Healthcare Accessibility Analysis

Delhi National Capital Territory

Evidence-based assessment of healthcare infrastructure coverage and underserved populations across Delhi NCT using GIS spatial analysis.

Study Overview

Study Area

Delhi NCT, India

1,484 km² area

Population

19,435,508 residents

WorldPop 2020 estimate

Healthcare Facilities

495 hospitals analyzed

OpenStreetMap data

Analysis Method

5km Euclidean buffer

GIS spatial assessment

Data Sources & Processing

Key Datasets

- Administrative boundaries from GADM v4.1

- Hospital locations via OpenStreetMap (QuickOSM)

- Population density from WorldPop (1km resolution)

- Road network from OpenStreetMap

Processing Steps

- Reprojected to UTM Zone 43N for accurate distance calculations

- Clipped datasets to Delhi boundary

- Removed 5 hospitals outside official boundary

- Resampled population raster using bilinear interpolation

Analysis Methodology

01

Service Area Creation

Created 5km buffers around each hospital location and dissolved overlapping areas to create continuous coverage zones.

02

Gap Identification

Used difference geoprocessing to identify areas beyond 5km from any hospital, resulting in 4 underserved zones.

03

Population Quantification

Clipped population raster to underserved areas and calculated zonal statistics to determine affected populations.
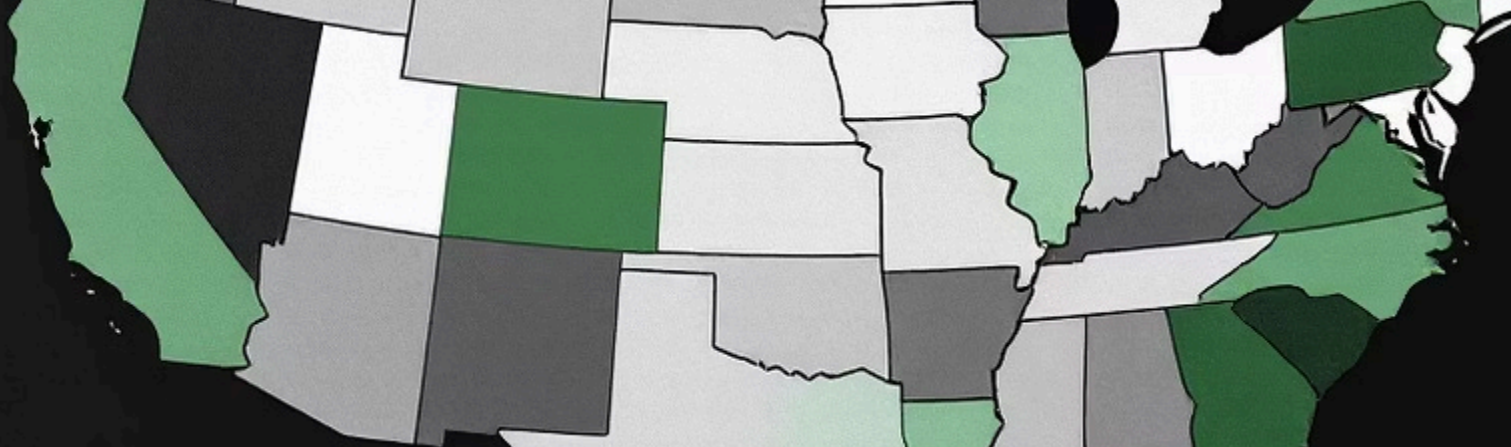
04

Priority Assessment

Ranked zones by population density as a proxy for urgency, identifying high-priority intervention areas.

Overall Coverage Results

97.83%
Population Coverage
19,013,068 residents within 5km of a hospital

422K
Underserved Population
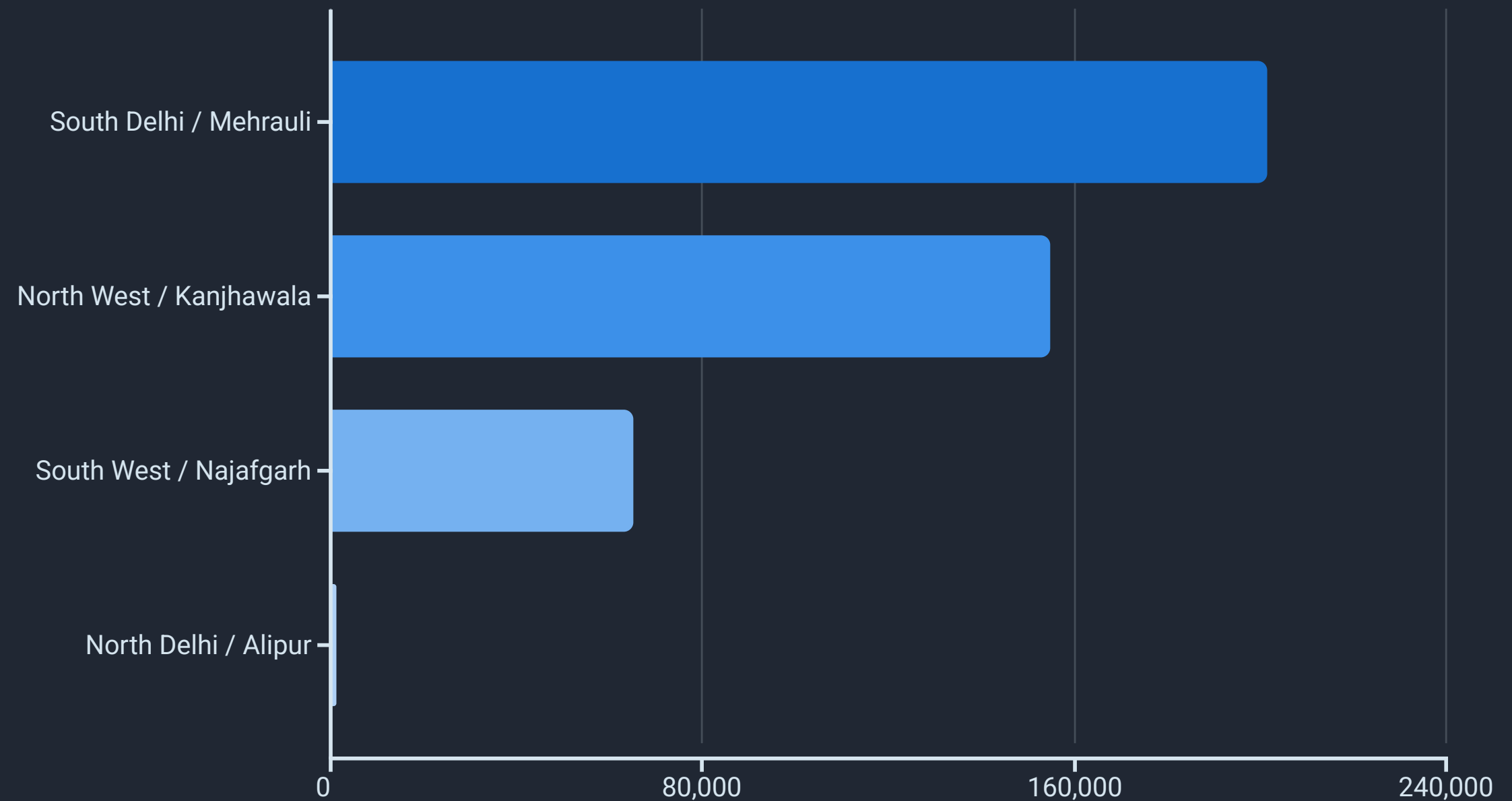422,440 people beyond 5km access (2.17%)

495
Healthcare Facilities
Approximately 1 hospital per 39,000 residents

Delhi's healthcare infrastructure exceeds WHO urban access recommendations of 80%, demonstrating strong spatial coverage across the territory.

Identified Gap Zones

Four underserved areas identified in peripheral districts, ranked by population density and priority level.

South Delhi / Mehrauli		
North West / Kanjhawala		
South West / Najafgarh		
North Delhi / Alipur		
0	80,000	160,000	240,000

Priority Zone Details

1

Mehrauli Tehsil (South Delhi)

Population: 201,339 | **Area:** 52.2 km²

Density: 3,857 per km² | **Priority:** HIGH

2

Kanjhawala Tehsil (North-West)

Population: 154,931 | **Area:** 50.2 km²

Density: 3,084 per km² | **Priority:** HIGH

3

Najafgarh Subdivision (South-West)

Population: 64,966 | **Area:** 40.9 km²

Density: 1,589 per km² | **Priority:** MEDIUM

4

Alipur Subdivision (North)

Population: 1,204 | **Area:** 2.3 km²

Density: 523 per km² | **Priority:** LOW

Strategic Recommendations

1 — **Immediate Action (0-2 years)**

Establish 200-bed multi-specialty hospital in Mehrauli Tehsil serving 201,339 residents.

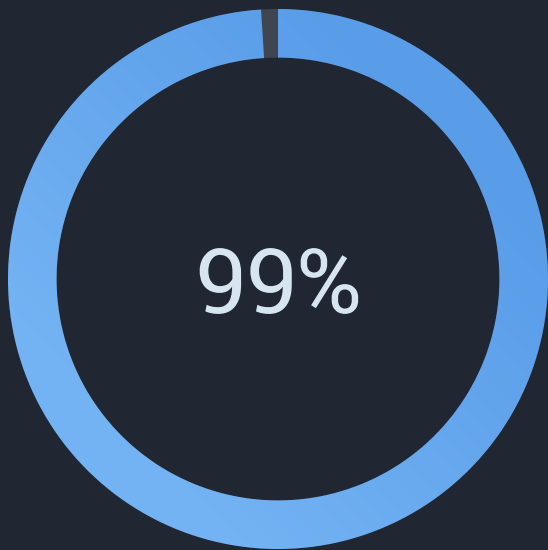Establish 150-bed district hospital in Kanjhawala Tehsil serving 154,931 residents.

2 — **Medium-Term Planning (2-5 years)**

Upgrade existing primary health center or establish 50-bed community hospital in Najafgarh Subdivision.

Monitor population growth in Alipur; consider mobile health unit deployment.

Expected Impact

99%

Coverage Increase

Implementation of priority recommendations

356K

Beneficiaries

Currently underserved residents served

Estimated Investment: ₹300-500 crores for two priority facilities

Key Findings

Delhi's healthcare infrastructure demonstrates strong spatial coverage (97.83%), exceeding international urban access benchmarks. Priority interventions in Mehrauli and Kanjhawala tehsils could serve 356,270 underserved residents, improving coverage to >99%.

Strong Foundation

Current coverage exceeds WHO recommendations

Targeted Gaps

422,440 residents in 4 peripheral zones identified

Evidence-Based Planning

GIS analysis enables strategic resource allocation

Analysis conducted: November 2025 | Analyst: Tanish | Project: Urban Infrastructure Accessibility Assessment - Delhi NCT

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