

IBM DATA SCIENCE PROFESSIONAL CERTIFICATE

IBM CAPSTONE PROJECT: APPLIED DATA SCIENCE CAPSTONE

COVID-19 Vaccine Distribution in Johannesburg,
South Africa

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1. Introduction

This project aims to determine the optimal location for a COVID-19 vaccine storage and distribution site in Johannesburg, South Africa.

2. Business Problem

The COVID-19 pandemic of the early 2020s has severely changed the world. Economies were shut down as countries went into lock down. As the infection rates increased and the number of people dying increased, the race to develop a vaccine was prioritized by governments and researchers.

South Africa, a country of approximately 60 million people, struggled to control the impact of the spreading of the virus and this affected lives and livelihoods. In June 2021, less than 1% of the population has been vaccinated and the procuring and distribution of the vaccine has been slow.

Johannesburg is the economic capital of South Africa, and as the virus has spread the city has been put in various degrees of lockdown. To ensure the safe reopening of the city, herd immunity needs to be reached with citizens getting vaccinated as soon as possible.

A start-up company wants to investigate the optimal location for a vaccine distribution site, where the vaccines can be stored and then distributed to pharmacies that are with a close distance to the distribution site, furthermore, the company wants to investigate the optimal location to partner with local pharmacies, where there is not an existing vaccination site.

Therefore, there are two key business questions to be answered;

- 1.) Which suburb in Johannesburg is the optimal site to store vaccines?
- 2.) Which suburb in Johannesburg has a shortage of vaccination sites but has pharmacies that could be used as a vaccination site?

3. Target Audience

The primary audience for this research is the said startup company, however, this research will also be of benefit to local and national health administrators, medical insurance companies, pharmacies, healthcare professionals, privately owned medical facilities and general citizens.

4. Data

The data required for the completion of this research is as follows;

1. A list of neighbourhoods in Johannesburg, this will be scrapped from the following web page:
https://en.wikipedia.org/wiki/City_of_Johannesburg_Metropolitan_Municipality#Regions
2. A list of the currently approved vaccination sites. This will be scrapped from the following web page: <https://sacoronavirus.co.za/active-vaccination-sites/>
3. Determine the longitudes and latitudes of the neighbourhoods and vaccination site using the Geocoder package.

5. Methodology

Once the data has been sourced, we will use k-means clustering to determine the clusters of vaccine sites that exist, and where they are highly clustered a vaccination storage will be recommended where they are not highly clustered the opening of a new vaccination site will be recommended.