IBM – Applied Data Science Capstone Project

Optimal allocation of Funding/Resources among the NYC Hospitals during COVID 19 Pandemic

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INTRODUCTION

COVID-19 is an infectious disease caused by the most recently discovered corona virus.

COUNTRY	CASES	DEATHS
United states	5,874,146	180,604
Brazil	3,605,783	114,772
India	3,106,348	57,692
Russia	956,749	16,383
South Africa	609,773	13,059

New York City, which was once the epicenter of the pandemic in the US, has reported a total of 236,822 cases and 23,658 confirmed deaths (Source: The New York Times-Aug 23, 2020).

Business Problem

In this project I am going to analyse COVID-19 situation in NYC. Number of cases in each neighbourhood along with hospitals located in the neighbourhood will be used to analyse which hospitals possibly have higher need for resources/funding.
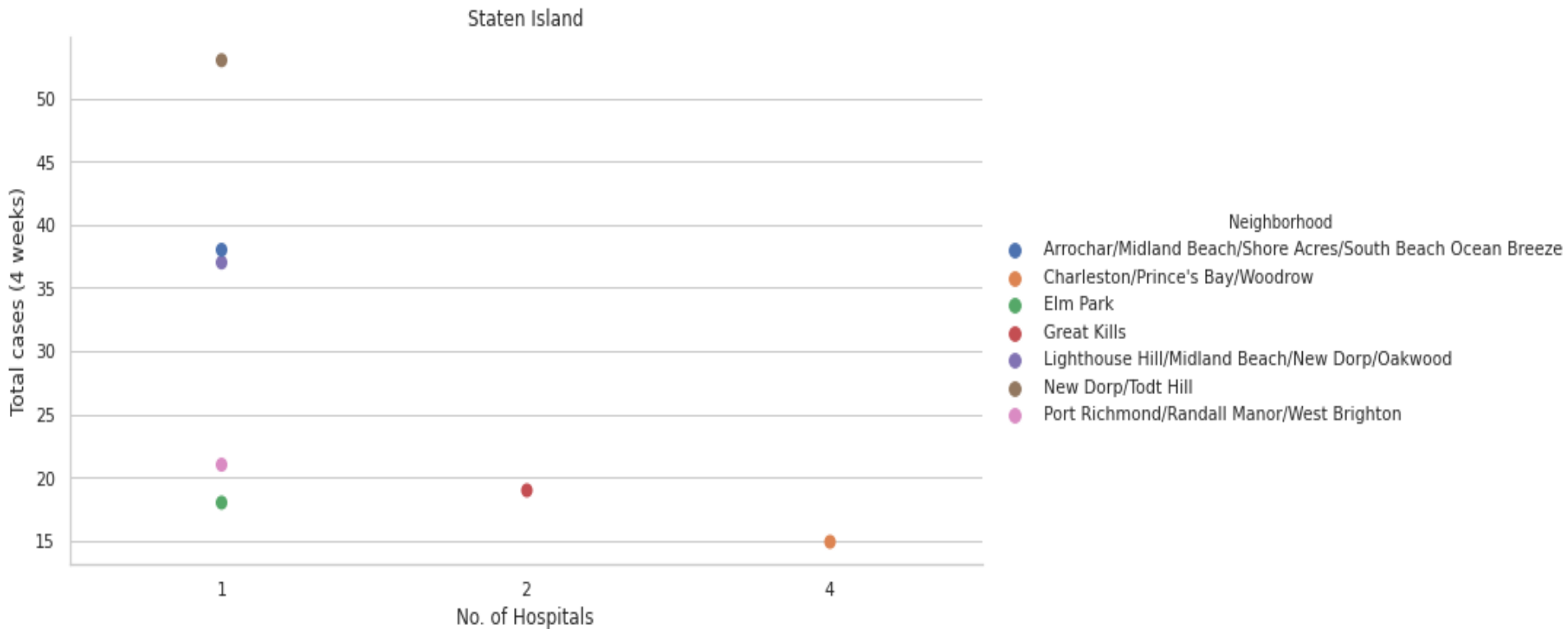
Target Audience

Governmental and non-governmental organizations, non-profits and charity organizations, any volunteer willing to help by donating resources or time.
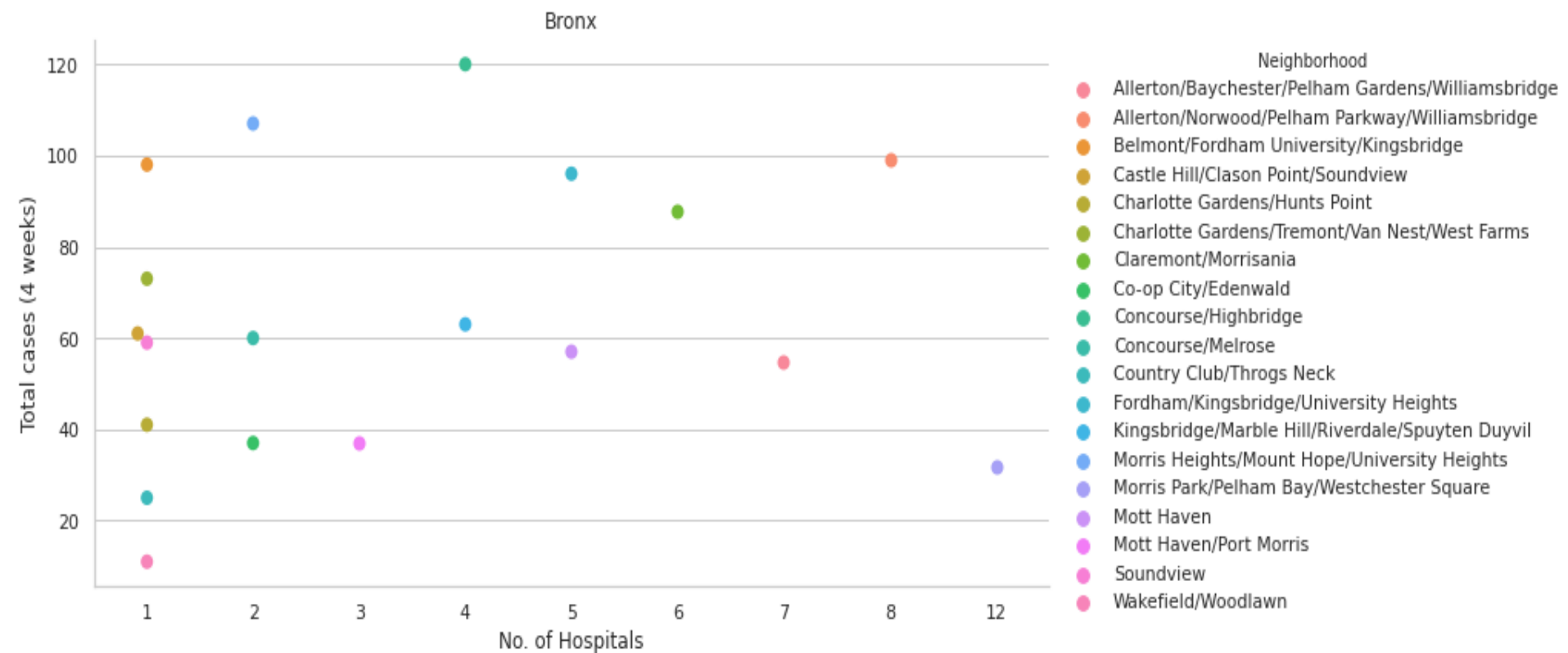
DATA COLLECTION

• **NYC COVID-19 data set** - CSV file was downloaded from https://www1.nyc.gov/site/doh/covid/covid-19-data.page.

• **NYC data set** - using neighborhood names from Covid-19 dataset, latitudes and longitudes for each neighborhood were extracted using geocoder.

• **NYC Hospitals** - Hospitals in each neighborhood are fetched from foursquare API
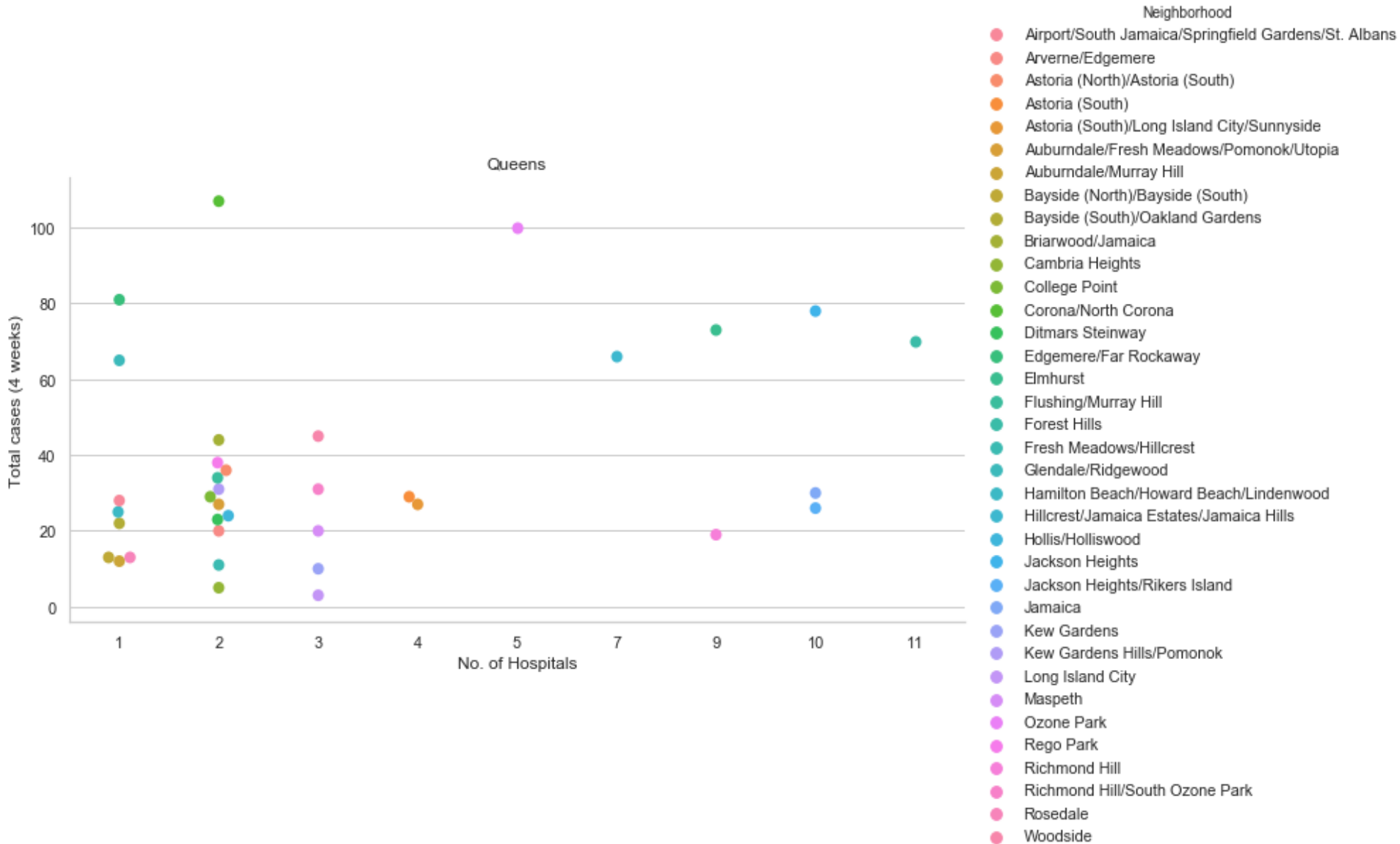
Exploratory Data Analysis
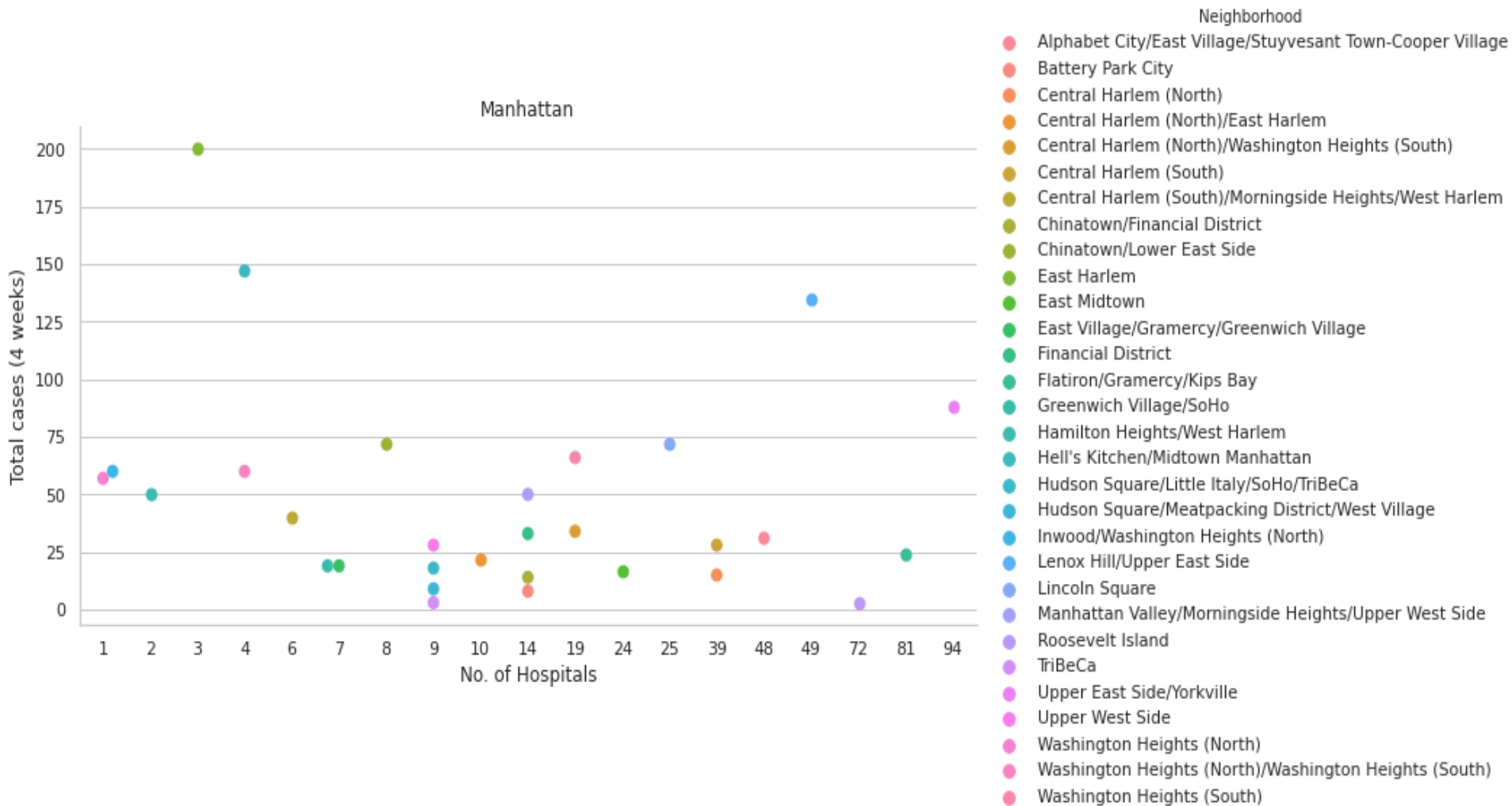
BOROUGH – STATEN ISLAND

BOROUGH - BRONX

Bronx

Total cases (4 weeks) vs No. of Hospitals

Neighborhood
- Allerton/Baychester/Pelham Gardens/Williamsbridge
- Allerton/Norwood/Pelham Parkway/Williamsbridge
- Belmont/Fordham University/Kingsbridge
- Castle Hill/Clason Point/Soundview
- Charlotte Gardens/Hunts Point
- Charlotte Gardens/Tremont/Van Nest/West Farms
- Claremont/Morrisania
- Co-op City/Edenwald
- Concourse/Highbridge
- Concourse/Melrose
- Country Club/Throgs Neck
- Fordham/Kingsbridge/University Heights
- Kingsbridge/Marble Hill/Riverdale/Spuyten Duyvil
- Morris Heights/Mount Hope/University Heights
- Morris Park/Pelham Bay/Westchester Square
- Mott Haven
- Mott Haven/Port Morris
- Soundview
- Wakefield/Woodlawn

BOROUGH - QUEENS

Queens

Manhattan

Neighborhood
- Alphabet City/East Village/Stuyvesant Town-Cooper Village
- Battery Park City
- Central Harlem (North)
- Central Harlem (North)/East Harlem
- Central Harlem (North)/Washington Heights (South)
- Central Harlem (South)
- Central Harlem (South)/Morningside Heights/West Harlem
- Chinatown/Financial District
- Chinatown/Lower East Side
- East Harlem
- East Midtown
- East Village/Gramercy/Greenwich Village
- Financial District
- Flatiron/Gramercy/Kips Bay
- Greenwich Village/SoHo
- Hamilton Heights/West Harlem
- Hell's Kitchen/Midtown Manhattan
- Hudson Square/Little Italy/SoHo/TriBeCa
- Hudson Square/Meatpacking District/West Village
- Inwood/Washington Heights (North)
- Lenox Hill/Upper East Side
- Lincoln Square
- Manhattan Valley/Morningside Heights/Upper West Side
- Roosevelt Island
- TriBeCa
- Upper East Side/Yorkville
- Upper West Side
- Washington Heights (North)
- Washington Heights (North)/Washington Heights (South)
- Washington Heights (South)
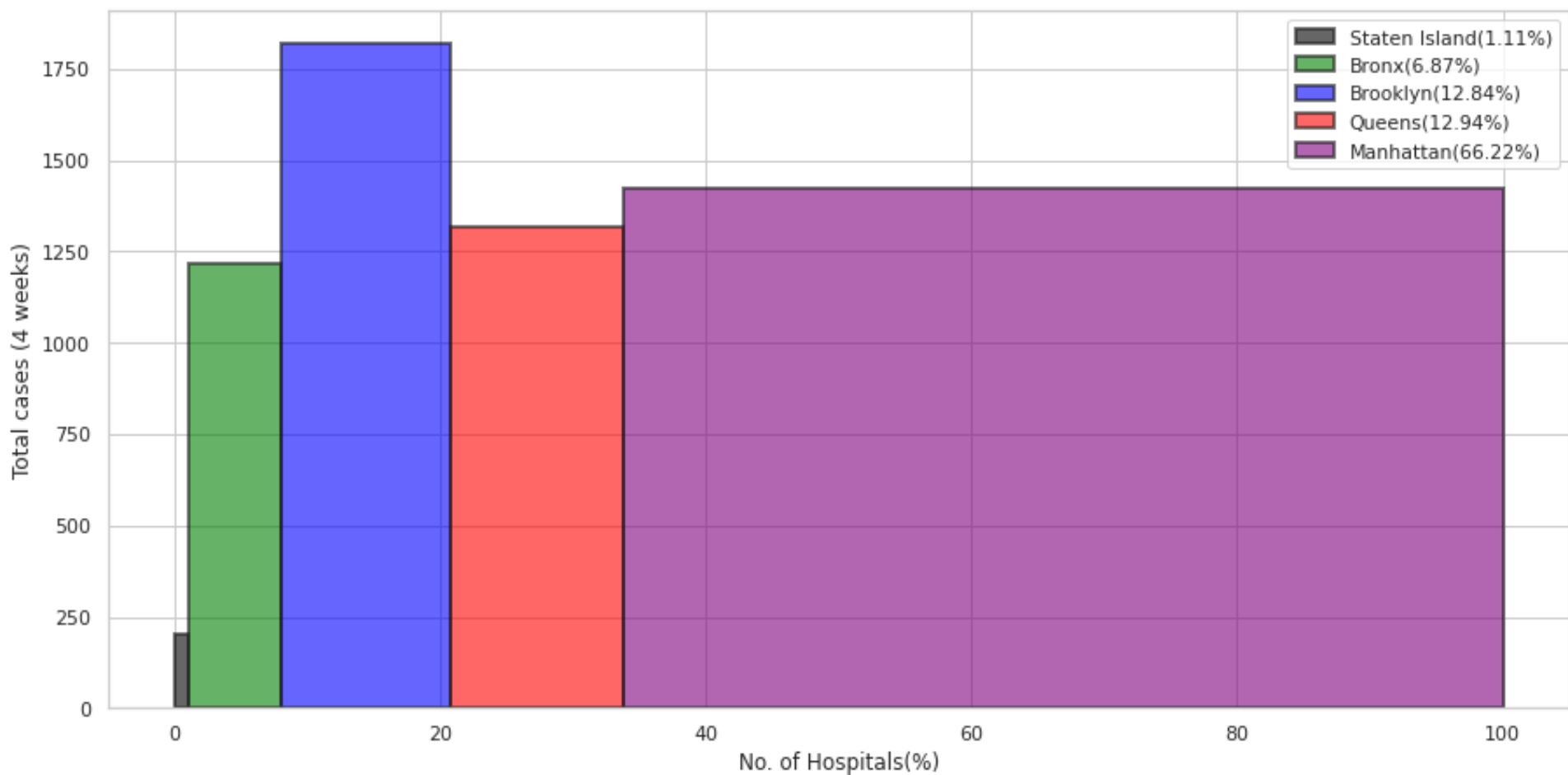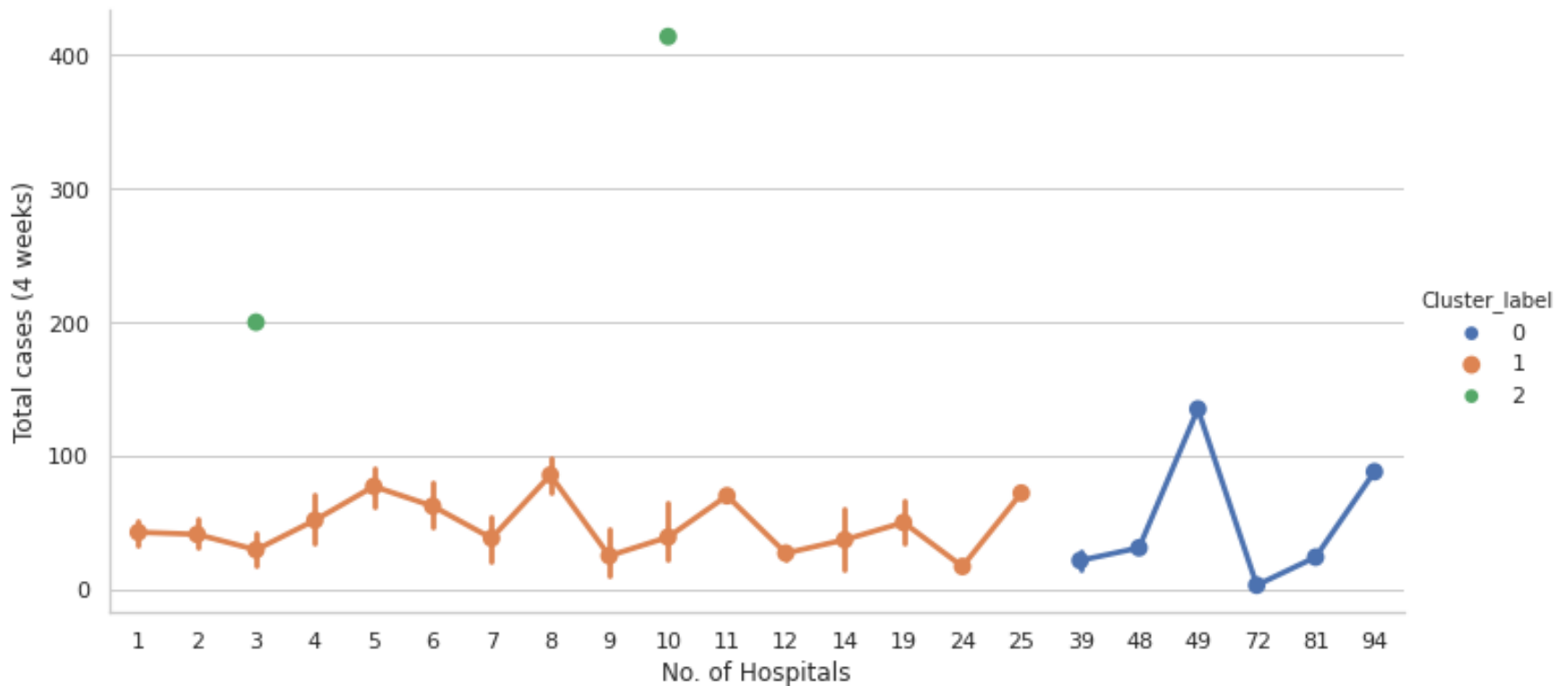
Brooklyn

Graph depicting status of hospital availability vis a vis covid 19 cases & need assessment of resources (Borough Wise)
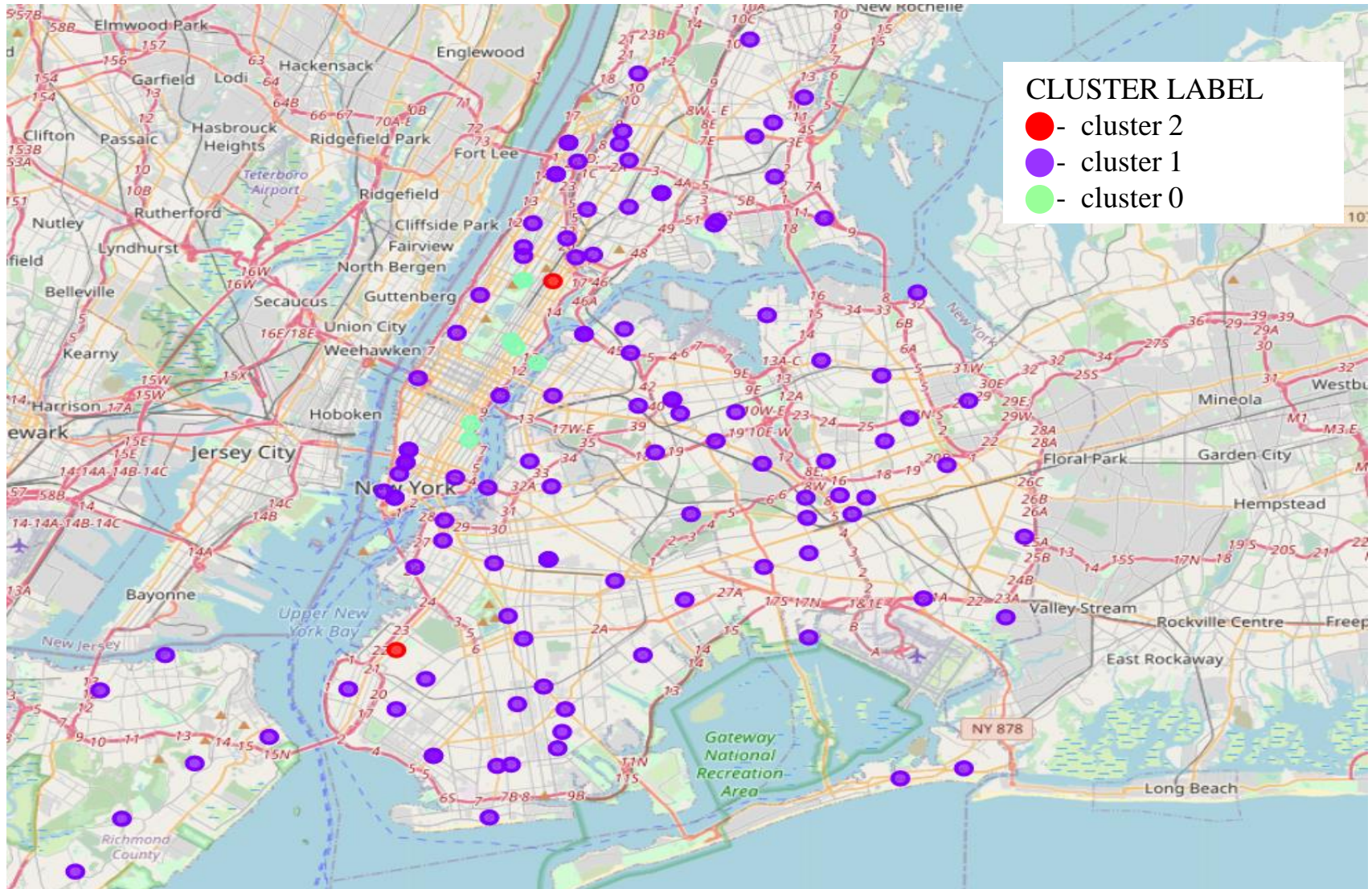
RESULTS

The point plot represents the 3 clusters formed using KMeans. Outliers in the dataset are marked by green points. These are the neighborhoods which have lower number of hospitals and higher number of cases.

VISUALIZATION OF CLUSTERS ON NYC MAP

CLUSTER LABEL
- cluster 2
- cluster 1
- cluster 0

CONCLUSION

Cluster 2 comprises of the following hospitals which require donation of resources or funding due to high number of Covid-19 cases in their respective neighbourhoods

NEIGHBOURHOOD	BOROUGH	HOSPITAL
East Harlem	Manhattan	General Hospital
East Harlem	Manhattan	VA Harlem Veterans Centre
East Harlem	Manhattan	New York City Health and Hospitals Corporation
Sunset Park	Brooklyn	CityMD Sunset Park Urgent Care
Sunset Park	Brooklyn	ModernMD Urgent Care
Sunset Park	Brooklyn	New York Centre for Special Surgery
Sunset Park	Brooklyn	NYU Lutheran Medical Centre
Sunset Park	Brooklyn	NYU Lutheran SICU
Sunset Park	Brooklyn	LMC 5th FLR
Sunset Park	Brooklyn	Calvary Hospital
Sunset Park	Brooklyn	NYU Lutheran Annex
Sunset Park	Brooklyn	NYU Langone Hospital
Sunset Park	Brooklyn	Maimonides Medical Centre

FUTURE PROSPECTIVES

- Area wise hospitals specifically designated as covid centres can be considered.

- Number of beds, ICU in each hospital can be used to determine which hospitals are in need for funding or resources.

- Not all covid positive patients require hospital facilities. Factors like :
  - Age of patients
  - Underlying medical conditions of patients
  - Population of an area

 influence requirement of resources for a particular hospital. Such factors can be taken into consideration for future study in the domain area.

- Number of clinical and non-clinical staff available in each hospital can also be taken into account.