



Accessibility of Cape Town's clinics

afrimapr - 28 July 2021

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now you know

COVID-19 STATISTICS IN SOUTH AFRICA

14 587 196
TESTS CONDUCTED

2 383 490
POSITIVE CASES

2 169 452
RECOVERIES

70 018
DEATHS

5 683
NEW CASES

Active Cases
144 020

MONDAY
26
July 2021

Learn more to
BE READY
for #COVID-19
sacoronavirus.co.za
Covid-19 Public Hotline
0800 029 999
Whatsapp 'Hi' to
0600 123 456



Unallocated
Confirmed Cases: 00

Daily Deaths
243

Recovery Rate
91,0%



Vaccines Administered
6 613 704



health

Department:
Health
REPUBLIC OF SOUTH AFRICA

DOWNLOAD the **COVID Alert SA** app

The COVID Alert SA app can notify you if you have been exposed to another app user with coronavirus. Download it now to protect yourself and others











FILTER BY



Clinics and healthcare facilities

Our clinics and healthcare centres deliver general, primary care to communities across Cape Town.

CITY HEALTH FACILITY CLOSURES



Some of our [health facilities may close temporarily](#) for decontamination or offer only essential services due to staff testing positive for COVID-19. Patients will be redirected to nearby facilities for medication and treatment. Follow us on twitter at [@CityofCT](#) or [Facebook](#) for the latest updates.



COVID-19 TESTING

Some of our healthcare facilities are offering COVID-19 testing. [Check the schedule](#) for testing times.



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140 Facilities

< 1 | 2 | 3 >



Adriaanse Clinic

📍 40th Avenue, Clarkes Estate, Elsies River



Albow Gardens Community Day Centre

📍 2 Albow Road, Milnerton



Albow Gardens Field Clinic

📍 Cnr Nahum and Albow Roads, Rugby



Albow Gardens Mobile Clinic

📍 Koeberg Road, Rugby, Milnerton



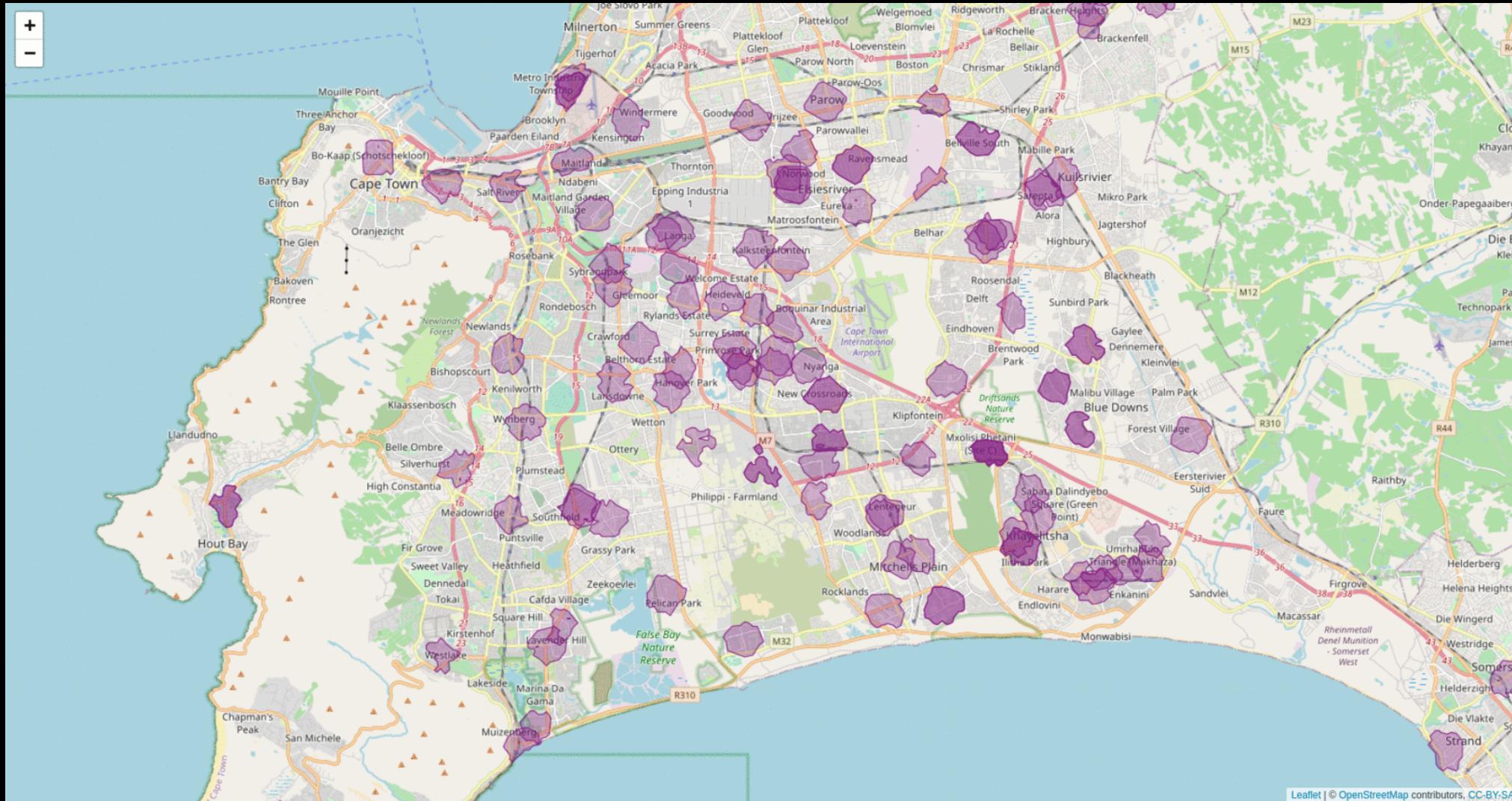
Alphen Clinic

📍 Alphen Centre, Main Road, Constantia

What is the **distribution** of 140 clinics across the city?

How **accessible** are they to different communities?

What **areas** are covered to reach a clinic within different walking times?



bit.ly/clinic-mapping

The data

Clinic locations



positive for COVID-19. Patients will be redirected to nearby facilities for medication and treatment. Follow us on twitter at [@CityofCT](#) or [Facebook](#) for the latest updates.



COVID-19 TESTING

Some of our healthcare facilities are offering COVID-19 testing. [Check the schedule](#) for testing times.

140 Facilities

1 | 2 | 3 | >

 Adriaanse Clinic 40th Avenue, Clarkes Estate, Elsies River
 Albow Gardens Community Day Centre 2 Albow Road, Milnerton
 Albow Gardens Field Clinic Cnr Nahum and Albow Roads, Rugby
 Albow Gardens Mobile Clinic Koeberg Road, Rugby, Milnerton
 Alphen Clinic Alphen Centre, Main Road, Constantia

Network tab in browser developer tools showing network requests and responses. The response body shows a JSON array of clinic locations:

```
1 [
2   {
3     "SchemaVersion": "15.0.8.0", "LibraryVersion": "15.0.4905.1000", "ErrorInfo": null, "TraceCorrelationId": "34afdf9f-e54f-4...
4     "Name": "ProcessQuery", "Headers": {}, "Preview": "", "Response": "1 { 2   \"SchemaVersion\": \"15.0.8.0\", \"LibraryVersion\": \"15.0.4905.1000\", \"ErrorInfo\": null, \"TraceCorrelationId\": \"34afdf9f-e54f-4...
5       \"IsNullOrEmpty\": false 6   }, 7   { 8     \"IsNullOrEmpty\": false 9   }, 10  { 11    \"IsNullOrEmpty\": false 12  }, 13  { 14    \"IsNullOrEmpty\": false 15  }, 16  { 17    \"IsNullOrEmpty\": false 18  }, 19  { 20    \"IsNullOrEmpty\": false 21  }, 22  { 23    \"IsNullOrEmpty\": false 24  }, 25  { 26    \"IsNullOrEmpty\": false 27  }, 28  { 29    \"IsNullOrEmpty\": false 30  }, 31  { 32    \"IsNullOrEmpty\": false 33  }, 34  { 35    \"IsNullOrEmpty\": false 36  }, 37  { 38    \"IsNullOrEmpty\": false 39  }, 40  { 41    \"IsNullOrEmpty\": false 42  }, 43  { 44    \"IsNullOrEmpty\": false 45  }, 46  { 47    \"IsNullOrEmpty\": false 48  }, 49  { 50    \"IsNullOrEmpty\": false 51  }, 52  { 53    \"IsNullOrEmpty\": false 54  }, 55  { 56    \"IsNullOrEmpty\": false 57  }, 58  { 59    \"IsNullOrEmpty\": false 60  }, 61  { 62    \"IsNullOrEmpty\": false 63  }, 64  { 65    \"IsNullOrEmpty\": false 66  }, 67  { 68    \"IsNullOrEmpty\": false 69  }", "Initiator": "", "Timing": "200 ms", "Cookies": ""}, "ResultTables": [{"Object": "Microsoft.SharePoint.Client.Search.Query.ResultTableCollection", "Elapsed": 287, "Properties": {"RowLimit": 50, "SourceId": "8413cd39-2156-4e00-b54d-11ef9abdb89"}, "QueryErrors": null, "QueryId": "553fc3b0-e47e-44a9-889f-41c1050a9b0e", "TriggeredRules": []}], "ObjectTemplateId": null, "ItemTemplateId": null, "GenerationId": 9223372036854775806, "ExecutionTime": 0, "QueryModification": "IsDocument", "IsDocument": true, "ContentClass": "00000000-0000-0000-0000-000000000000", "ResultRow": 1, "Rank": 0, "DocId": 33394, "Title": "Adriaanse Clinic", "LocationOWSTEXT": "40th Avenue, Clarkes Estate, Elsies River", "Site": "1", "Rank": 0, "DocId": 33414, "Title": "Albow Gardens Community Day Centre", "LocationOWSTEXT": "2 Albow Road, Milnerton", "Site": "1", "Rank": 0, "DocId": 37104, "Title": "Albow Gardens Field Clinic", "LocationOWSTEXT": "Cnr Nahum and Albow Roads, Rugby", "Site": "1", "Rank": 0, "DocId": 33458, "Title": "Albow Gardens Mobile Clinic", "LocationOWSTEXT": "Koeberg Road, Rugby, Milnerton", "Site": "1", "Rank": 0, "DocId": 33490, "Title": "Alphen Clinic", "LocationOWSTEXT": "Alphen Centre, Main Road, Constantia", "Supporting": 1, "Rank": 0, "DocId": 33566, "Title": "Bloekombos Clinic", "LocationOWSTEXT": "Sam Nokasela Avenue, Kraaifontein", "Supporting": 1, "Rank": 0, "DocId": 37093, "Title": "Bloekombos Field Clinic", "LocationOWSTEXT": "Sam Njokazela Street, Bloekombos", "Supporting": 1, "Rank": 0, "DocId": 33597, "Title": "Blue Downs Clinic", "LocationOWSTEXT": "Bentley Road, Blue Downs", "Supporting": 1, "Rank": 0, "DocId": 37095, "Title": "Blue Down Field Clinic", "LocationOWSTEXT": "Bentley Road, Blue Downs", "Supporting": 1, "Rank": 0, "DocId": 33661, "Title": "Brackenfell Clinic", "LocationOWSTEXT": "Paradys Street, Brackenfell", "Supporting": 1, "Rank": 0, "DocId": 37126, "Title": "Brackenfell Field Clinic", "LocationOWSTEXT": "Cnr Paradys and Old Paarl Road", "Supporting": 1, "Rank": 0, "DocId": 33694, "Title": "Brighton Clinic", "LocationOWSTEXT": "Brighton Street, Kraaifontein", "Supporting": 1, "Rank": 0, "DocId": 37127, "Title": "Brighton Field Clinic", "LocationOWSTEXT": "Brighton Street, Kraaifontein", "Supporting": 1, "Rank": 0, "DocId": 33986, "Title": "Chapel Street Clinic", "LocationOWSTEXT": "Chapel Street, Woodstock", "Supporting": 1, "Rank": 0, "DocId": 34012, "Title": "Chestnut (St Vincent) Satellite Clinic", "LocationOWSTEXT": "St Vincent Drive, Belhar", "Supporting": 1, "Rank": 0, "DocId": 34026, "Title": "Claremont Clinic", "LocationOWSTEXT": "40 Old Stanhope Road, Claremont", "Supporting": 1, "Rank": 0, "DocId": 34047, "Title": "Crossroads 1 Clinic", "LocationOWSTEXT": "Old Klipfontein Road, Crossroads", "Supporting": 1, "Rank": 0, "DocId": 34080, "Title": "Delft South Clinic", "LocationOWSTEXT": "Cnr Boyce Street and Delft Main Road, Delft", "Supporting": 1, "Rank": 0, "DocId": 37110, "Title": "Diep River Clinic", "LocationOWSTEXT": "10 Schay Road, Diep River", "Supporting": 1, "Rank": 0, "DocId": 37138, "Title": "Dirkie Uys Clinic", "LocationOWSTEXT": "Dingle Road, Goodwood", "Supporting": 1, "Rank": 0, "DocId": 37141, "Title": "Dr Ivan Toms Community Day Centre", "LocationOWSTEXT": "Cnr Nqubelani and Umbrashe st", "Supporting": 1}], "Line 1, Column 1
```

Clinic locations

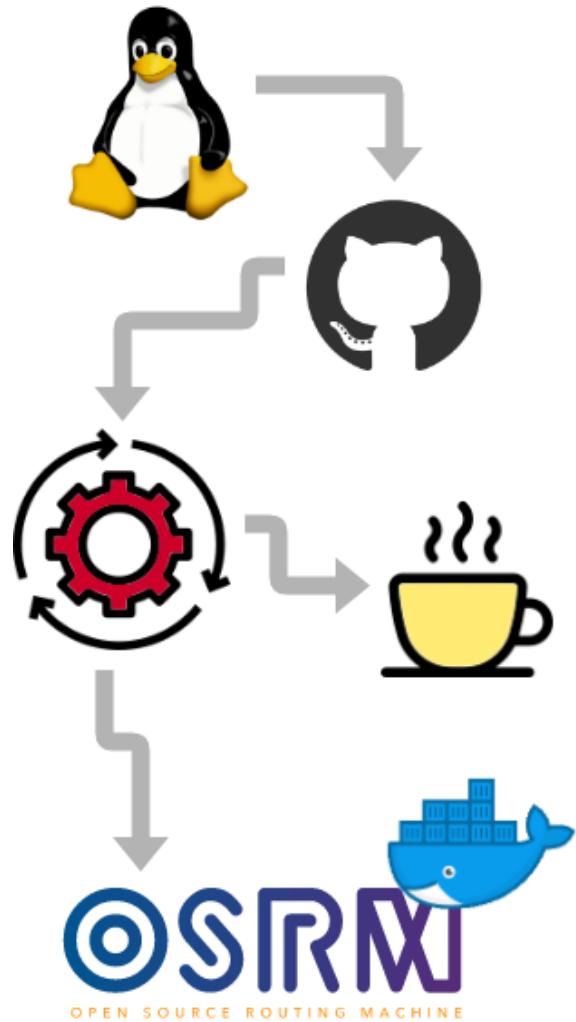
1. Got the JSON from the response queries for each page.
2. Read JSON into R and extracted location and name for each clinic.
3. Used `{ggmap}` to geocode the locations to get the coordinates.

Tools and mapping



OPEN SOURCE ROUTING MACHINE

Building OSRM



```
# Install and build on Linux
#
# OR
#
# Use the docker image
#
docker pull osrm/osrm-backend
```

Getting the data ~ www.openstreetmap.org

openstreetmap.org/export#map=10/-33.9857/19.0800

OpenStreetMap Edit History Export GPS Traces User Diaries Copyright Help About Log In Sign Up

Search Where is this? Go

Export

-33.5078	
18.1619	19.9980
-34.4609	

Manually select a different area

Manually select a different area

Licence

OpenStreetMap data is licensed under the [Open Data Commons Open Database License \(ODbL\)](#).

This area is too large to be exported as OpenStreetMap XML Data. Please zoom in or select a smaller area, or use one of the sources listed below for bulk data downloads.

If the above export fails, please consider using one of the sources listed below:

Overpass API
Download this bounding box from a mirror of the OpenStreetMap database

Planet OSM
Regularly-updated copies of the complete OpenStreetMap database

Geofabrik Downloads
Regularly-updated extracts of continents, countries, and selected cities

Other Sources
Additional sources listed on the

10 km
5 mi

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Preparing the data

Extract the map

- car
- bike
- foot

```
osrm-extract map.xml -p profile
```



Preparing the data

Create the hierarchy

```
osrm-contract map.xml.osrm
```

Launch the service

```
osrm-routed map.xml.osrm
```



The {osrm} R package

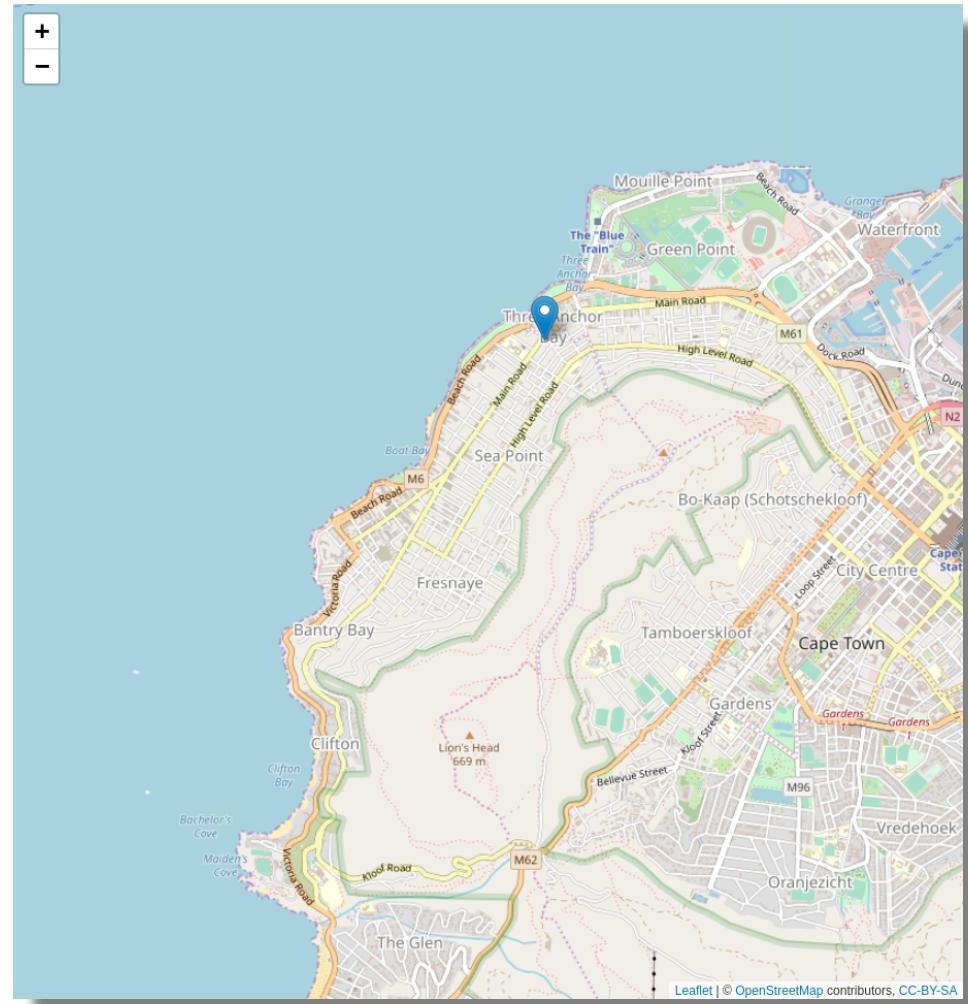
```
# Install package
install.packages('osrm')

# Load library
library(osrm)

# Point to osrm server running locally
options(osrm.server = "http://127.0.0.1:5000/")
```

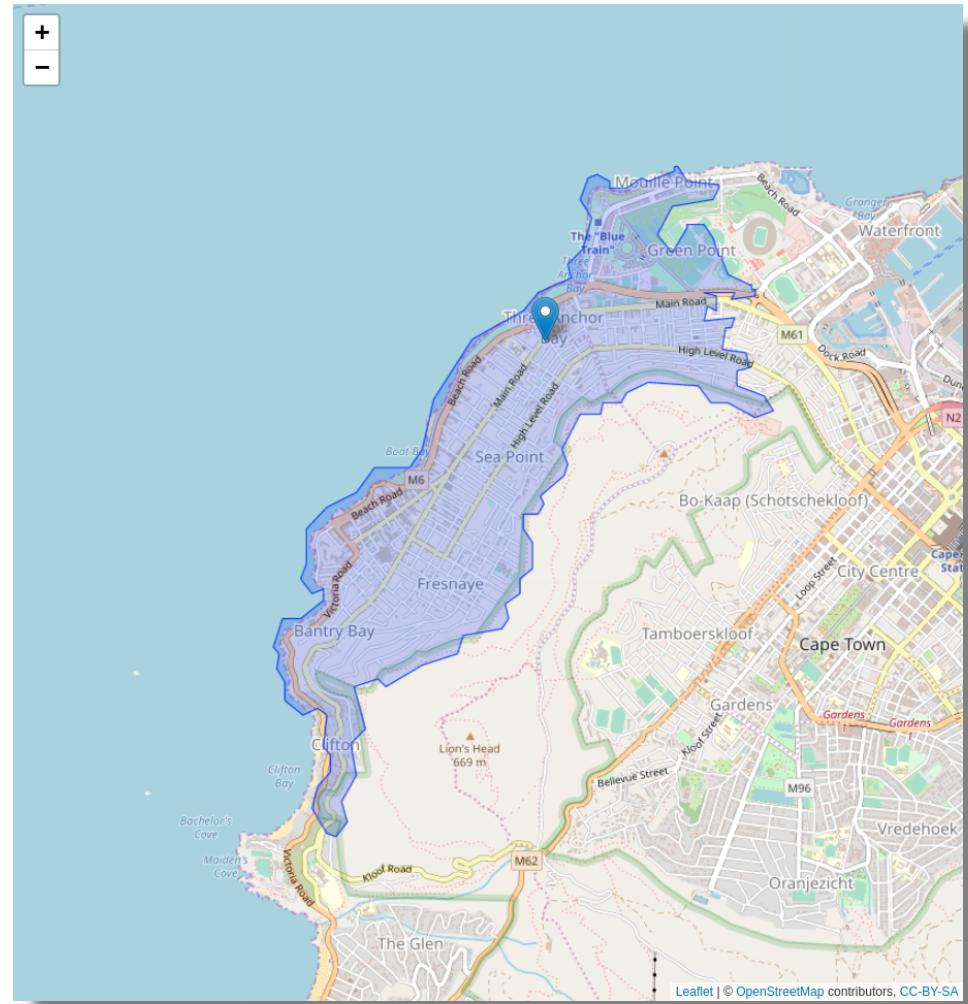
Isochrone application

- A store location



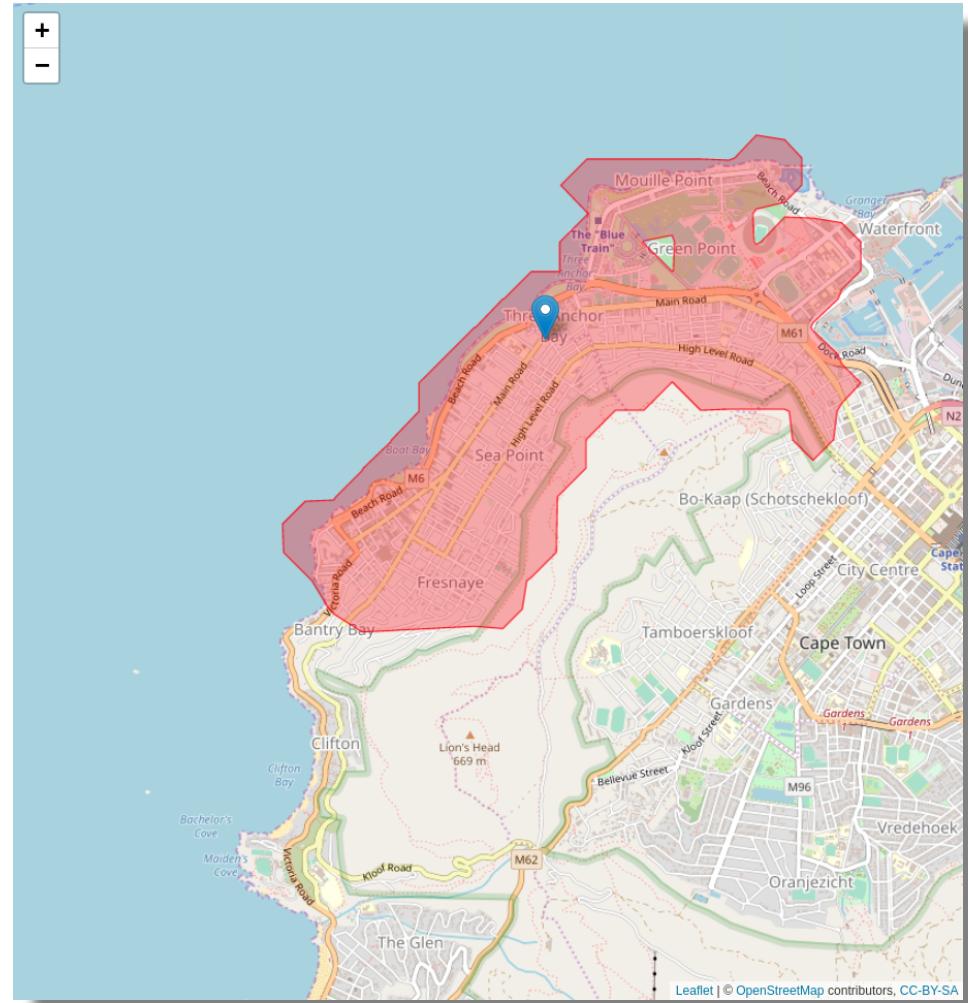
Isochrone application

- A store location
- A delivery area of max **8 min** – *isochrone*



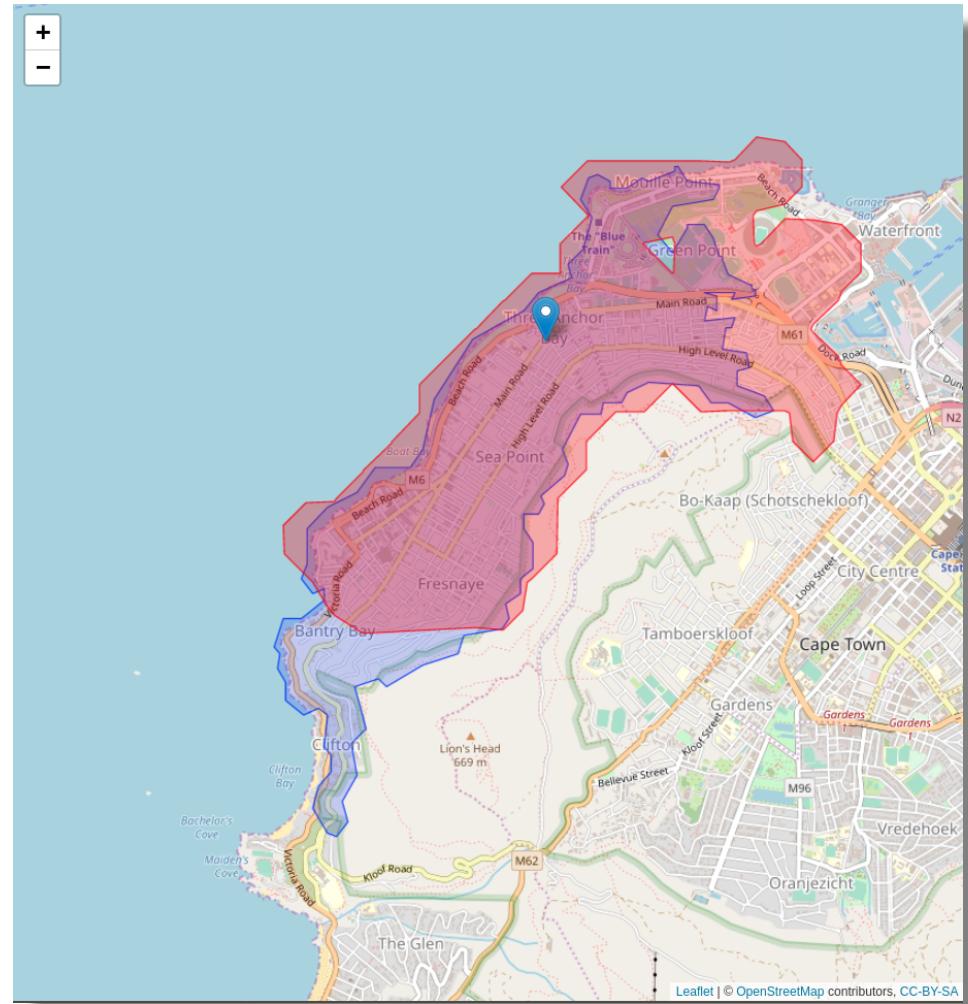
Isochrone application

- A store location
- A delivery area of max 8 min - *isochrone*
- A delivery area of max **2.5 km** - *isodistance*



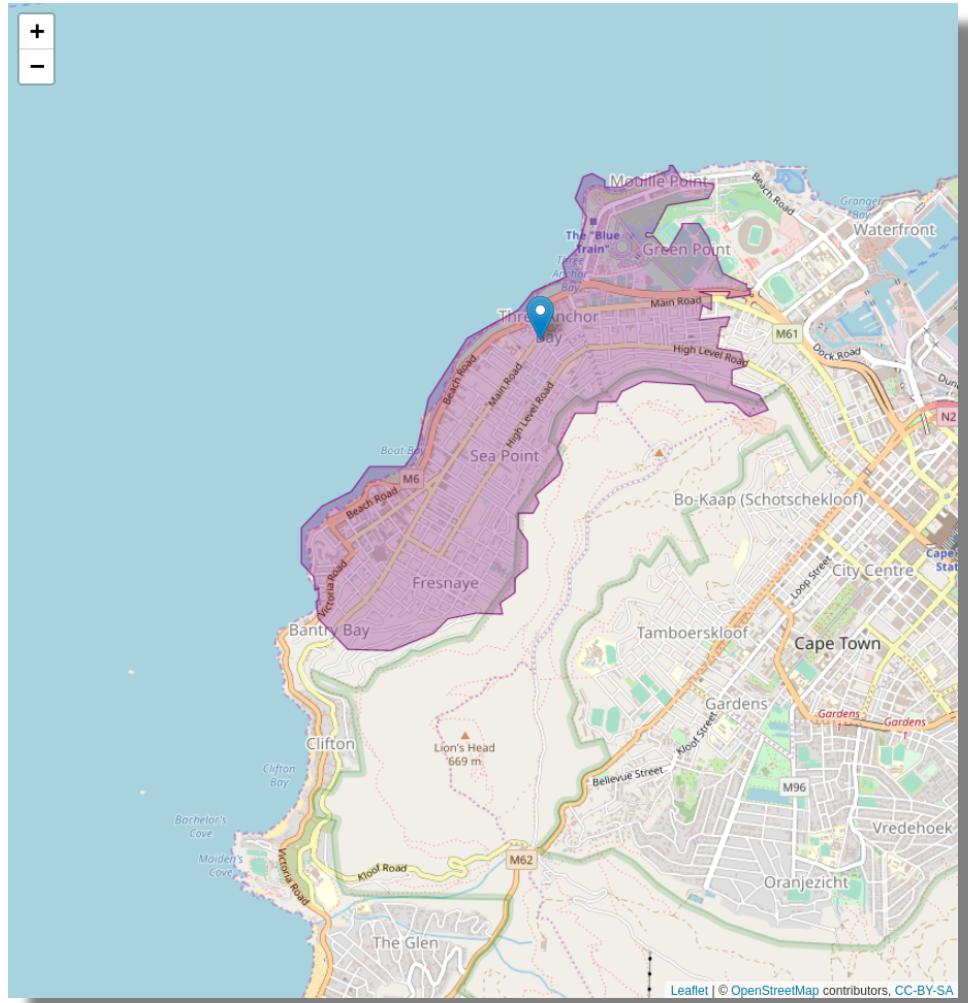
Isochrone application

- A store location
- A delivery area of max 8 min - *isochrone*
- A delivery area of max 2.5 km - *isodistance*
- An **intersection**



Isochrone application

- A store location
- A delivery area of max 8 min - *isochrone*
- A delivery area of max 2.5 km - *isodistance*
- An intersection
- Everyone is happy!



What about the
clinics?

bit.ly/clinic-mapping