Summer Internship Report

At

IQVIA

(22nd April – 21stJune, 2023)

A Report

By

Dr. Vaibhav Sethi

(PG/23/125)

PGDHM (Hospital and Health Management)

2023-25

ON

Study of Post-Pandemic Health System of Delhi for Better Healthcare Delivery

IIHMR DELHI

International Institute of Health Management Research, New Delhi

IQVIA

21st June 2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr Vaibhav Sethi** was associated with **IQVIA Consulting and Information Services India Private Limited ("IQVIA")** on the **Study of the Post-Pandemic Health System of Delhi for better Healthcare Delivery** as a part of the curriculum during the period from **22nd April 2024** till **21st June 2024**

This certificate is being issued to recognize successful completion of his internship.

For IQVIA Consulting and Information Services India Pvt. Ltd

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VARINDRA
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Varindra B
Director - Human Resources, South Asia

Certificate of Approval

The Summer Internship Project of titled "**Study of Post-Pandemic Health System of Delhi for Better Healthcare Delivery**" **at IQVIA, New Delhi** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed, or conclusion drawn therein but approve the report only for the purpose it is submitted.
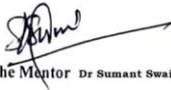
Name of the Mentor *Dr Sumant Swain, M Phil, Ph. D*

Designation *Assistant Professor*

IIHMR, Delhi

Feedback (Organization Supervisor)

Name of the Student: Dr. Vaibhav Sethi

Summer Internship Institution: IQVIA, Delhi

Area of Summer Internship: Healthcare System Strengthening

Attendance: Regular

Objectives met: Yes, all assigned objectives were met.

Deliverables: Vaibhav supported the team on the Biomedical Equipment Survey project by analysing human resource availability against IPHS standards. The exercise was performed efficiently within the given timeframe.

Strengths: Vaibhav proactively seeks feedback and is always eager to learn more. He effectively led all tasks assigned to the group and actively managed group activities.

Suggestions for Improvement: Students should work on report writing skills.

Wishing him all the best for future.

Vaishali Talani
Signature of the Officer-in-Charge
(Internship)
Date: 14ᵗʰ June 2024
Place: New Delhi

ACKNOWLEDGEMENT

The past two months has been incredibly intense and full of experience, and reflecting on this I would like to extend my gratitude to the people who have guided me to end up with this completion day. This internship would not have been possible without the contribution of the following people.

First, I would like to express my gratitude towards IIHMR DELHI for providing me with the opportunity to work with IQVIA and my mentor **Dr. Sumant Swain** for incessantly guiding me.

I extend my sincere thanks to **Mr. Kapil Dev Singh,** and **Mr. Chandan Nagasuri, Mrs. Vaishali Talani,** my managers and mentors, whose unwavering guidance and support throughout the internship have been instrumental in shaping my understanding of the Digital Health landscape. Their expertise and encouragement not only facilitated my learning but also helped me contribute meaningfully to the ongoing projects and have been instrumental in my development as a budding professional.

Their collaborative spirit, patience, and willingness to involve me in meaningful projects have truly made a difference in my learning experience. I am grateful for their trust and the opportunities they provided me to contribute to the team's objectives. The positive work environment fostered a sense of belonging and made every day an enjoyable and productive one.

I would also like to extend my appreciation to my fellow interns, with whom I had the pleasure of collaborating. Their enthusiasm and dedication made the internship experience even more enjoyable, and I am thankful for the knowledge exchange we had.

I cannot forget to mention the support and encouragement from my friends and family during this internship. Their unwavering belief in my abilities provided me with the motivation to push myself beyond boundaries and make the most out of this opportunity.

I look forward to utilizing this experience as a foundation for my future endeavours in the field of digital health and public health.

Thank you

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List of Abbreviations

COVID-19	Coronavirus Disease 2019
NCDs	Non-Communicable Diseases
WHO	World Health Organisation
UNICEF	United Nations International Emergency Funds
CDC	Centre for Disease Control and Prevention
AIIMS	All India Institute of Medical Sciences
ICU	Intensive Care Unit
PPE	Personal Protective Equipment
ICMR	Indian Council of Medical Research
MOHFW	Ministry of Health and Family Welfare
NGOs	Non-Governmental Organizations
PPP	Public-Private Partnership
HER	Electronic Health Record
EMS	Emergency Medical Services
PHC	Primary Health Care
HCWs	Health Care Workers
LMICs	Low- and Middle-Income Countries
HIS	Health Information System
CSR	Corporate Social Responsibility

OBSERVATIONAL LEARNINGS

Introduction

IQVIA is a leading, current provider of advanced analytics, technology solutions, and clinical research services to the life sciences industry, making it possible for the industry to realize an intelligent connection pertaining to all things across healthcare life using great analytics, transformative technology, big data resources, and deep domain expertise. IQVIA Connected Intelligence delivers powerful insights with speed and agility to our customers, who are developing and commercializing innovative medical treatments that improve the healthcare outcomes for patients. IQVIA employees number about 86,000 and work in more than 100 countries.

IQVIA is the global leader in protecting the privacy of the individual patient. The company ensures patient privacy through a variety of technologies and protections for enhancing the privacy of patient information in creation and analysis at a scale fitting for health stakeholders to determine disease patterns and correlations with an exact treatment path and therapies that will lead to better results. IQVIA's commercial fallouts and executive performance allow biotechnology, medical appliance, and pharmaceutical companies, medical researchers, government agencies, payers, and other healthcare stakeholders to process a more profound understanding of diseases, human behaviors, and scientific advances into their travels toward cures..

IQVIA MISSSION

IQVIA imagine a world where advances in data science and human ingenuity come together to provide creative solutions to improve human health. This is our vision. Where every challenge is seen as an opportunity to make a meaningful impact for customers, for patients,for people. Discover a career with purpose and help create a healthier world.

IQVIA VALUES

- Creativity
- Teamwork
- Innovation

IQVIA possesses extensive proficiency in delivering advisory services to governments, international non-governmental organizations (NGOs), and multidimensional funding agencies in emerging markets. Their comprehensive

capabilities encompass strategic guidance, program management, national health surveys, commodity assessment and mapping, procurement and supply chain evaluation, in-country development, monitoring and evaluation, assessment of pharmaceutical markets, engagement with the private sector, ensuring access to medicines, policy and regulatory analysis, and health data analytics across different geographies.

The International Finance Corporation (IFC), a member of the World Bank Group, has engaged IQVIA to conduct a comprehensive market study and landscape assessment of the pharmaceutical market in Armenia to enhance their export readiness for pharmaceutical products in various international markets.

Mode of data collection

The data collection process involved utilizing secondary research techniques like conductingdesktop analysis, consulting public domain current reports, examining published articles and research papers, extracting data from reliable government websites, and gathering information from relevant platforms.

Learnings

During my internship at IQVIA Consulting, I had the opportunity to work on multiple projects-

- Market intelligence consultancy for the Armenian pharmaceutical sector
- SNCU and Human Resource Mapping for Jharkhand ,Maharastra ,UP and Bihar

Role in IQVIA

- Desktop research and assessment of documents available on government websites andother public domains
- Proposal and report writing
- Support in stakeholder consultations

Conclusive Learnings

- Professional presentation

- Proposal writing

- Report Making

- Maintaining work-life balance

- Coordination among team members for the timely achievement of goals

- Communication skills

- Exposure to the corporate world

- Time management
- Handling work pressure
- Attending given deadlines

- Making new connections with our colleagues

- Engaging with people from varied areas of experience and expertise

Limitations

Varying time zones have hindered the availability of stakeholders for meetings, makingscheduling and coordination more difficult.
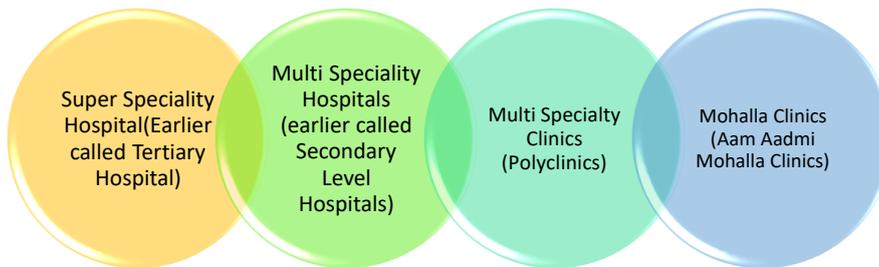
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Study of Post-Pandemic Health System of Delhi for Better Healthcare Delivery

"One of the Sustainable Development Goals is "ensuring healthy lives and promoting well-being for all." The Government of the National Capital Territory of Delhi is working hard to meet the targets under the SDGs that are related to health indicators.

A fundamental human right, health is something that all citizens, regardless of wealth, social class, or geographic location, must have access to from the government. There are numerous urgent issues facing Delhi's urban health system. First and foremost, the state government is in charge of organizing and carrying out the provision of health services in the National Capital Territory, which includes the entire National Capital Region (NCR) and the surrounding states, in excess of the population of those in need. Second, there is often overlap in the acts that result from the current rules and regulations.

Delhi Healthcare Delivery System (re-organized in July 2015)

Super Speciality Hospital(Earlier called Tertiary Hospital)

Multi Speciality Hospitals (earlier called Secondary Level Hospitals)

Multi Specialty Clinics (Polyclinics)

Mohalla Clinics (Aam Aadmi Mohalla Clinics)

Source: Health & Family Welfare Department, GNCTD

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Notwithstanding the deaths from COVID-19, Delhi's population at the end of 2021 was 31,181,000, up 2.94% from 2020. Delhi's population has increased dramatically as a result of people moving there in search of better healthcare facilities. The capital is home to some of the best hospitals in the world, including Safdarjung Hospital and AIIMS. This massive rise made the inadequate health infrastructure that was in place clear and allowed for new changes.

The healthcare industry is changing quickly, which means that infrastructure, services, and standards need to be continuously improved. Global governments are facing previously unheard-of difficulties as a result of the COVID-19 pandemic, which has had a significant impact on public health protocols, economic resilience, and governance. Gaining an understanding of these effects is essential for developing health systems and future policy.

Rationale

Delhi, the capital territory of India, faced unique challenges during the pandemic due to its dense population, significant economic activity, and complex governance structures. The impact of the pandemic on governance, public health measures, and economic resilience in Delhi offers valuable insights into the broader context of crisis response and health system transformation.

The pandemic exposed weaknesses in governance structures, including coordination between different administrative bodies and levels of government. Delhi's response to the crisis was marked by tensions between the local government, led by the Chief Minister, and the central government, which controls key resources and agencies such as healthcare infrastructure and law enforcement.

This study is conducted with the intent to find whether the lessons learned from the pandemic have catalysed transformations in Delhi's health system. These include investments in healthcare infrastructure, expansion of testing and vaccination capacity, improvements in data collection and analysis, and reforms to enhance healthcare accessibility and affordability, particularly for marginalized communities.

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Objectives

The objectives of the study are mentioned below:

➢ To assess the existing infrastructure, facilities, and services of Delhi in the healthcare sector.

➢ To Identify key areas of improvement for better healthcare delivery and health outcomes

➢ Suggest Recommendations for improvements.

Methodology

This research employed a secondary data analysis. Searched academic databases like Google Scholar and ScienceDirect for peer-reviewed journal articles published within the last five years that addressed Post-Pandemic Restructuring of Delhi's Health Infrastructure.

The keywords used for the literature search like Mohalla Clinics, Health Infrastructure, Nurse: Patient Ratio, Doctor: Patient Ratio, Ambulance Response time, Ambulance Services and Bed Capacity.

Commented [SS1]: Key words added

Data Sources

- **Delhi Health Department:** https://health.delhi.gov.in/ This website contain reports, press releases, or data dashboards related to the pandemic response and healthcare infrastructure development.
- **Delhi State Health Mission:** https://dshm.delhi.gov.in/ This website had information on healthcare initiatives undertaken during and after the pandemic.
- **National Health Mission (India):** https://www.nhm.gov.in/ Since Delhi falls under the National Health Mission's ambit, found relevant data on national health policies and their impact on Delhi.

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Need for Analysis of Post-Pandemic Restructuring of Delhi's Health Infrastructure

The COVID-19 pandemic exposed vulnerabilities in healthcare systems worldwide, and Delhi was no exception. The city faced immense pressure on its hospitals, testing facilities, and medical personnel. A post-pandemic analysis of Delhi's health infrastructure is crucial for several reasons:

- **Identifying Strengths and Weaknesses:** The pandemic highlighted areas where the system excelled, such as rapid response capabilities or specific treatment protocols. However, it also exposed weaknesses, like inadequate capacity for infectious diseases, shortages of critical care beds and equipment, or gaps in communication and coordination. A thorough analysis will pinpoint these areas for improvement.
- **Prioritizing Investments:** Limited resources necessitate strategic decision-making. Analysis will help identify which areas require the most urgent investment. Should it be expanding hospital bed capacity, strengthening primary healthcare, or investing in telemedicine infrastructure? Data-driven analysis will guide efficient resource allocation.
- **Building Resilience for Future Threats:** Pandemics are not the only public health threats we face. Delhi's health infrastructure needs to be adaptable to handle various emergencies, including outbreaks of new infectious diseases, natural disasters, or even bioterrorism threats. Analysis can help identify ways to build a more robust and resilient system.
- **Improving Public Health Outcomes:** Ultimately, the goal is to improve the health and well-being of Delhi's residents. Analysing the pandemic's impact on various health indicators, such as mortality rates, communicable disease prevalence, or access to preventive care, will reveal areas where improvements are needed.
- **informing Policy Decisions:** Policymakers require data-driven insights to make informed decisions about healthcare resource allocation, infrastructure development, and public health interventions. An analysis will provide the foundation for developing evidence-based policies to strengthen Delhi's health system.

By analysing Delhi's health infrastructure in the post-pandemic context, the city can learn valuable lessons, prioritize investments, and build a more robust and responsive healthcare system prepared to face future challenges.

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Comparative Analysis

Area studied and discussed are:

HEALTH INFRASTRUCTURE FACILITIES IN DELHI	BEDS IN MEDICAL INSTITUTIONS & BED POPULATION RATIO IN DELHI	PER CAPITA EXPENDITURE ON HEALTH BY GNCTD
EXPENDITURE ON HEALTH WITH REFERENCE TO GSDP	SCHEME/ PROGRAMME/PROJECT EXPENDITURE UNDER HEALTH AND FAMILY WELFARE BY DELHI GOVT.	Ambulance Services
Doctor Availability	Nurse Availability	

The state of the people's health in Delhi, the National Capital Territory, has improved significantly. Delhi has come a long way in building stable health facilities in vibrant settings. One of the Sustainable Development Goals is "icing healthy living and promoting well-being for people of all periods," and the Government of the National Capital Territory of Delhi is constantly working to fulfill the objectives under the SDGs pertaining to health. When it comes to the advancement of health care, the public capital has led the way. Health care services, ranging from basic to advanced, are provided by public, private, and nonprofit organizations. The COVID-19 pandemic's critical phase has been overcome thanks to the coordinated operation of health services.

The government of the National Capital Territory of Delhi provided preventive, promotive, and restorative health care services to the people of Delhi through 38 Mult speciality and super specialty hospitals, 167 allopathic drugstores, 58 seed primary urban health centres, 517 Aam

Aadmi Mohalla clinics, 30 polyclinics, 49 Ayurvedic drugstores, 22 Unani drugstores, 108 homeopathic drugstores, and 50 school health conventions as of March 31, 2022.

Besides robust individual installations, the Health & Family Welfare Department of the GNCTD is making all possible efforts to build the primary and secondary healthcare system well by opening new Aam Admi Mohalla Clinics and Polyclinics. Efforts are being made to revamp and revive the Delhi Government Hospitals by increasing the functioning and availability of vacant beds. All Delhi residents will be given free individual radiological services at expelled DGEHS centers like MRIs, CT Scans, PETCTs, TMT Echoes, etc., on prescription from the public health facilities of the Delhi government. The government has also introduced the Free Surgery Scheme on surgeries performed on referral from Delhi Government Hospitals at DGEHS-expelled private hospitals. The services will be available in specified hospitals across Delhi Government Hospitals under the domain of public-private partnership. The Directorate General of Health Services is under the Health & Family Welfare Department of government in the National Capital Territory of Delhi, dealing with governmental and non-governmental organizations on better health care services to the people residing in Delhi.

As of 31st March 2022, the Government of NCT of Delhi is providing primary health care services and has 995 pharmacies, which will be approximately 61% of total number of pharmacies, which comes to be 1621.

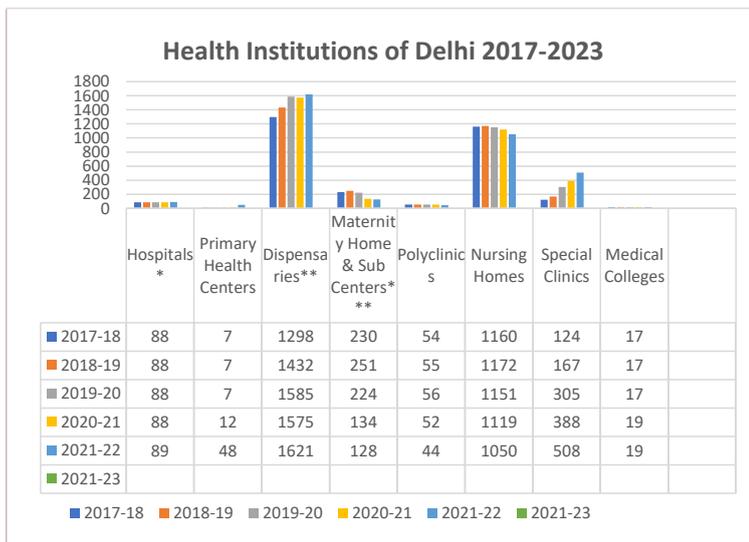**Table 1: Health Facilities added Per Year 2014-2022**

Health Institutions	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Hospitals	95	95	94	83	88	88	88	88	89
PHC	5	2	5	7	7	7	7	12	48
Dispensaries	1451	1389	1507	1240	1298	1432	1585	1575	1621
Maternity home and sub-centres	267	267	265	193	230	251	224	134	128
Polyclinics	19	19	42	48	54	55	56	52	44

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Nursing homes	855	973	1057	1057	1160	1172	1151	1119	1050
Special clinics	27	27	27	14	124	167	305	3888	508
Medical colleges	16	16	17	17	17	17	17	19	19
Total	**2375**	**2788**	**3014**	**2659**	**2978**	**3189**	**3433**	**3387**	**3507**

Source : Directorate of Health Services, GNCTD.

Figure 1: Health Institutions of Delhi from 2017-18 to 2021-23

Health Institutions of Delhi 2017-2023

	Hospitals*	Primary Health Centers	Dispensaries**	Maternity Home & Sub Centers***	Polyclinics	Nursing Homes	Special Clinics	Medical Colleges
2017-18	88	7	1298	230	54	1160	124	17
2018-19	88	7	1432	251	55	1172	167	17
2019-20	88	7	1585	224	56	1151	305	17
2020-21	88	12	1575	134	52	1119	388	19
2021-22	89	48	1621	128	44	1050	508	19
2021-23								

■ 2017-18 ■ 2018-19 ■ 2019-20 ■ 2020-21 ■ 2021-22 ■ 2021-23

Source : Directorate of Health Services, GNCTD.

As can be seen from the image above, Delhi has more medical facilities now—3507 as opposed to 3387 in 2020–21—in 2021–2022. The slow rate of expansion of new health facilities can be attributed to a variety of factors, including a lack of land, a labor shortage, the proliferation of agencies, etc. Furthermore, all Delhi hospitals, particularly the larger ones, deal with a high patient volume.

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Growth in Bed Capacity: WHO recommends a bed population ratio of 5 beds for every 1,000 people. Nonetheless, Delhi's bed-to-population ratio for 2021–2022 stayed at 2.89, significantly below the WHO standard. Data on the increase in the population and number of beds in medical facilities

Table 2: Beds Per 1000 Population 2016-2022

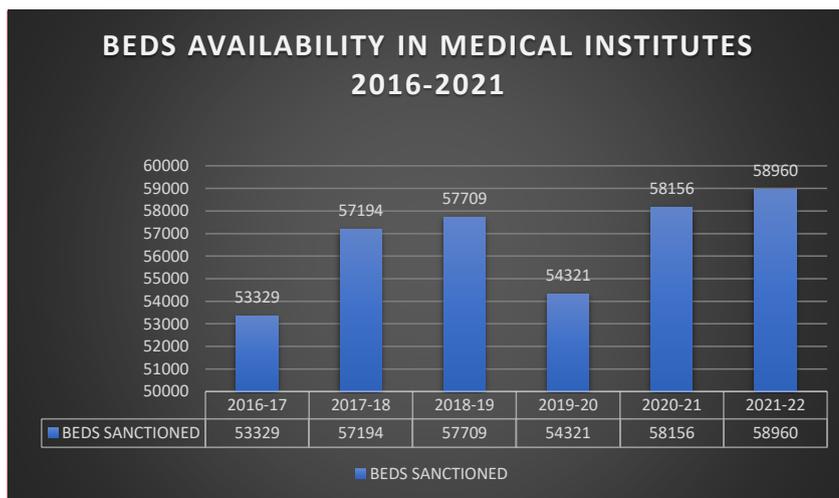| Year	Beds sanctioned	Beds per 1000
2016-2017	53329	2.86
2017-2018	57194	2.99
2018-2019	57709	2.96
2019-2020	54321	2.74
2020-2021	58159	2.88
2021-2022	58960	2.89

Source: data on Health Services Gov of Delhi

Figure 2: Beds Per 1000 Population 2016-2022
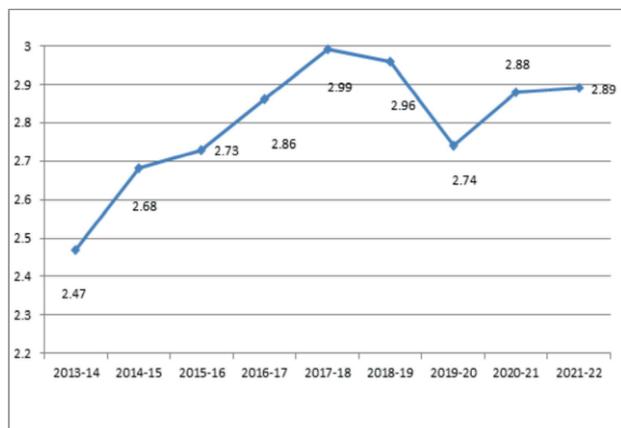
Source: data on Health Services Gov of Delhi

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Figure 3: **BEDS AVAILABILITY IN MEDICAL INSTITUTES 2016-2021**

*Source: data on Health Services Gov of Delhi*

As on 31.03.2021, the availability of beds in 1163 Government and Private Medical Institutions & Hospitals in Delhi was 58960, which has in NCR increased from the 58156 beds available at the end of the Financial Year 2021–2022. B eds authorized in Delhi Government hospitals and institutions have increased hugely from 12543 in 2020–21 to 14244 in 2021–22. The beds in medical institutions, which are run by the Delhi government, the Indian government, and local bodies, accounted for 24.2 percent, 22.6 percent, and 6.5 percent, respectively, and the beds in private, hospitals care facilities, and voluntary organizations were 46.7 percent. In addition to new schemes and projects, the government of Delhi has also commenced the upgradation process of existing hospitals and the space for more beds in the light of the sanctioned FAR.

Table 3: Expenditure on Health Schemes as Part of Total Expense on Other Schemes(in cr)

Year	Total Expenditure on Schemes and Projects in cr	Total Expenditure on Schemes and Projects related to Health in cr	% Expenditure
2012-2013	13237	1522	11.5
2013-2014	13964	1600	11.4
2014-2015	13979	2137	15.29
2015-2016	14960	1999	13.37
2016-2017	14355	2074	14.45
2017-2018	14400	1906	13.24
2018-2019	15762	2325	14.8
2019-2020	20307	2357	11.6
2020-2021	19258	3000	15.55
2021-2022	30530	4938	16.1

Source: Schemes/Programmes/Projects wise expenditure document GNTCD

Figure 4: Scheme/Project wise expenditure on Health by Delhi Government

Scheme/Project wise expenditure on Health by Delhi Government
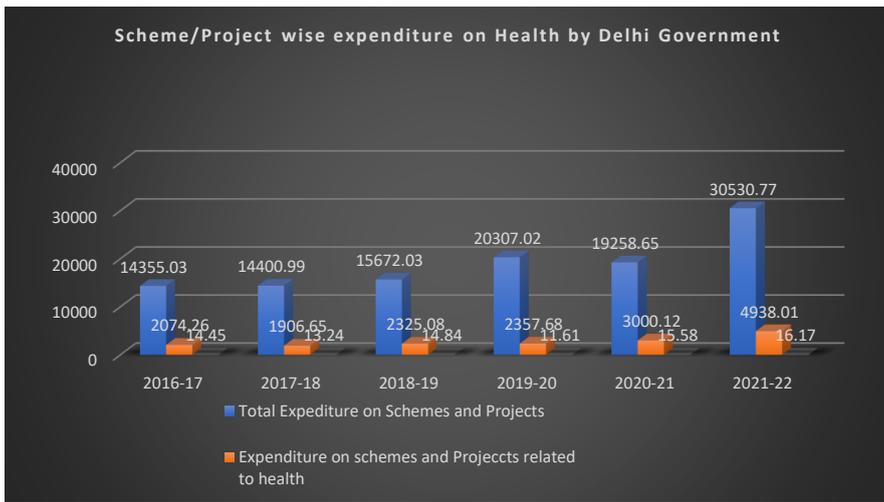
Delhi's government revamped up its health spending big time over a decade. From 2012–13 to 2021–22, cash for Health & Family Welfare schemes shot up from 1522.18 crore to a whopping 4938.01 crore. That's not all - it grabbed a bigger slice of the pie too. The chunk of total project and program money going to health jumped from 11.50% to 16.17%.

Table 4: Expenditure On Health Per Capita by Delhi Government

Year	Expenditure on Health Per Capita
2012-2013	1572
2013-2014	1675
2014-2015	1996
2015-2016	1962
2016-2017	2133
2017-2018	2455
2018-2019	2795
2019-2020	2867
2020-2021	3133
2021-2022	5022

Source : Annual Financial Statements of GNCTD and Population projections by MoSPI

Figure 5: **Per Capita Expenditure on Health by GNCTD**
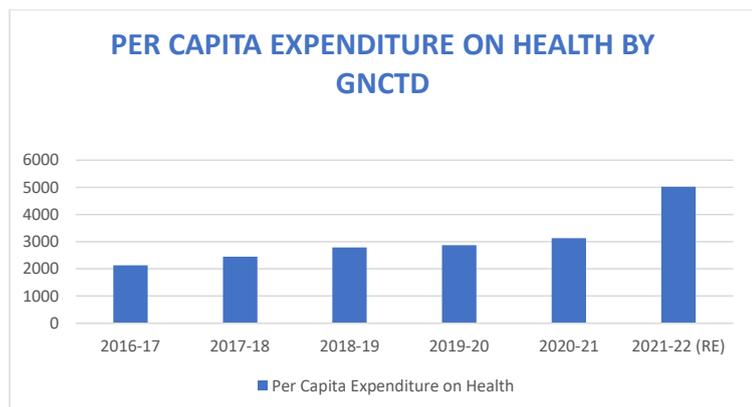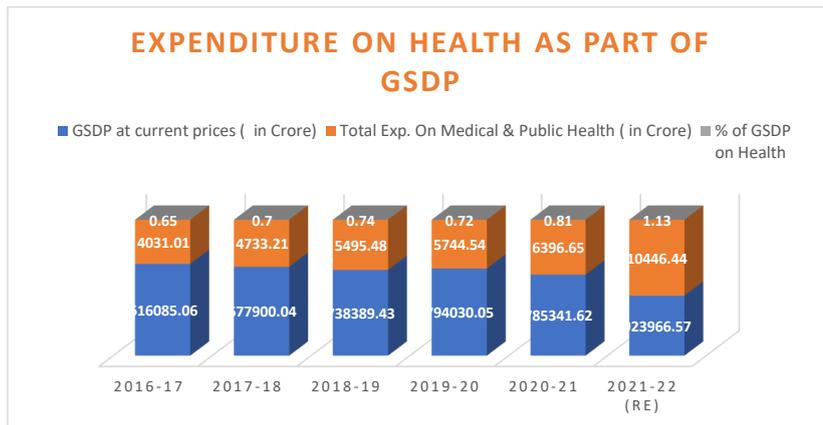

PER CAPITA EXPENDITURE ON HEALTH BY GNCTD

Source: Annual Financial Statements of GNCTD and Population projections by MoSPI

Table 5: Expenditure on Health as part of GSDP

YEAR	GSDP in cr	Total Expense on public health in cr	% of GSDP on health
2012-2013	391387	2734	0.70
2013-2014	443959	2977	0.67
2014-2015	494803	3621	0.73
2015-2016	550803	3634	0.66
2016-2017	616085	4031	0.65
2017-2018	677900	4733	0.700
2018-2019	738389	5495	0.74
2019-2020	74030	5744	0.72
2020-2021	758341	6396	0.81
2021-2022	923966	10446	1.13

Source: Annual Financial Statements of GNCTD and GSDP by MoSPI

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Figure 6: **Expenditure on Health as part of GSDP**

EXPENDITURE ON HEALTH AS PART OF GSDP

■ GSDP at current prices (in Crore) ■ Total Exp. On Medical & Public Health (in Crore) ■ % of GSDP on Health

0.65	0.7	0.74	0.72	0.81	1.13
4031.01	4733.21	5495.48	5744.54	6396.65	10446.44
616085.06	677900.04	738389.43	794030.05	785341.62	923966.57

2016-17 2017-18 2018-19 2019-20 2020-21 2021-22 (RE)

1. The aforementioned data clearly shows that over the previous nine years, Delhi %Government's per capita spending on health and family welfare has increased more than three times, from 1573 in 2012–13 to 5022 in 2021–22.

2. Health and Family Welfare Expenditure in Relation to GSDP: The Health and Family Welfare Expenditure, when accounting for the costs incurred under the Government of Delhi's Establishment & Scheme/Programs, increased significantly to 1.13 percent in 2021–22 (RE) from 0.81% in 2020–21.

Pre-Pandemic Scenario (2019 and earlier):

1. Infrastructure: Delhi had a total of 44 government hospitals and 114 private hospitals, with a bed capacity of approximately 40,000.

2. Workforce: Delhi faced shortage of trained healthcare professionals, with a doctor-to-patient ratio of 1:1444 and a nurse-to-patient ratio of 1:633.

3. Equipment and Technology: Many government hospitals lacked modern medical equipment, and there was a shortage of ventilators, ICU beds, and diagnostic facilities.

4. Emergency Services: The city's emergency services were inadequate, with long response times and a lack of ambulances.

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Challenges Faced:

1. Overwhelming Demand: Sudden rise in Covid19 cases lead to shortages of beds, equipment, and staff.

2. Lack of Preparedness: The initial lack of preparedness and inadequate infrastructure led to delays in responding to the pandemic.

3. Staff Safety: Healthcare professionals faced risks of infection, and many contracted COVID-19 while on duty.

4. Despite the increase in bed capacity, many hospitals still face overcrowding and shortage of critical care beds.

5. The surge in demand for ambulance services has put a strain on resources, leading to occasional delays and unavailability.

6.The nursing staff continues to face high workload and burnout, despite the increase in numbers.

Responses Undertaken:

1. **Rapid Infrastructure Expansion**: The government rapidly expanded its healthcare infrastructure to cope with the surge in demand.

2. Staff Augmentation: The government recruited additional healthcare professionals to support the existing workforce.

3. **Equipment Procurement**: The government invested in modern medical equipment to enhance the city's healthcare capabilities.

4. Public-Private Partnerships: The government collaborated with private hospitals and healthcare providers to increase the city's healthcare capacity.

Post-Pandemic Scenario (2020 and later):

1. **Infrastructure:** The Delhi government rapidly expanded its healthcare infrastructure, setting up temporary hospitals, COVID-19 care centres, and quarantine facilities. The total bed capacity increased by 50%.

2. Workforce: The government recruited additional healthcare workforce, such as doctors, nurses, and paramedics, to cope up with the increasing demand.

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3. **Equipment and Technology:** The government invested in modern medical equipment, including ventilators, ICU beds, and diagnostic facilities, to enhance the city's healthcare capabilities.

4. Emergency Services: The emergency services were strengthened, with the introduction of a dedicated COVID-19 helpline and an increase in the number of ambulances.

Ambulance Services[1]

- **Number of ambulances: 2019** - 1,056.
- **Number of ambulances 2020-2021** - 1,432 (35.5% increase)
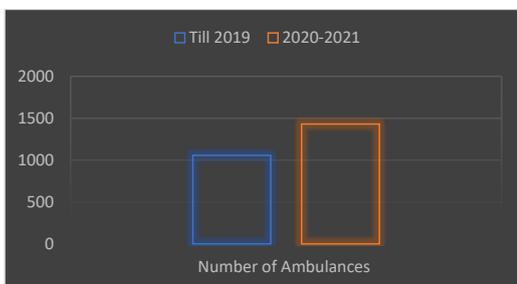
- **Average Ambulance response time: 2019** - 20 minutes.
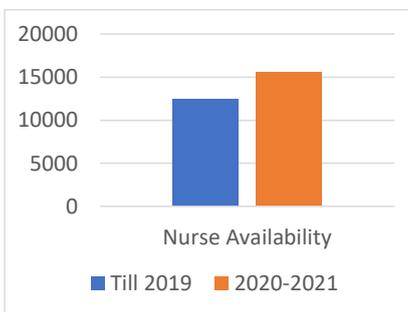- **Average Ambulance response time:2020-2021** - 15 minutes (25% improvement)

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1 **Delhi Health Department: https://health.delhi.gov.in/**

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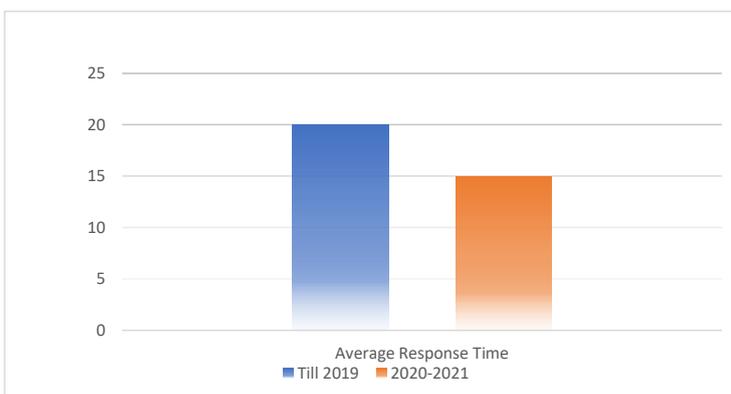
- **Ambulance availability: 2019** - 80%;
- **Ambulance availability :2020-2021** - 95% (17.5% improvement)

Nurse Availability[2]:

- **Number of nurses: 2019** - 12,456.
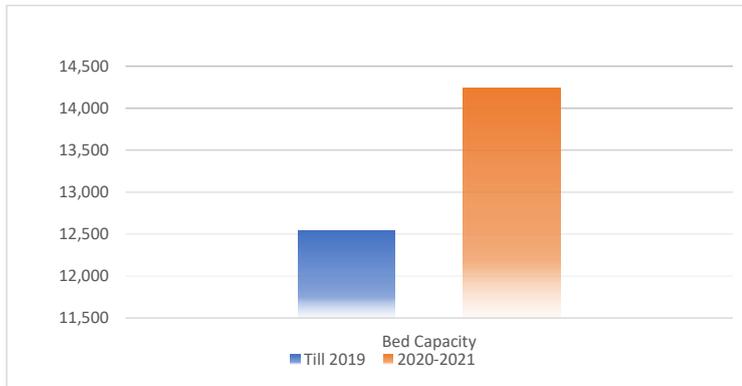- **Number of nurses: 2020-2021** - 15,612 (25.5% increase)

- **Nurse-to-patient ratio: 2019** - 1:10.
- **Nurse-to-patient ratio: 2020-2021** - 1:8 (20% improvement)

Hospital Availability & Bed Capacity:[3]

- **Bed capacity: 2019** - 12543
- **Bed capacity: 2020-2021** - 14244

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2   National Health Mission (India): https://www.nhm.gov.in/

3   National Health Mission (India): https://www.nhm.gov.in/

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- **Average doctor-to-patient ratio: 2019** - 1:1,445;
- **Average doctor-to-patient ratio: 2020-2021** – 1:1200

Improvements:

- **Increased bed capacity** and **doctor availability** have improved the overall healthcare infrastructure in Delhi.
- **Enhanced ambulance services** have reduced response times and improved availability, ensuring timely medical attention to patients.
- **The increase in nurse availability** has improved patient care and reduced the workload on existing nursing staff.

Lessons Learned:

1. Invest in Infrastructure: The pandemic highlighted the need for a robust and scalable healthcare infrastructure to respond to emergencies.

2. Develop Contingency Plans: The government should develop contingency plans to respond to future pandemics and emergencies.

3. Strengthen Emergency Services: The emergency services should be strengthened to respond quickly and effectively to emergencies.

4. Invest in Healthcare Workforce: The government should invest in the healthcare workforce, including training and capacity building, to ensure a sufficient supply of healthcare professionals.

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Discussion:

- The COVID-19 pandemic exposed the reality of Delhi's health infrastructure, highlighting the need for a strengthening it . In response, the Delhi government has adopted a restructuring initiative that includes expanding hospital bed capacity, improving access to critical care services, and improving the primary care system.

- While long-term effectiveness of the reforms is yet to be determined, but they hold the capability to enhance healthcare quality for all Delhi residents. The success of this restructuring effort is associated with several factors. First and foremost, the Delhi government's commitment is important. Regular monitoring and evaluation are crucial to ensure the reforms achieve their targeted goals. It's important to remember that this restructuring is an ongoing process. By continuously identifying and addressing the challenges that confront Delhi's health system, a more robust and resilient healthcare infrastructure can be established.

- This was made possible as shown by above results .Also by following recommendations it can lead to tremendous success in making Delhi No.1 state in terms of health infrastructure and healthcare service providing.

Conclusion

 Covid 19 has put immense pressure on the healthcare infrastructure of Delhi, exposing its weaknesses. This comparative analysis provides an insight of Delhi's healthcare infrastructure before and after the pandemic, highlighting the challenges faced, responses undertaken, and lessons learned.

Covid 19 brought unexpected challenges for the healthcare system in Delhi, forcing facilities to adapt and transform in order to meet the demand and supply gap. This report presents a comparative analysis of doctor, hospitals, ambulance services, and nurse availability in Delhi before and after the COVID-19 pandemic, highlighting the improvements and challenges faced by these facilities.

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Covid 19 brought challenges for the healthcare system in Delhi, but it has also accelerated the growth and development of healthcare facilities. While there have been notable improvements in doctor hospitals, ambulance services, and nurse availability, there are still challenges that need to be addressed. By continuing to invest in healthcare infrastructure and addressing the challenges faced by healthcare professionals, Delhi can emerge stronger and more resilient in the face of future healthcare crises.

Recommendations:

- **Sustain Infrastructure Expansion:** The government should sustain the expanded healthcare infrastructure to ensure a robust response to future emergencies.
- **Enhance Emergency Preparedness:** The government should enhance emergency preparedness, including developing contingency plans and conducting regular drills.
- **Invest in Healthcare Technology:** The government should invest in healthcare technology, including telemedicine and digital health platforms, to enhance the city's healthcare capabilities.
- **Strengthen Public-Private Partnerships**: The government should strengthen public-private partnerships to leverage the expertise and resources of private healthcare providers.
- **The Delhi government should continue to invest in healthcare** infrastructure development, focusing on critical care facilities and specialized services.
- **Ambulance services should be further augmented** to ensure 100% availability and reduced response times.
- **Nurse training programs and staff welfare initiatives** should be implemented to reduce burnout and improve job satisfaction.

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