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Breathing in 2020

Data Visualization on COVID-19

Analysis and Insights – Using Python

This is a Project of Scientific Data Visualization of COVID-19 Pandemic on Human Life. Global Datasets were collected for Insights & Analysis has been done on them.This project is a product of Learnings and guidance under -

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INTRODUCTION

COVID-19 is an infectious disease caused by the recently found virus known as SARS-CoV-2 (or coronavirus). Before the outbreak originated in Wuhan, China on December 2019, there was no information about this virus

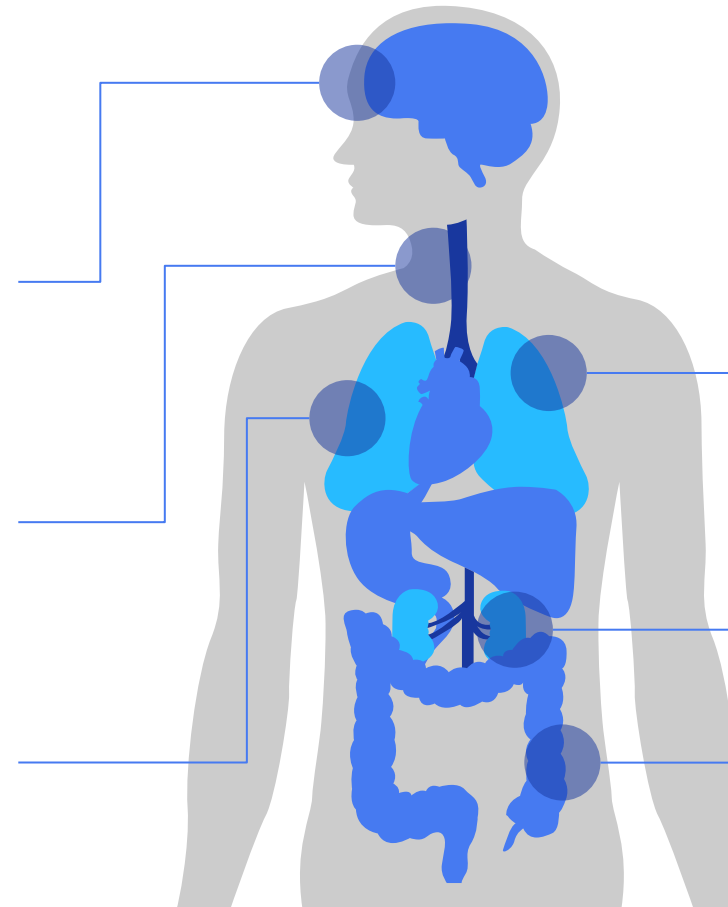# PHYSICAL EXAMINATION

COMMON SYMPTOMS

FEVER

The body temperature can exceed 37.3 °C

DRY COUGH

Constant coughing without expelling mucus

BAD BREATHING

Breathing actually feels more difficult

EVENTUAL SYMPTOMS

PNEUMONIA

Inflammation of both lungs

KIDNEY FAILURES

Kidney failures can result in vomiting

GASTRO DISORDERS

The patient may suffer from diarrhea

COVID-19

Global Scenario while COVID was decleared Pandemic by WHO
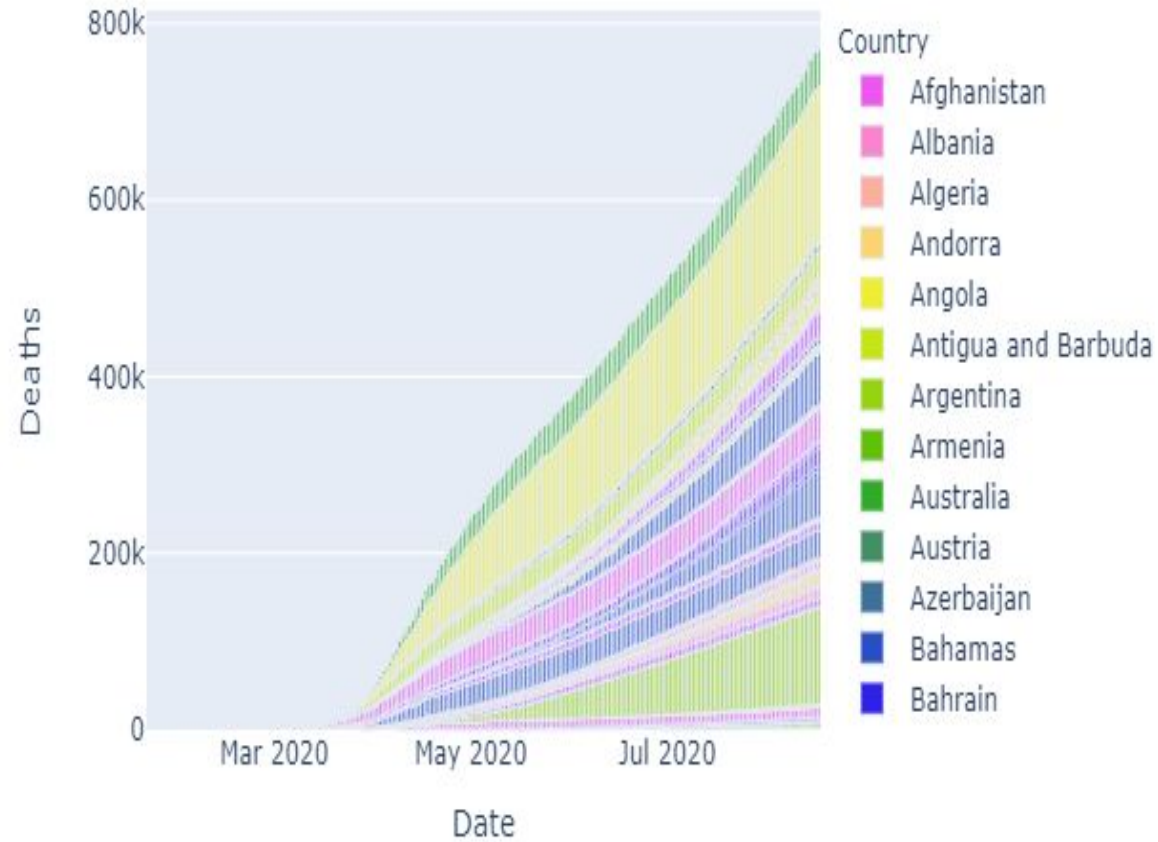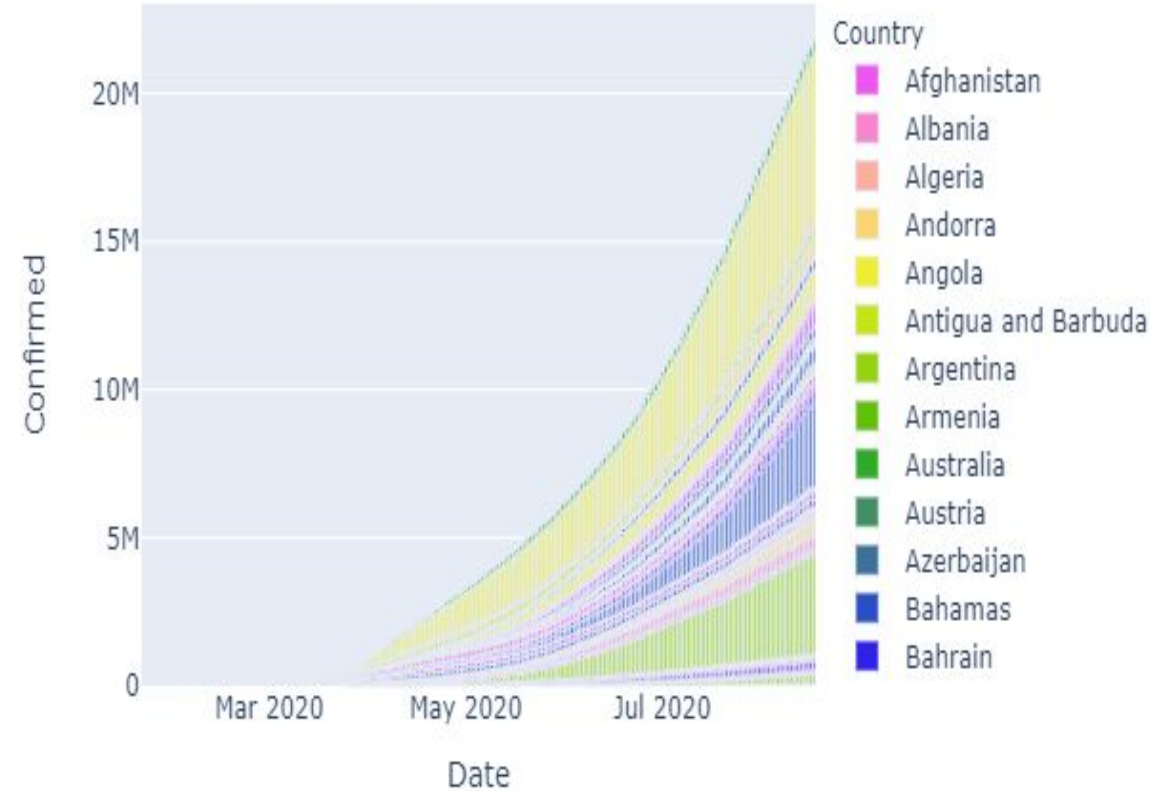
Cases over time

Observation:

The steep rise in cases in April is due to the lack of understanding of its impact in countries outside China. Recoveries improved with improved understanding and Precautionary Lockdowns and other measures.
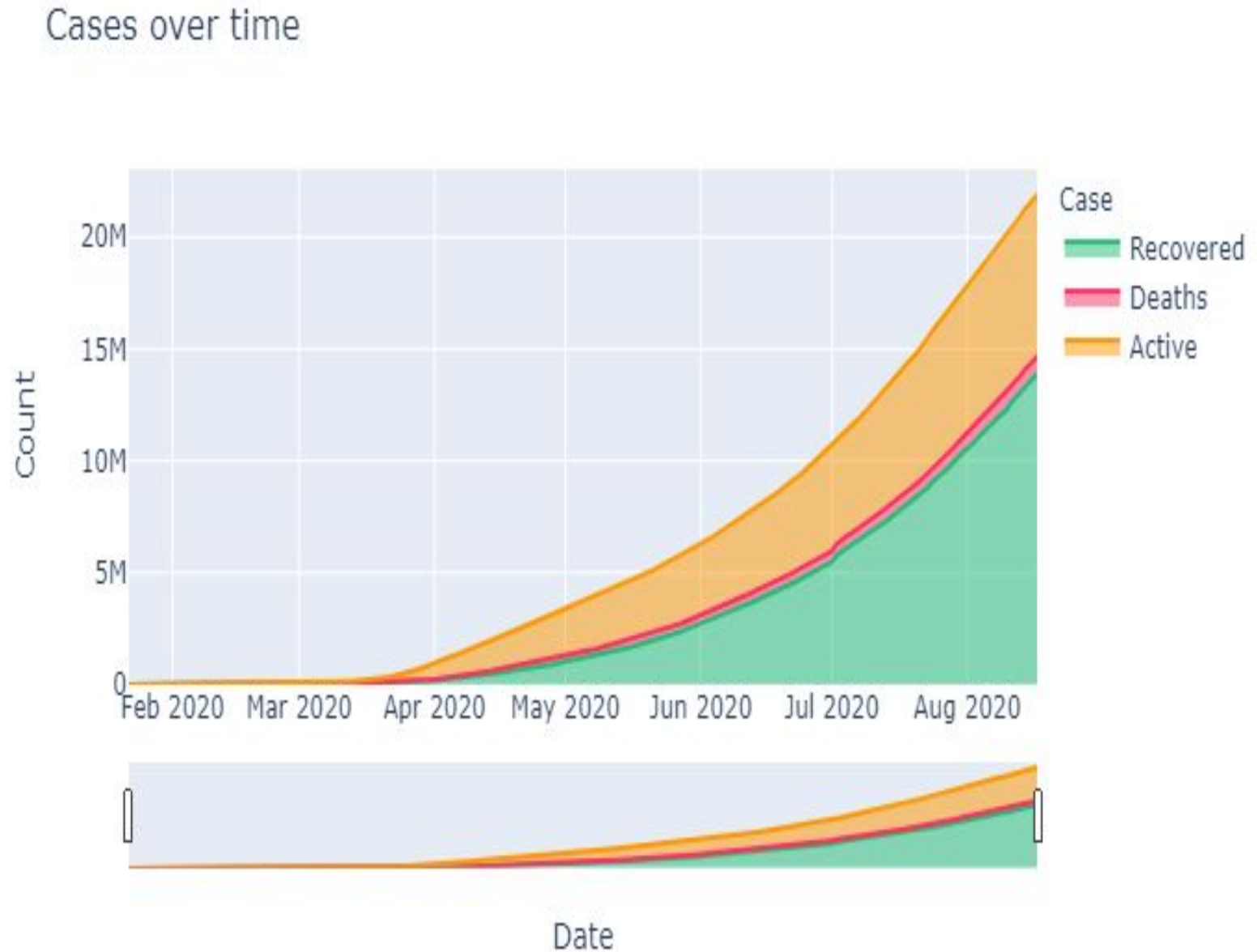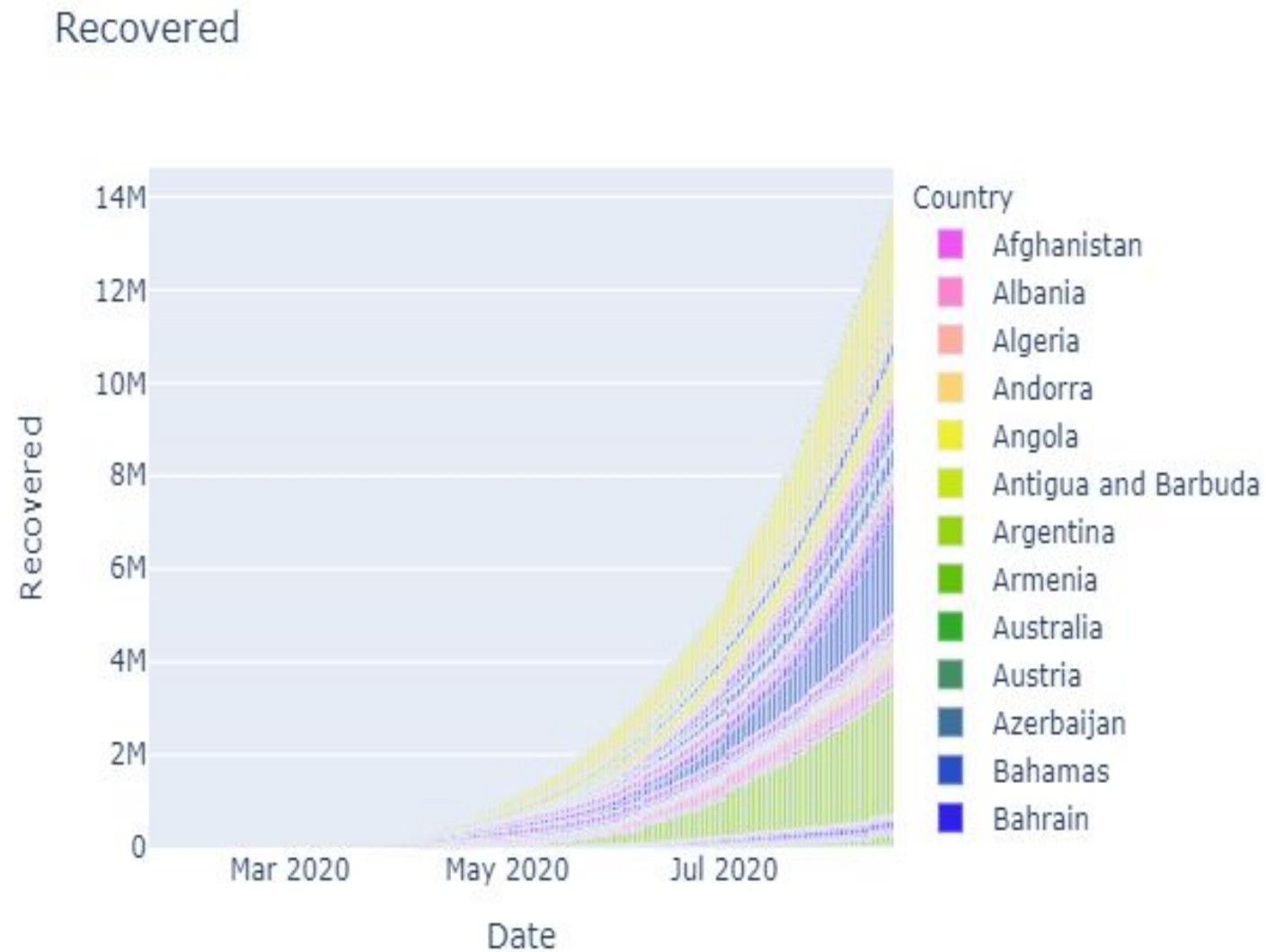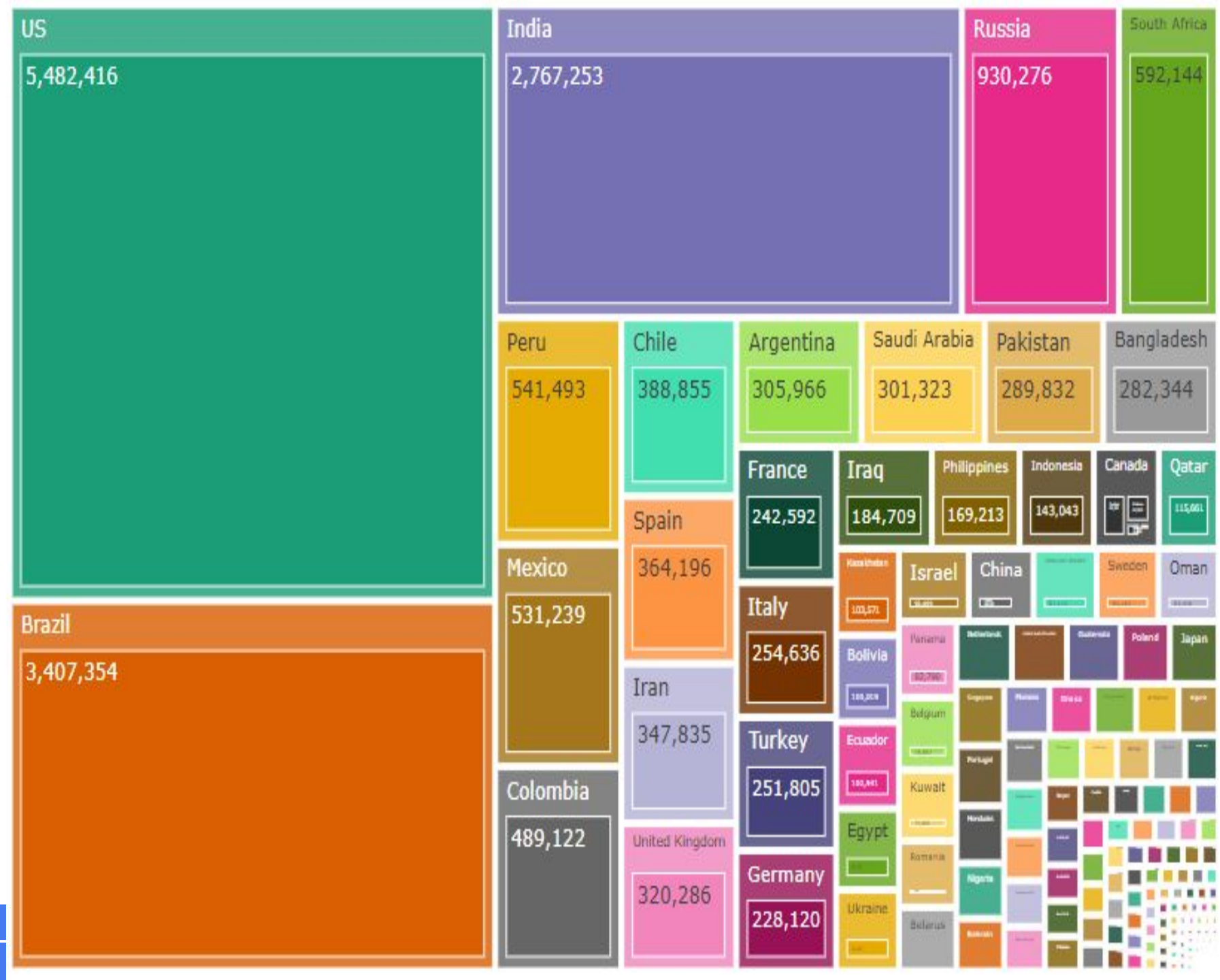
Observation:

With social distancing the only way known but still to be a learnt behaviour, the virus started spreading exponentially all over the world. The high human movement in big cities acted as the catalyst for the pace of spread.
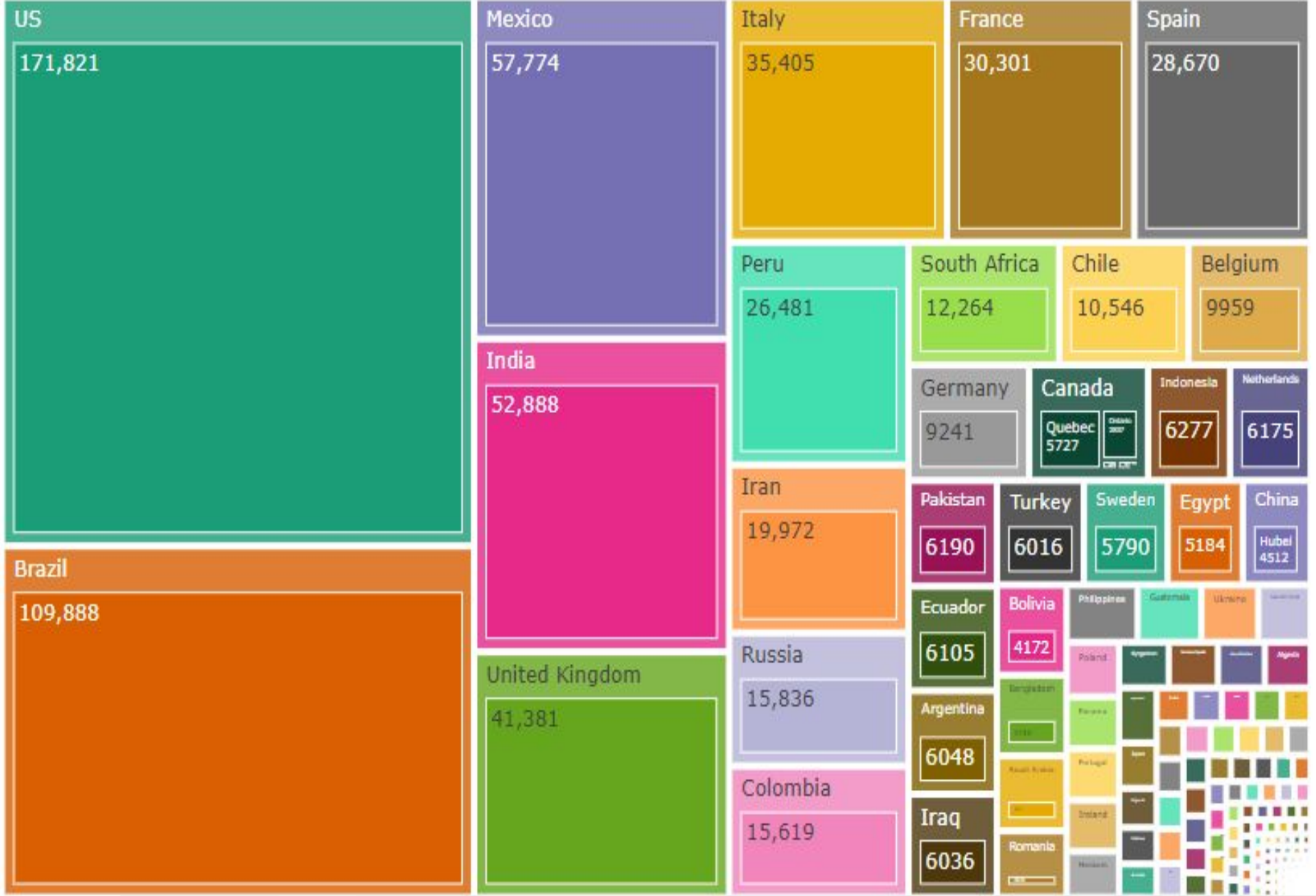
Observation:

- Started as Pneumonia in Wuhan in Dec2019, the Corona Virus started showing signs of becoming a global pandemic from April 2020.

Recovered

CONFIRMED CASES

Country	Cases
US	5,482,416
Brazil	3,407,354
India	2,767,253
Russia	930,276
South Africa	592,144
Peru	541,493
Mexico	531,239
Colombia	489,122
Chile	388,855
Spain	364,196
Iran	347,835
United Kingdom	320,286
Argentina	305,966
Saudi Arabia	301,323
Pakistan	289,832
Bangladesh	282,344
Italy	254,636
Turkey	251,805
France	242,592
Germany	228,120
Iraq	184,709
Philippines	169,213
Indonesia	143,043
Canada	115,061
Kazakhstan	103,571
Bolivia	100,209
Ecuador	100,881

Death Cases

India

The number of confirmed cases is lower than the number of total cases. The main reason for this is limited testing.
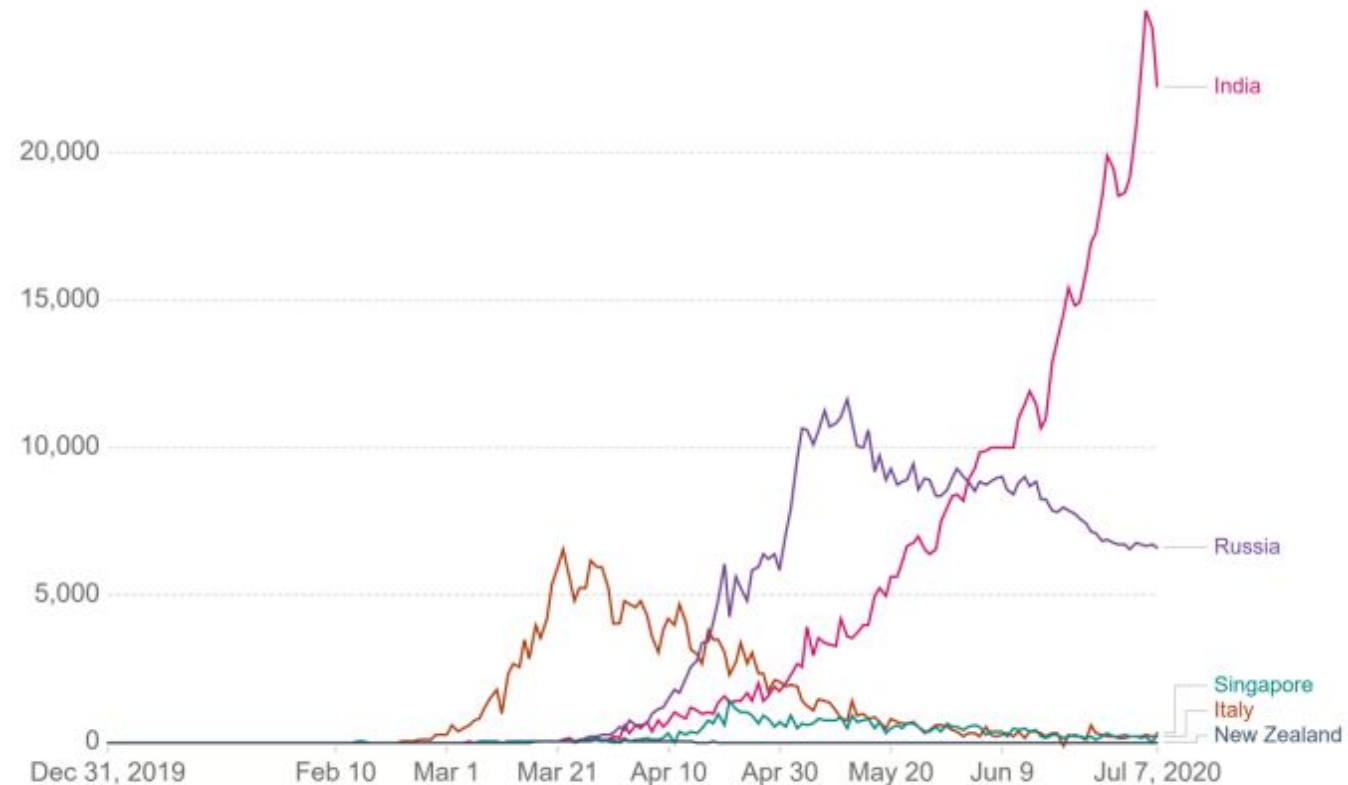
India is putting up a brave fight against the COVID, starting with its early lockdown in March and strict curfews. However, it still has not been able to flatten its daily cases like Singapore, New Zealand and Russia did despite starting their lockdown days after India did.

The objective of this notebook is to provide a state-wise breakdown of the virus' spread to glean a few insights on how to better combat the crisis.
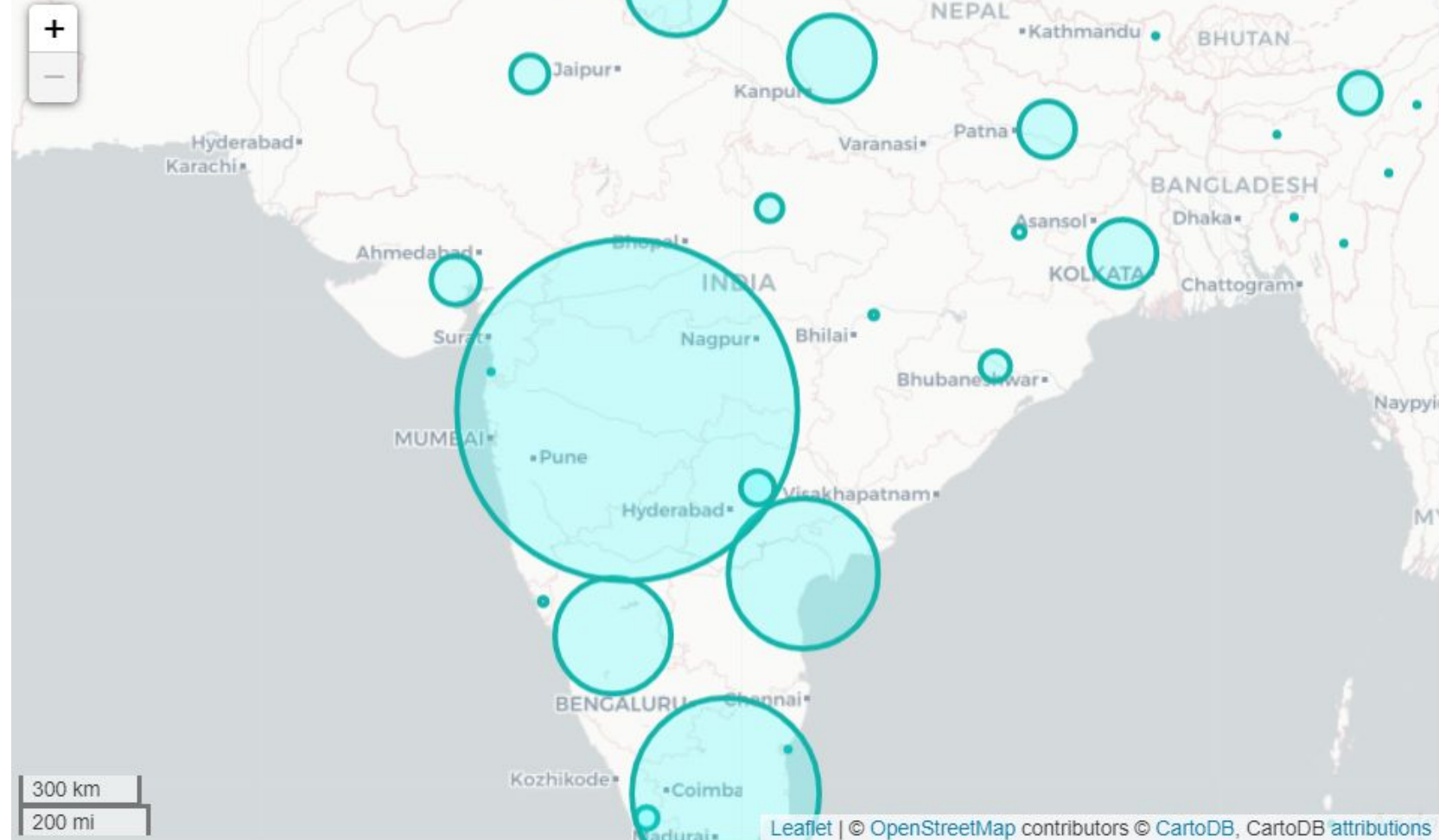
Observation:

At first glance, the main virus hotspots seem to be the most populous states of the country. But it does not follow that general trend, with Delhi having the 3rd highest confirmed cases but a comparatively lower population. Let's do some analysis.

|	State/UnionTerritory	Date	Cured	Deaths	Confirmed	Active	Deaths per 100 Cases
0	Andaman and Nicobar Islands	08/11/2020	709	20	1625	896	1.23
1	Andhra Pradesh	08/11/2020	145636	2116	235525	87773	0.90
2	Arunachal Pradesh	08/11/2020	1592	3	2231	636	0.13
3	Assam	08/11/2020	43586	151	61737	18000	0.24
4	Bihar	08/11/2020	54088	397	82550	28065	0.48
5	Cases being reassigned to states	07/18/2020	0	0	9265	9265	0.00
6	Chandigarh	08/11/2020	1004	25	1595	566	1.57
7	Chhattisgarh	08/11/2020	9013	99	12448	3336	0.80
8	Dadar Nagar Haveli	06/11/2020	2	0	26	24	0.00
9	Dadra and Nagar Haveli and Daman and Diu	08/11/2020	1167	2	1613	444	0.12
10	Daman & Diu	06/11/2020	0	0	2	2	0.00
11	Delhi	08/11/2020	131657	4131	146134	10346	2.83
12	Goa	08/11/2020	6208	80	9029	2741	0.89
13	Gujarat	08/11/2020	55304	2672	72031	14055	3.71
14	Haryana	08/11/2020	35492	489	42429	6448	1.15
15	Himachal Pradesh	08/11/2020	2205	17	3463	1241	0.49
16	Jammu and Kashmir	08/11/2020	17375	478	25367	7514	1.88
17	Jharkhand	08/11/2020	9724	188	18723	8811	1.00
18	Karnataka	08/11/2020	99126	3312	182354	79916	1.82
19	Kerala	08/11/2020	22616	115	35515	12784	0.32
20	Ladakh	08/11/2020	1237	9	1717	471	0.52
21	Madhya Pradesh	08/11/2020	29674	1015	39891	9202	2.54
22	Maharashtra	08/11/2020	358421	18050	524513	148042	3.44

Major Hotspots in India

Observation:

We can deduce that the worst-struck states of India are the ones with densely packed urban areas, like Mumbai in Maharashtra, Chennai in Tamil Nadu and New Delhi. Let's see how the total national confirmed cases are distributed.

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Observations:

MH has the most number of cases being an International destination as well as having large number of densely populated urban pockets.
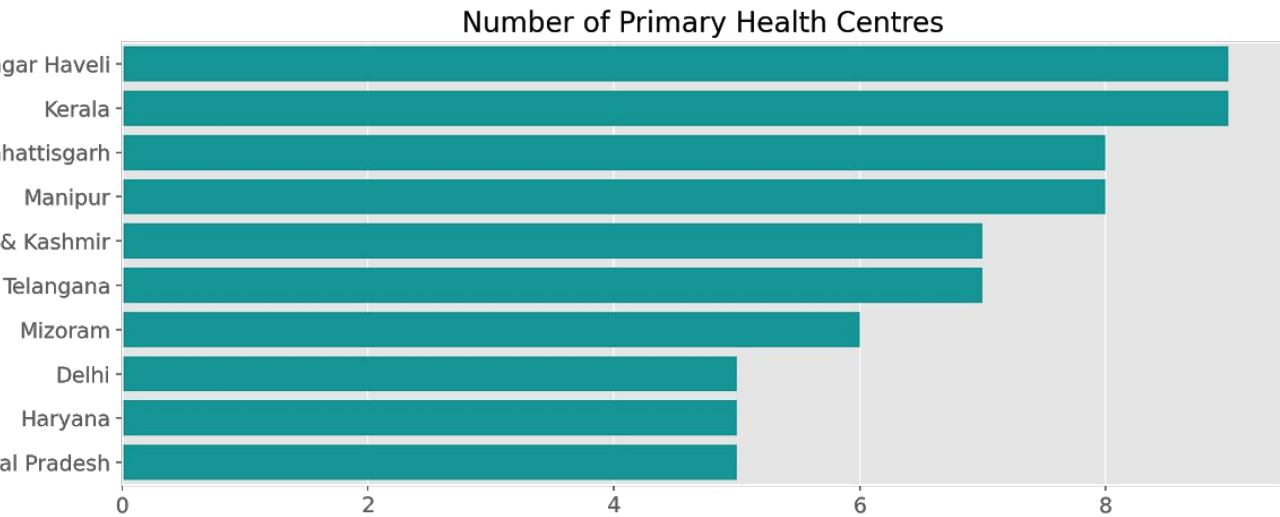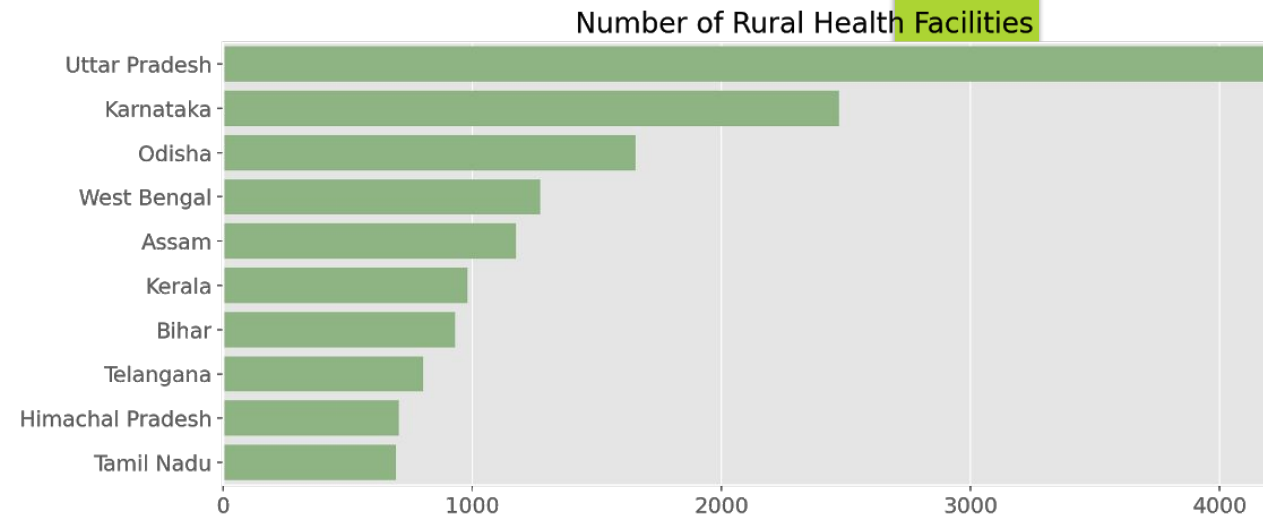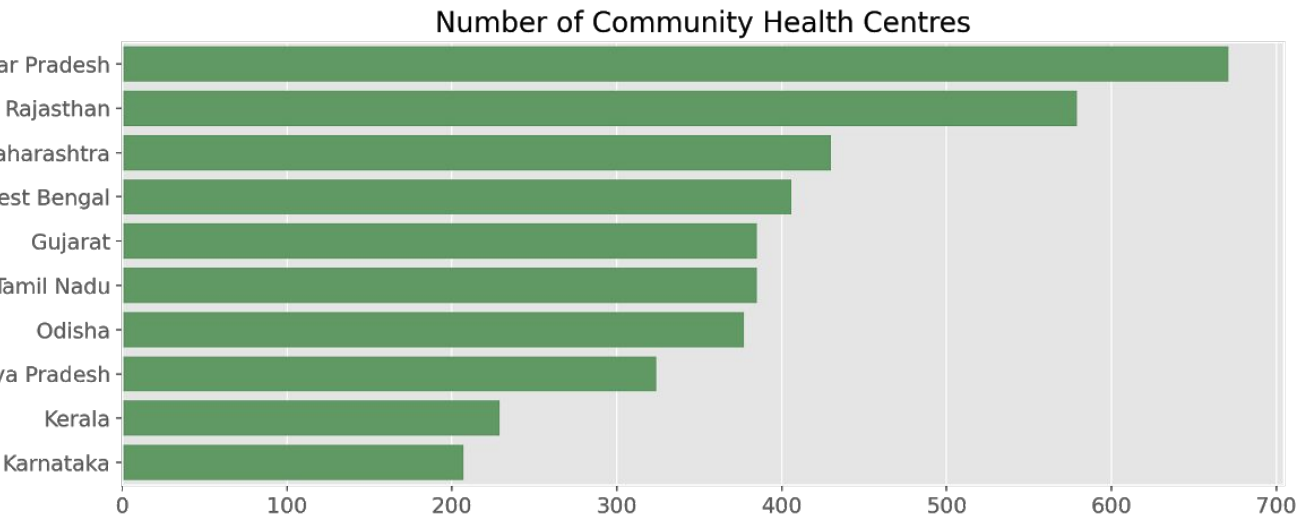
Top 20 States by Confirmed Cases
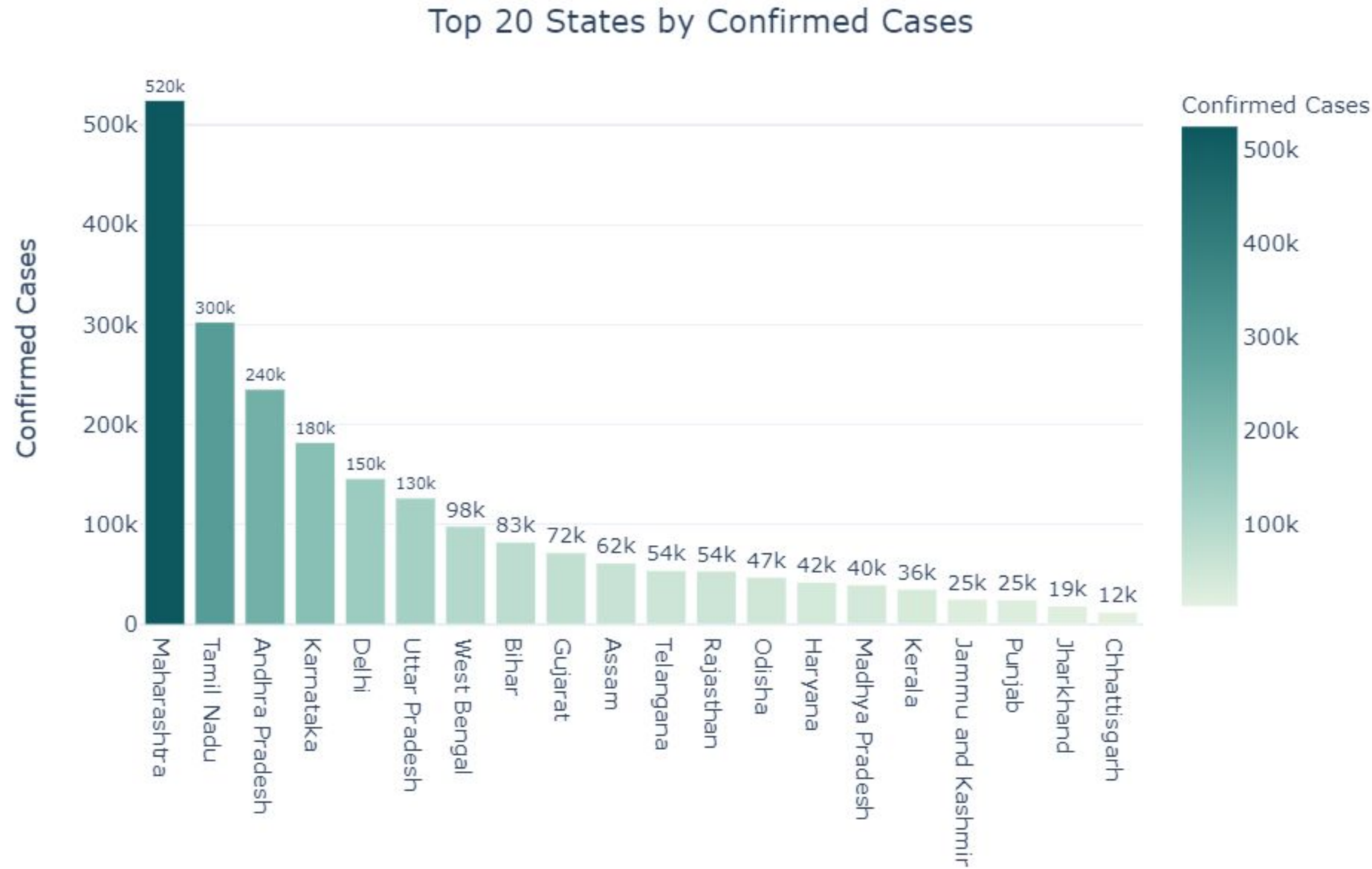
State wise Lab Facilities

Observation:

- Government Labs: MH>TN>UP

- Private Labs: MH > TGN > DL
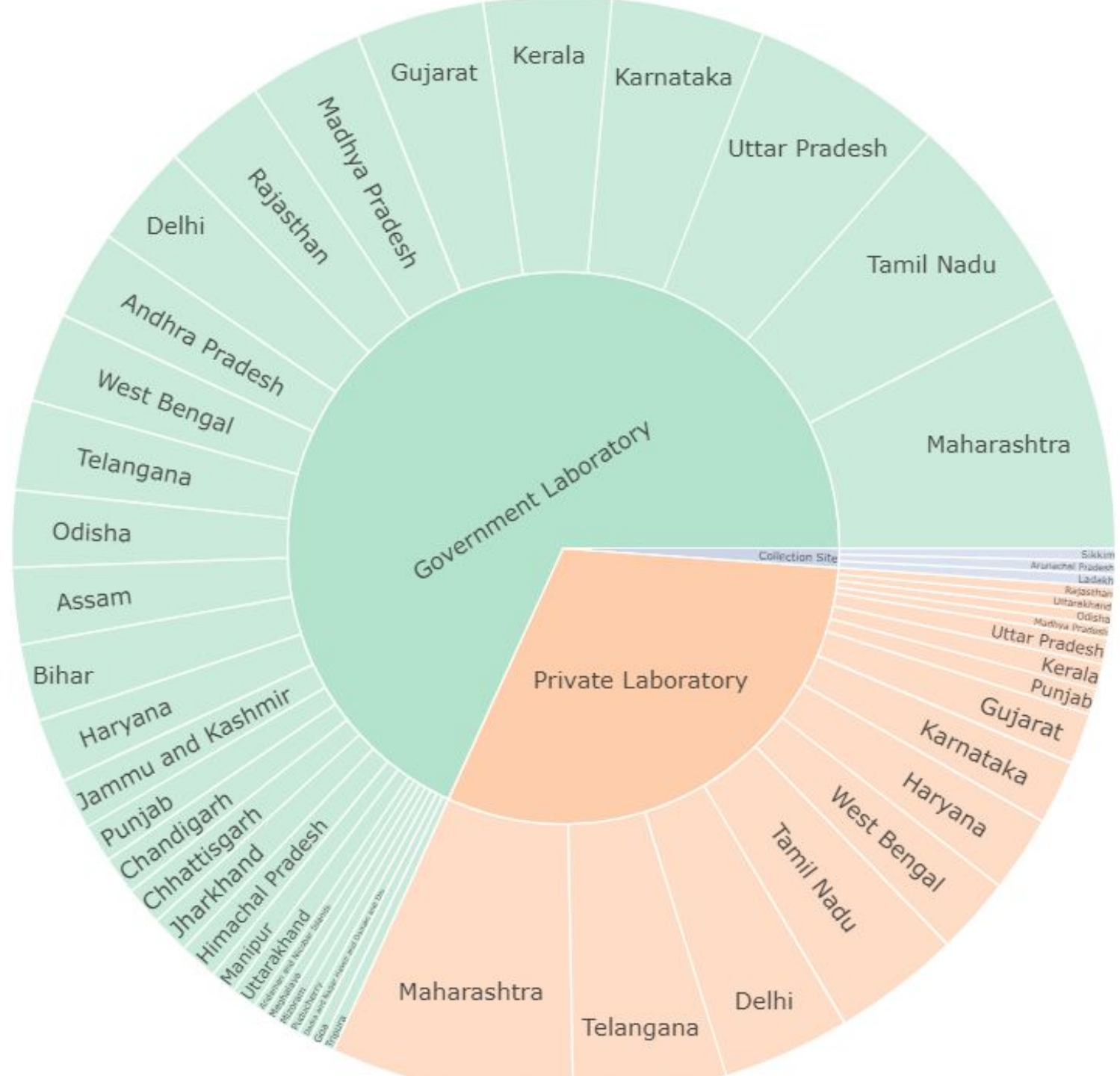
State-wise Distribution of Health Facilites
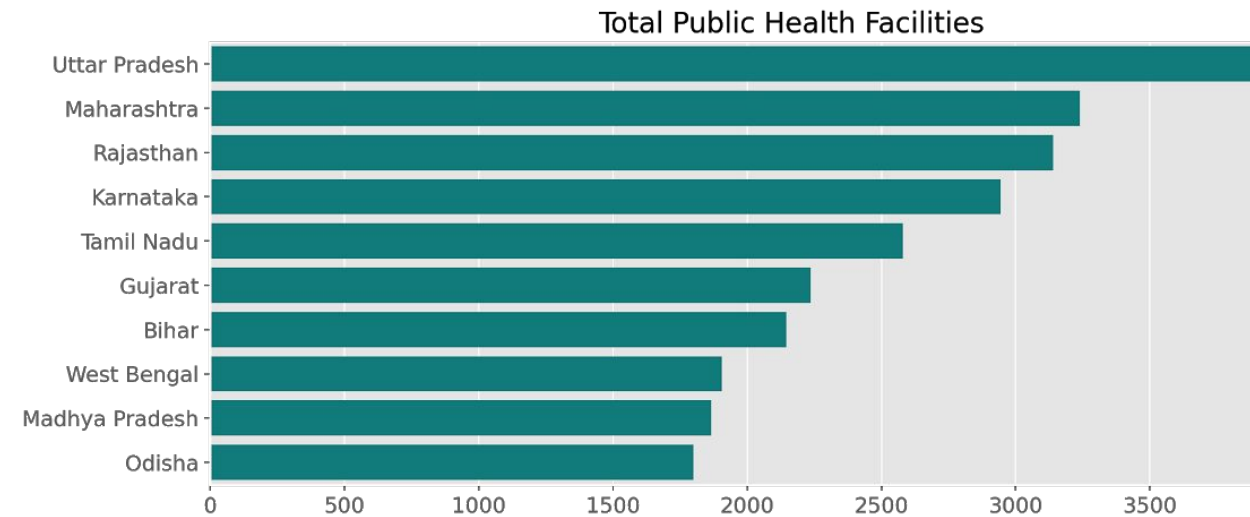
Observation:

- Tamil Nadu doesn't rank that high when comparing Total Public Health Facilities. Its low mortality rate can be attributed to faster detection of the virus in patients. Despite having a lot of Public and Rural health facilities, Karnataka is still contending to cure patients.
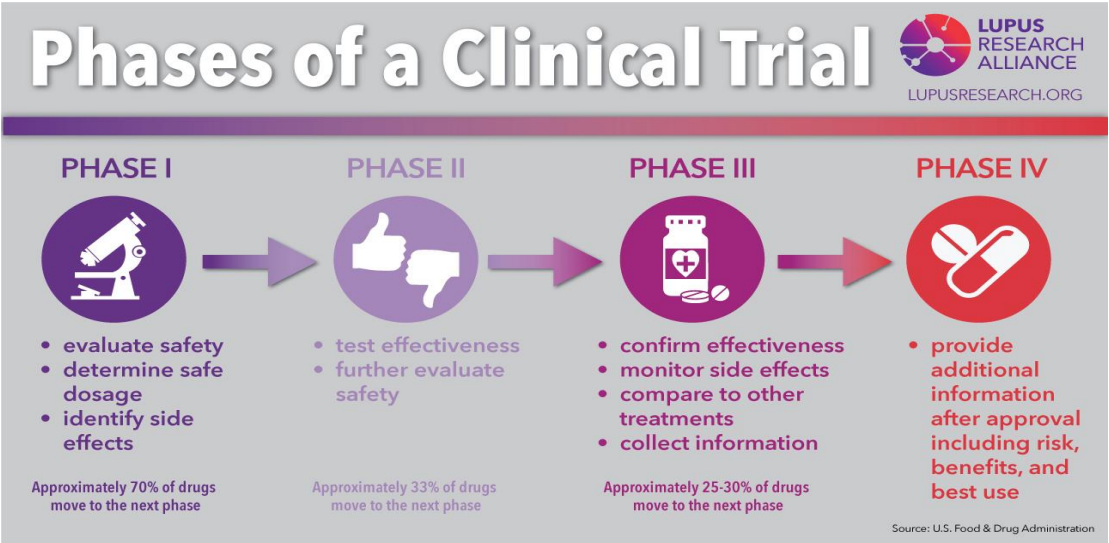
Observation:

- Maharashtra , Delhi ,Telangana need to increase their testing as >10% of their tests are positive. Our prime weapon against COVID is detection, contact tracing and breaking the chain.

- Andhra Pradesh has done well to have a highest test rate despite a limited count of health care institutions in state.

COVID Tests Done vs Positive
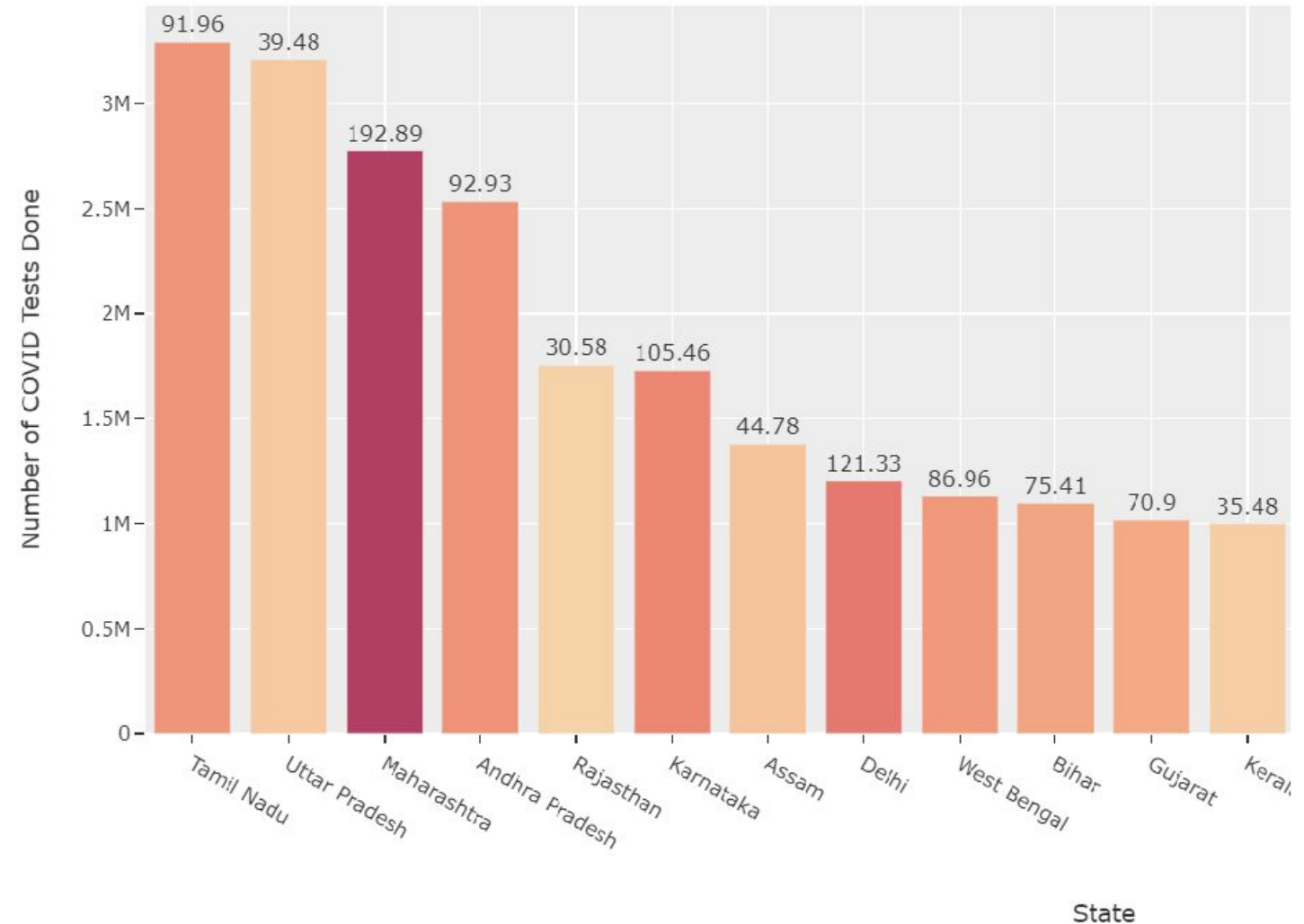
"Everything can be taken from a man but...the last of the human freedoms – to choose one's attitude in any given set of circumstances."

– Viktor Frankl

Clinical Trials

Phases of a Clinical Trial
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LUPUSRESEARCH.ORG

PHASE I
- evaluate safety
- determine safe dosage
- identify side effects

Approximately 70% of drugs move to the next phase

PHASE II
- test effectiveness
- further evaluate safety

Approximately 33% of drugs move to the next phase

PHASE III
- confirm effectiveness
- monitor side effects
- compare to other treatments
- collect information

Approximately 25-30% of drugs move to the next phase

PHASE IV
- provide additional information after approval including risk, benefits, and best use

Source: U.S. Food & Drug Administration

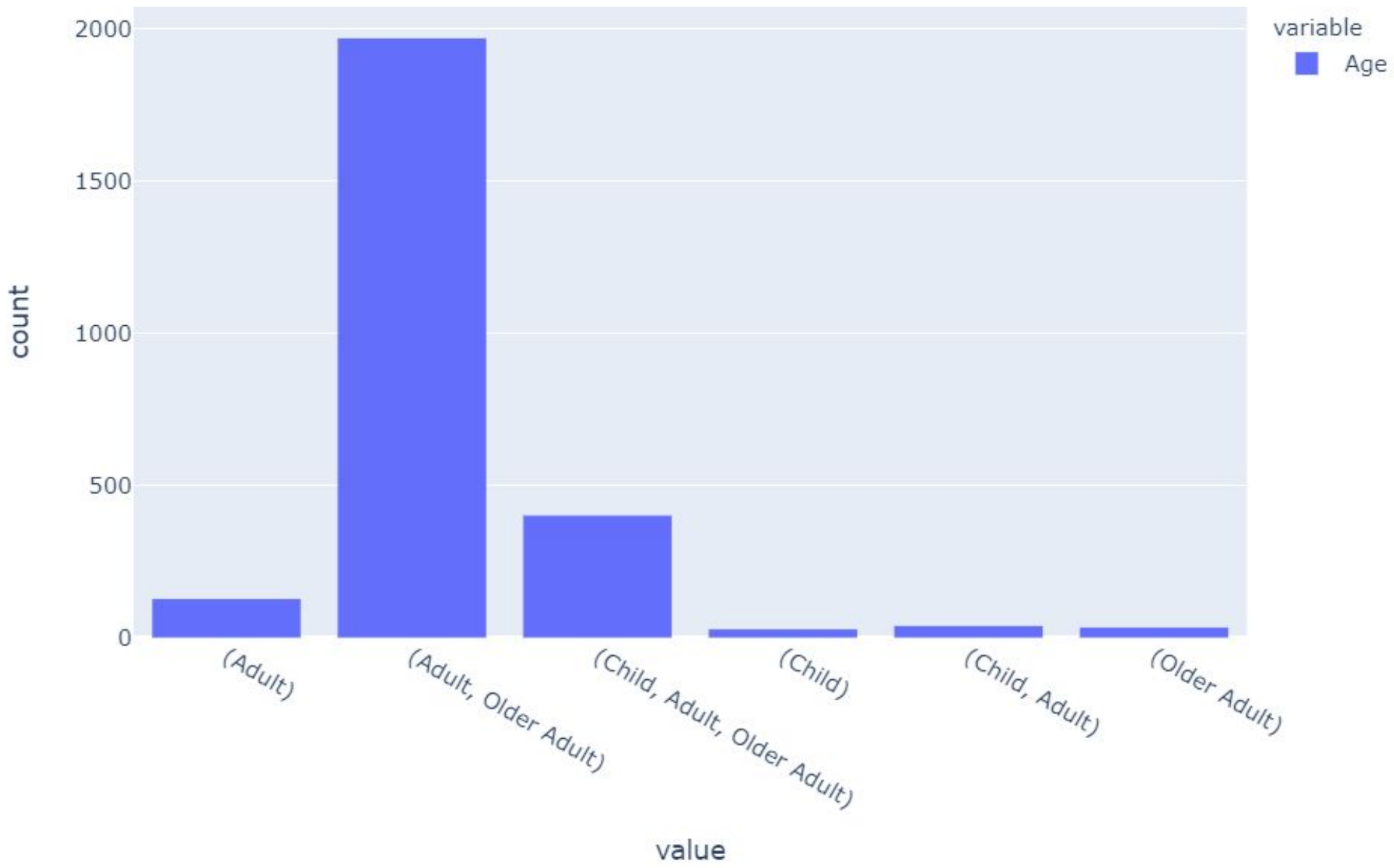# **Vaccine Trials in Different Phases**

Observation:

Majority of Vaccines are in phase 2, with progress towards phase 3 and phase 4.

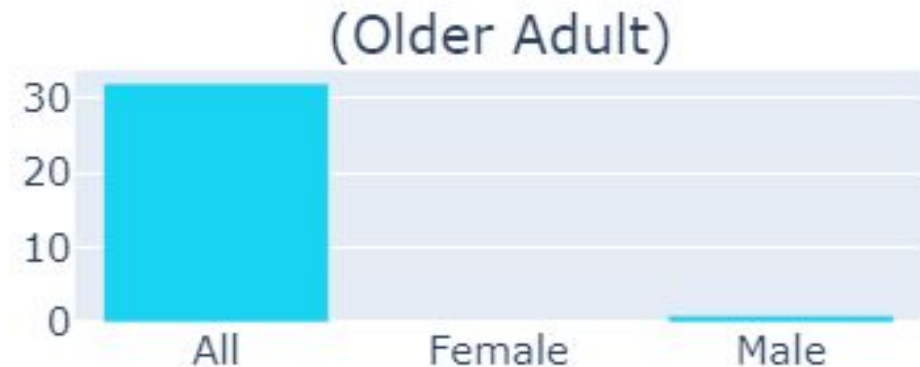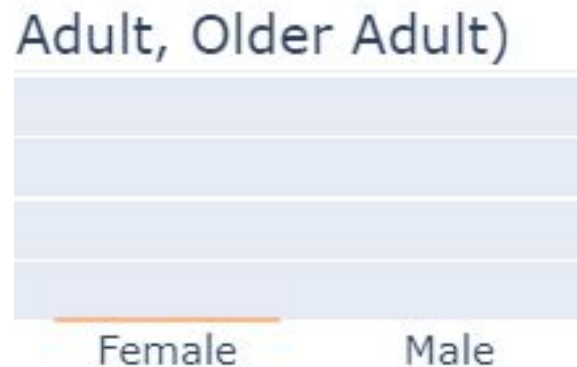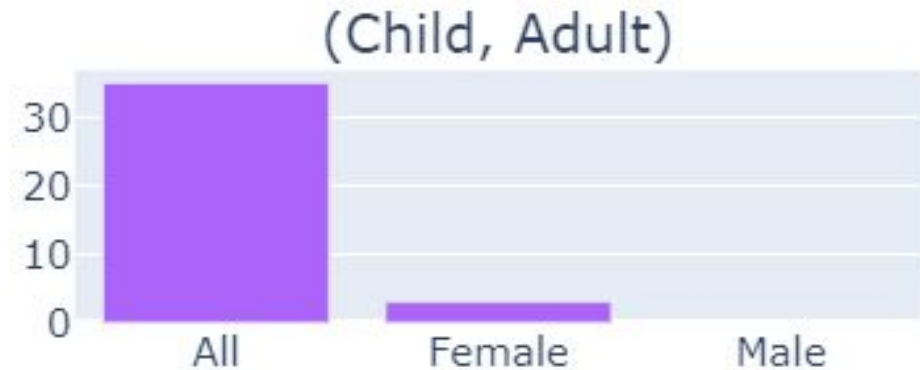Note: Please refer the diagram on previous page for Phases of clinical Trials.
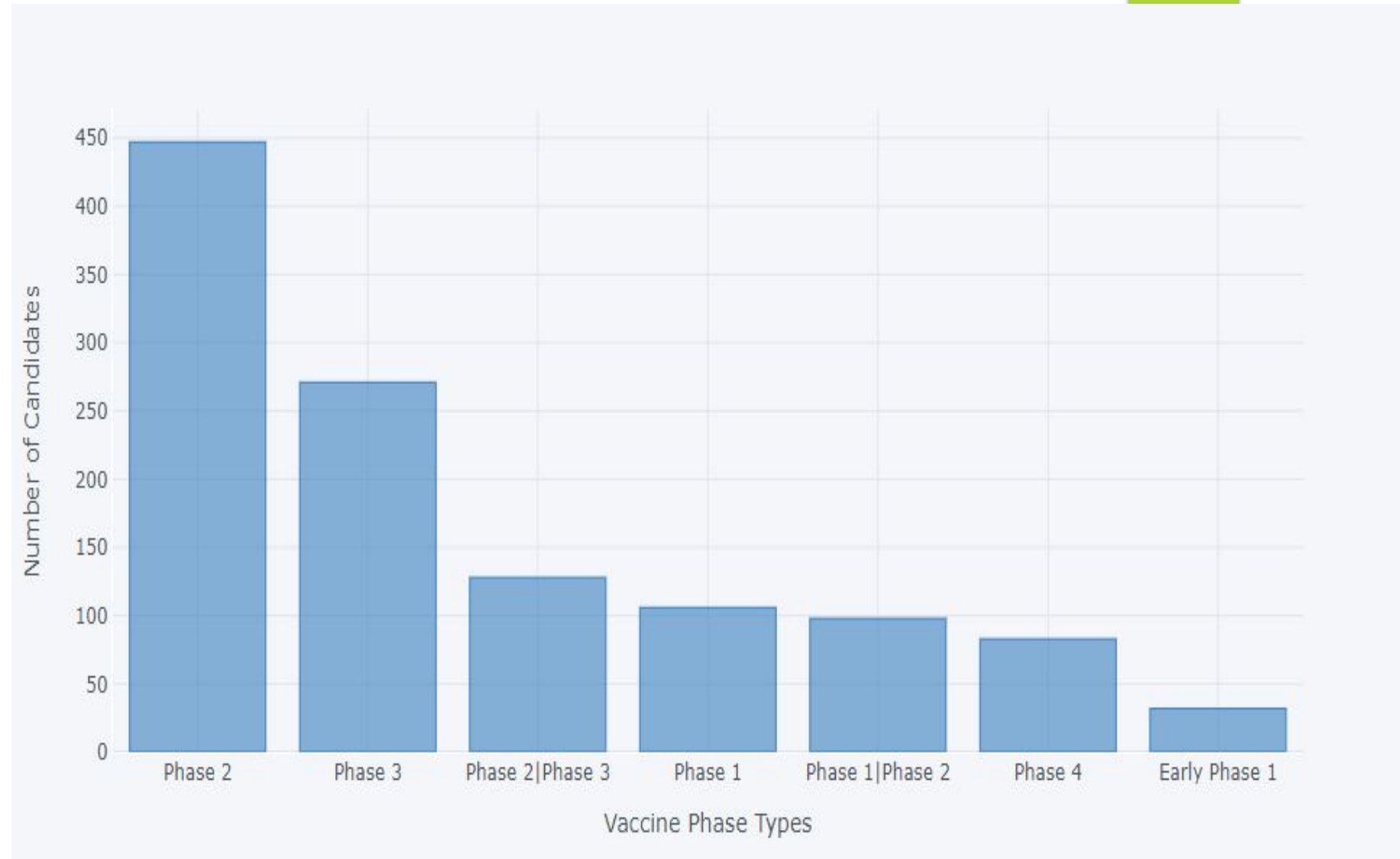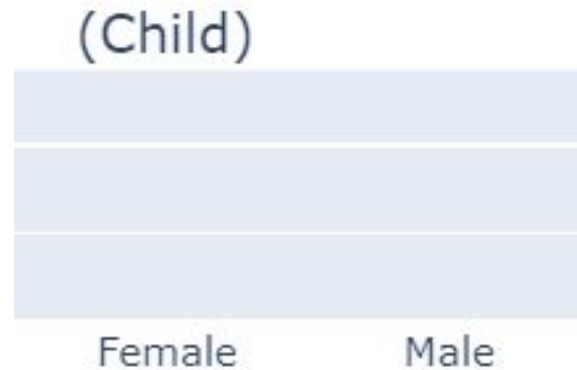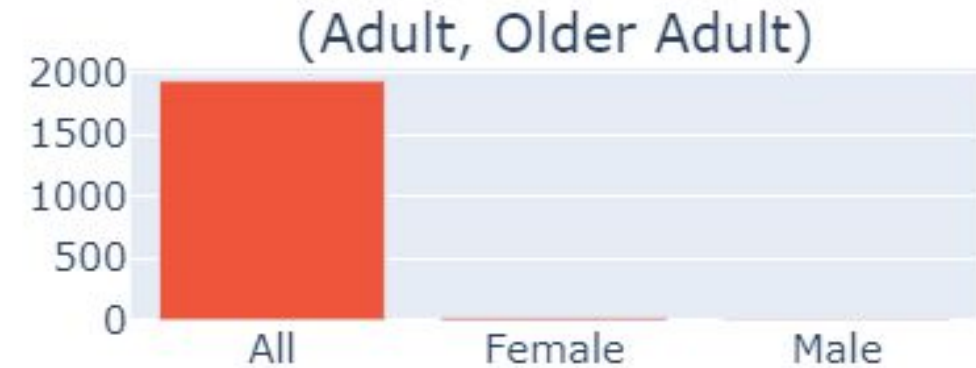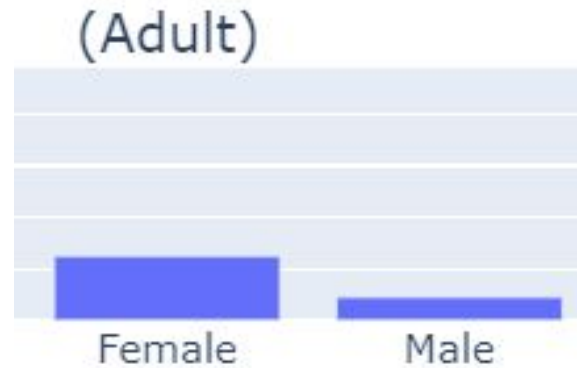
Age Groups involved for trials

Diversity of Volunteers for trials

Observations:

- Most studies have taken data from All Genders

- In (Adult) and (Child,Adult) Category there is significant number of Female patients considered for the studies

A BIG SALUTE TO CORONA WARRIORS

TEAM

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References

1. Ministry of Health and Family Welfare.
2. John Hopkins University github link
3. keggle.com
4. github.com
5. covid19india.org
6. google.com (for photographs)

Python Libraries Used-
1. Pandas
2. Numpy
3.Matplotlib
4.Folium
5.Plotly
6.Seaborn

For Code and Datasets, Please visit-

GitHub

https://github.com/rohitgupta29/AI7-

Thank You!