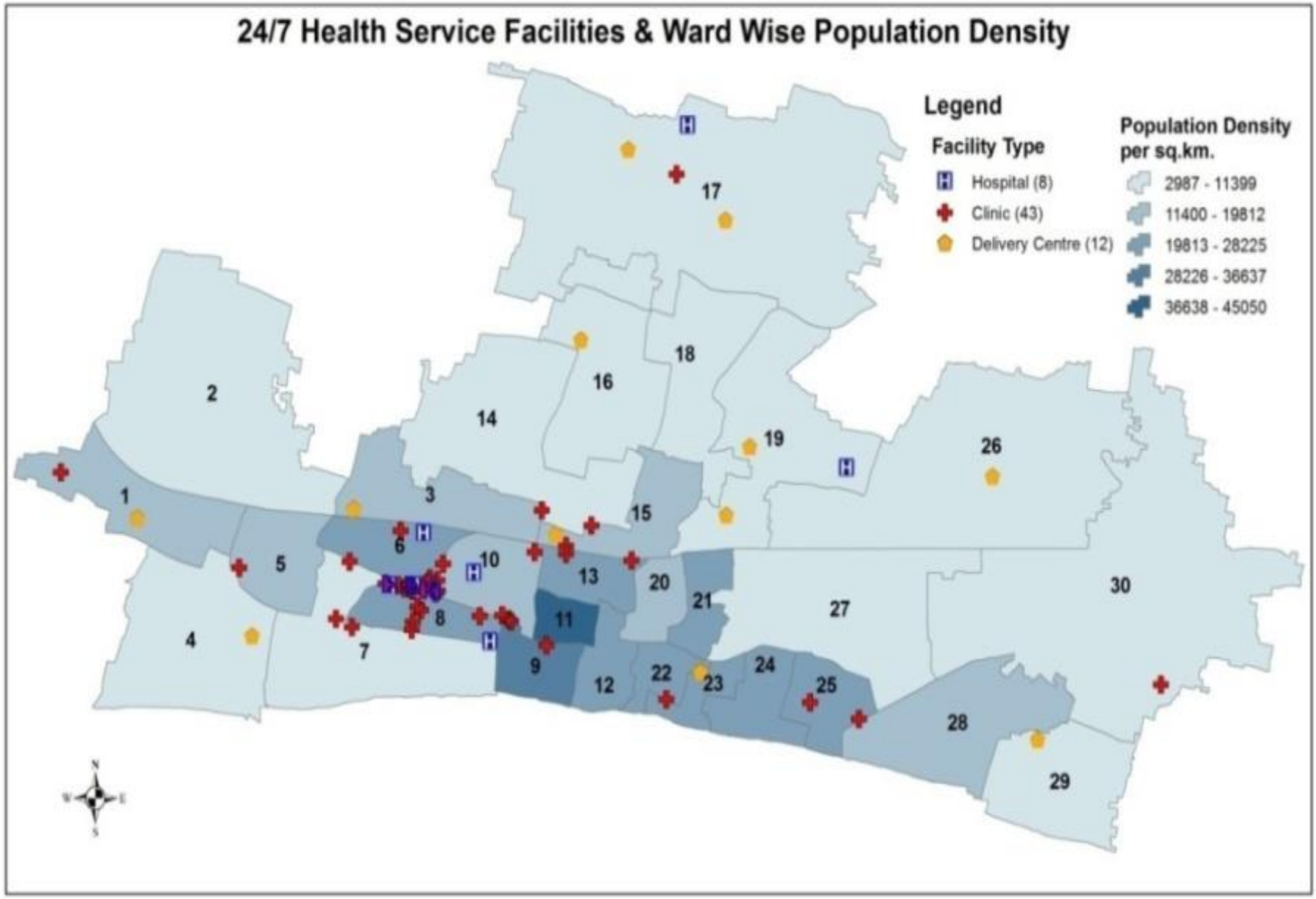
Annex 2 Health facility distribution in relation to ward population density per km^2



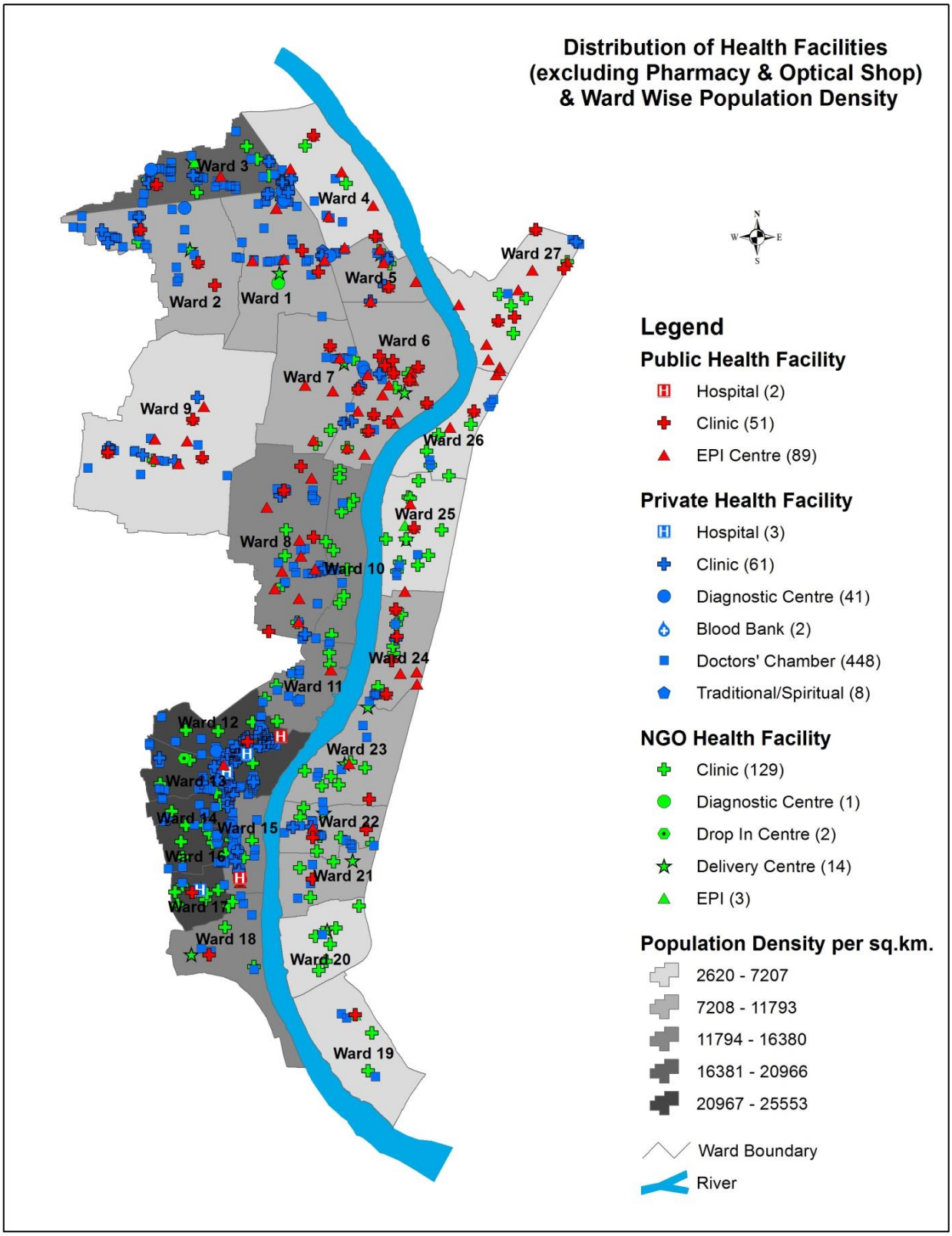
Annex 3 Distribution of health facilities in relation to density of poor settlements in RCC



Annex 4 Distribution and type of health facilities offering 24/7 services in RCC



Annex 5 Ward wise distribution of health facilities and population density in NCC



Annex 6 24/7 availability of health service facilities and population density in NCC