

Data Science Project Report

(Project Semester August-December 2020)

Covid-19 Analysis in India

Submitted by

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Registration No. 11902757

Programme and Section: P132 & KM002

Course Code: INT217

Under the Guidance of

Maneet Kaur (UID:15709)

Discipline of CSE/IT

Lovely School of Technology and Science

Lovely Professional University, Phagwara



L OVELY
P ROFESSIONAL
U NIVERSITY

CERTIFICATE

This is to certify that **M. Lakshmi Narasa Reddy** bearing Registration no. **11902757** has completed **INT217** project titled, “**Covid-19 Analysis in India**” under my guidance and supervision. To the best of my knowledge, the present work is the result of his/her original development, effort, and study.

Signature and Name of the Supervisor

Designation of the Supervisor

School of Computer Science and Engineering

Lovely Professional University

Phagwara, Punjab.

Date:

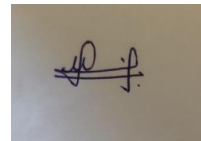
DECLARATION

I, **M. Lakshmi Narasa Reddy**, student of **P132** under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date:

Registration No. **11902757**
Reddy

Signature

A rectangular box containing a handwritten signature in black ink. The signature appears to be 'M. Lakshmi Narasa Reddy' written in a cursive style.

Name of the student: M. Lakshmi Narasa

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019. The disease has since spread worldwide, leading to an ongoing pandemic. More than a year has passed since and the virus is still wreaking havoc in many nations including especially the US and India.

Symptoms of COVID-19 are variable, but often include fever, cough, headache, fatigue, breathing difficulties, and loss of smell and taste. Symptoms may begin one to fourteen days after exposure to the virus. At least a third of people who are infected do not develop noticeable symptoms. Of those people who develop symptoms noticeable enough to be classed as patients, most (81%) develop mild to moderate symptoms (up to mild pneumonia), while 14% develop severe symptoms (dyspnoea, hypoxia, or more than 50% lung involvement on imaging), and 5% suffer critical symptoms (respiratory failure, shock, or multiorgan dysfunction). Older people are at a higher risk of developing severe symptoms. Some people continue to experience a range of effects (long COVID) for months after recovery, and damage to organs has been observed. Multi-year studies are underway to further investigate the long-term effects of the disease

COVID-19 transmits when people breathe in air contaminated by droplets and small airborne particles containing the virus. The risk of breathing these in is highest when people are in close proximity, but they can be inhaled over longer distances, particularly indoors. Transmission can also occur if splashed or sprayed with contaminated fluids in the eyes, nose, or mouth, and, rarely, via contaminated surfaces. People remain contagious for up to 20 days and can spread the virus even if they do not develop symptoms.

Several testing methods have been developed to diagnose the disease. The standard diagnostic method is by detection of the virus' nucleic acid by real-time reverse transcription polymerase chain reaction (rprt-PCR), transcription-mediated amplification (TMA), or by reverse transcription loop-mediated isothermal amplification (RT-LAMP) from a nasopharyngeal swab.

Several COVID-19 vaccines have been approved and distributed in various countries, which have initiated mass vaccination campaigns. Other preventive measures include physical or social distancing, quarantining, ventilation of indoor spaces, covering coughs and sneezes, hand washing, and keeping unwashed hands away from the face. The use of face masks or coverings has been recommended in public settings to minimize the risk of transmissions. While work is underway to develop drugs that inhibit the virus, the primary treatment is symptomatic. Management involves the treatment of symptoms, supportive care, isolation, and experimental measures.

OBJECTIVES

The objectives of the analysis presented in this Report are as follows:

- In this study we cluster the states of India in terms of the spread of COVID-19 and related variables such as active cases, total Positives, Deaths etc and the Population of the state.
- Comparing positivity rates of different states
- Building a Search Board
- Dashboard of Covid 19 across India
- Visual Representation of Covid 19 across states
- Vaccination Tracker
- Visual representation of vaccination across states
- Population Analysis

SCOPE OF ANALYSIS

Data analytics is a process through which data is cleaned analysed and modelled using tools. This data is then used to derive insights. The insights are then used for decision-making purposes.

The world is becoming more tech-driven and fast-paced now, data analysis professional is already playing an increasingly crucial role in businesses. Both start-ups and tech giants in India are adding data analysts to their workforce who are able of recording, analysing and dissecting data to drive efficient decision-making.

CAREER PROSPECTS AND SCOPE OF DATA ANALYTICS:

It has been estimated that data is expected to grow up to 50 times by 2020. Companies must stay updated with the requirements of huge volumes of data so that they don't become obsolete. Therefore, experts who are well-versed in advanced analytics are crucial for organizations to adjust their business models and stay ahead of the competition. To master Data analytics, one can join data analytics training course.

The scope of data analytics In India includes companies in policing, banking, healthcare, fraud detection, e-commerce, energy, telecommunications, and risk management.

JPMorgan, Accenture, Microsoft, Adobe, Flipkart, AIG, Ernst & Young, Wipro, Vodafone & Deloitte are the organizations that had the greatest number of openings for data analysts last year.

Thus, if you have the required skillset and are ready to keep yourself updated, your career as a Data Analyst is expected to keep growing onwards and upwards. This line stands true especially when we consider that a data analyst salary in India is directly or indirectly dependent on how upskilled and updated, they are.

The scope of the project contains Dashboards and visual charts that provide us an insight to the situation of ongoing covid 19 in India across all states. The comparison between the states provides us the idea of action that respective states took against covid 19. Population analysis provides us how the heavily populated states are performing in this time of pandemic.

SOURCE OF DATASET

- <https://www.covid19india.org/>

It is an open-source website where anyone can get the data and use it for the educational purposes.

I have downloaded my covid 19 data from this website.

- <https://www.mohfw.gov.in/>

It is managed by ministry of MINISTRY OF HEALTH AND FAMILY WELFARE.

I have downloaded my Vaccination data from this website.

- https://en.wikipedia.org/wiki/List_of_states_and_union_territories_of_India_by_population

It is the Wikipedia page where the population data of various states is available from 2001 census.

I have downloaded state wise population data from this website.

ETL PROCESS

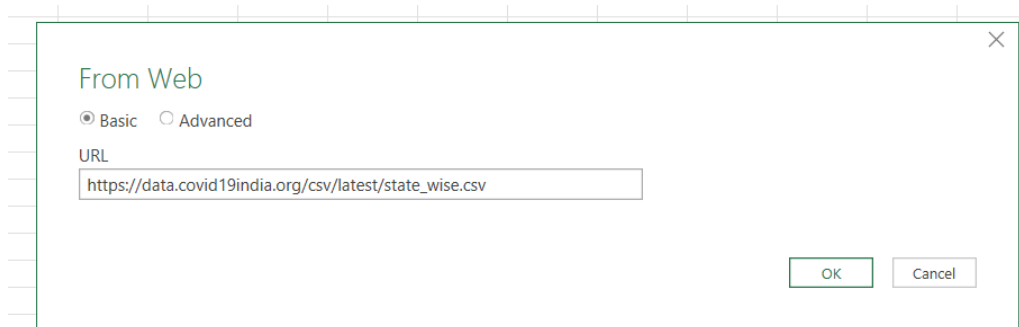
1. ETL FOR STATE_WISE COVID DATA:

Extraction:

I took the data from covid19India website where the data available in the form csv file updated regularly.

Link for the file: https://data.covid19india.org/csv/latest/state_wise.csv

Then go to data tab in excel and select get data from web and paste the above csv file link in the **URL** place and press ok.



From Web

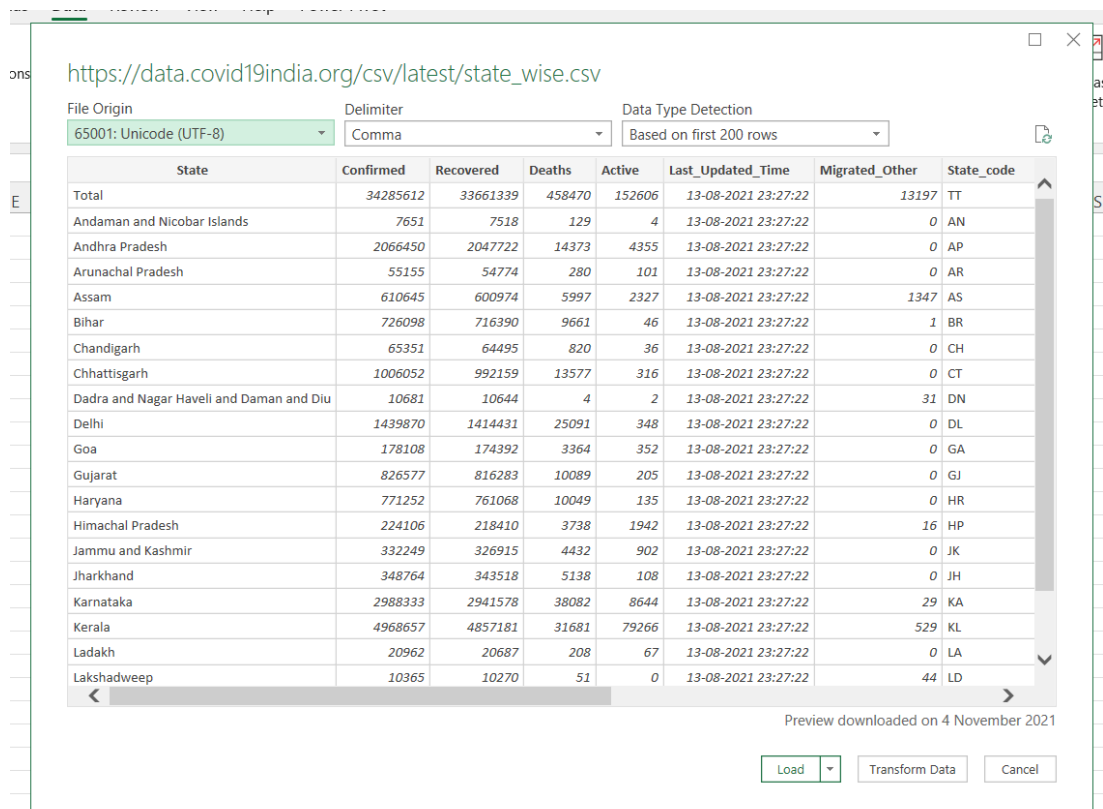
☒ Basic ☐ Advanced

URL

OK Cancel

Transformation:

Press TRANSFORM DATA in the given table



https://data.covid19india.org/csv/latest/state_wise.csv

File Origin: 65001: Unicode (UTF-8) | Delimiter: Comma | Data Type Detection: Based on first 200 rows

State	Confirmed	Recovered	Deaths	Active	Last_Updated_Time	Migrated_Other	State_code
Total	34285612	33661339	458470	152606	13-08-2021 23:27:22	13197	TT
Andaman and Nicobar Islands	7651	7518	129	4	13-08-2021 23:27:22	0	AN
Andhra Pradesh	2066450	2047722	14373	4355	13-08-2021 23:27:22	0	AP
Arunachal Pradesh	55155	54774	280	101	13-08-2021 23:27:22	0	AR
Assam	610645	600974	5997	2327	13-08-2021 23:27:22	1347	AS
Bihar	726098	716390	9661	46	13-08-2021 23:27:22	1	BR
Chandigarh	65351	64495	820	36	13-08-2021 23:27:22	0	CH
Chhattisgarh	1006052	992159	13577	316	13-08-2021 23:27:22	0	CT
Dadra and Nagar Haveli and Daman and Diu	10681	10644	4	2	13-08-2021 23:27:22	31	DN
Delhi	1439870	1414431	25091	348	13-08-2021 23:27:22	0	DL
Goa	178108	174392	3364	352	13-08-2021 23:27:22	0	GA
Gujarat	826577	816283	10089	205	13-08-2021 23:27:22	0	GJ
Haryana	771252	761068	10049	135	13-08-2021 23:27:22	0	HR
Himachal Pradesh	224106	218410	3738	1942	13-08-2021 23:27:22	16	HP
Jammu and Kashmir	332249	326915	4432	902	13-08-2021 23:27:22	0	JK
Jharkhand	348764	343518	5138	108	13-08-2021 23:27:22	0	JH
Karnataka	2988333	2941578	38082	8644	13-08-2021 23:27:22	29	KA
Kerala	4968657	4857181	31681	79266	13-08-2021 23:27:22	529	KL
Ladakh	20962	20687	208	67	13-08-2021 23:27:22	0	LA
Lakshadweep	10365	10270	51	0	13-08-2021 23:27:22	44	LD

Preview downloaded on 4 November 2021

Load Transform Data Cancel

Then transform the data as required.

Applied changes can be seen under applied steps section.

Manage Columns

Reduce Rows

Sort

Transform

Combine

Parameters

Data Sources

New Query

Table.RemoveColumns(#"Renamed Columns",{"State_Notes", "Delta_Deaths", "Delta_Recovered", "Delta_Confirmed", "Last_Updated_Time",

State/UT

Confirmed

Recovered

Deaths

Active

State_code

1

Total

34285612

33661339

458470

152606

TT

2

Andaman and Nicobar Islands

7651

7518

129

4

AN

3

Andhra Pradesh

2066450

2047722

14373

4355

AP

4

Arunachal Pradesh

55155

54774

280

101

AR

5

Assam

610645

600974

5997

2327

AS

6

Bihar

726098

716390

9661

46

BR

7

Chandigarh

65351

64495

820

36

CH

8

Chhattisgarh

1006052

992159

13577

316

CT

9

Dadra and Nagar Haveli and Daman and Diu

10681

10644

4

2

DN

10

Delhi

1439870

1414431

25091

348

DL

11

Goa

178108

174392

3364

352

GA

12

Gujarat

826577

816283

10089

205

GJ

13

Haryana

771252

761068

10049

135

HR

14

Himachal Pradesh

224106

218410

3738

1942

HP

15

Jammu and Kashmir

332249

326915

4432

902

JK

16

Jharkhand

348764

343518

5138

108

JH

17

Karnataka

2988333

2941578

38082

8644

KA

18

Kerala

4968657

4857181

31681

79266

KL

19

Ladakh

20962

20687

208

67

LA

20

Lakshadweep

10365

10270

51

0

LD

21

Madhya Pradesh

792854

782215

10524

115

MP

22

Maharashtra

6611078

6450585

140216

16658

MH

23

Manipur

123731

121102

1921

708

MN

24

Meghalaya

83627

81746

1450

431

ML

25

Mizoram

121359

114612

432

6315

MZ

26

Nagaland

131842

29904

685

210

NL

27

Odisha

1041457

1029147

8386

3924

OR

28

Puducherry

128013

125726

1857

430

PY

Query Settings

PROPERTIES

Name

state_wise

All Properties

APPLIED STEPS

Source

Promoted Headers

Changed Type

Renamed Columns

Removed Columns

Prepared by: Anshul K. Gupta

Prepared on: 2023-09-14 10:00:00

Prepared by: Anshul K. Gupta

Prepared on: 2023-09-14 10:00:00

2. ETL FOR VACCINE DATA:

Extraction:

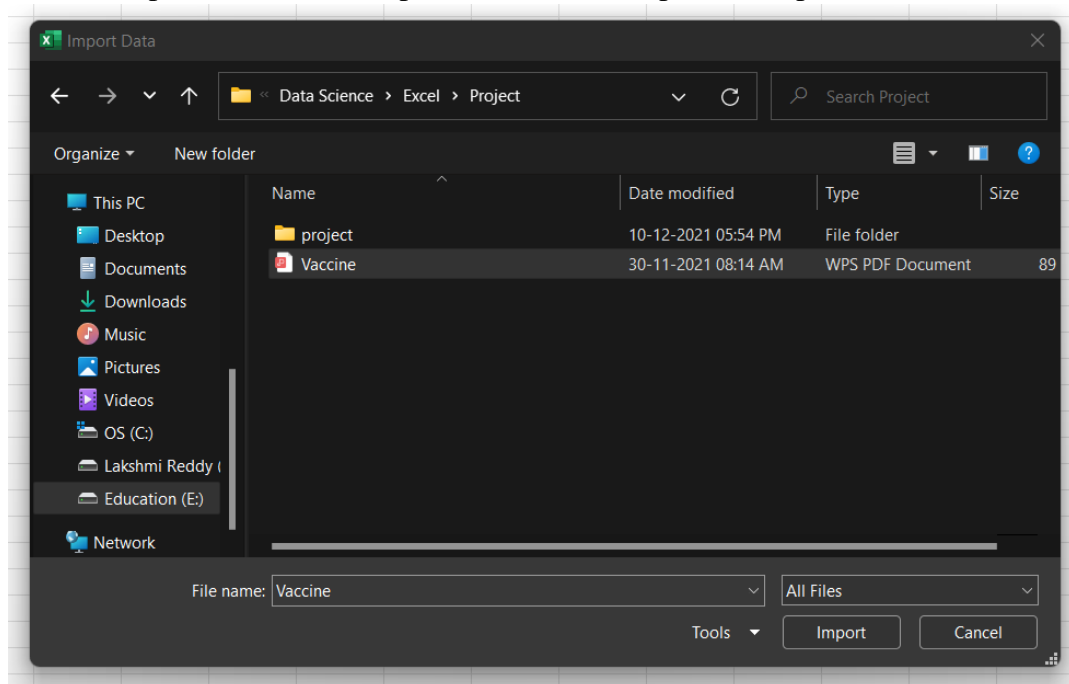
I took the vaccination data of states from MOHFW website where vaccination data of all the states are available in the form of pdf.

Download the pdf

Link to Pdf:

<https://www.mohfw.gov.in/pdf/CummulativeCovidVaccinationReport09december2021.pdf>

Then go to data tab in excel and select data from file option and select pdf. Select the path of the vaccine pdf file and click import data option.



Transformation:

Applied changes can be seen under applied steps section.

= Table.ReplaceValue(#"Replaced Value1", "Daman & Diu", "Daman and Diu", Replacer.ReplaceText, {"State/UT"})						
S. No.	State/UT	1st Dose	1 st	2nd Dose	1 st	Total Doses
1	Andaman and Nicobar Islands	296748		255179		551927
2	Andhra Pradesh	34686365		24747478		59433843
3	Arunachal Pradesh	793959		610181		1404140
4	Assam	21088077		11875829		32963906
5	Bihar	54295255		26591311		80886566
6	Chandigarh	940604		628071		1568675
7	Chhattisgarh	16406721		9370586		25777307
8	Dadra and Nagar Haveli	395054		224567		619621
9	Daman and Diu	279137		212645		491782
10	Delhi	13842452		8789721		22632173
11	Goa	1282226		1028810		2311036
12	Gujarat	45774702		34791894		80566596
13	Haryana	18562030		10031185		28593215
14	Himachal Pradesh	5820640		5119653		10940293
15	Jammu & Kashmir	9597825		6985685		16583510
16	Jharkhand	16534628		7774875		24309503
17	Karnataka	44638373		29234197		73872570
18	Kerala	25670739		17203634		42874373
19	Ladakh	211855		170926		382781
20	Lakshadweep	55399		49217		104616
21	Madhya Pradesh	51077647		35044626		86122273
22	Maharashtra	73737476		39388598		113126074
23	Manipur	1280996		870041		2151037
24	Meghalaya	1164562		807468		1972030
25	Mizoram	731876		556630		1288506
26	Nagaland	737995		547038		1285033
27	Odisha	27788872		15565985		43354857
28	Puducherry	764159		469363		1233522

LOAD:

Click **CLOSE AND LOAD** to get the data in to the required sheet.

3. ETL FOR STATE_WISE POPULATION DATA:

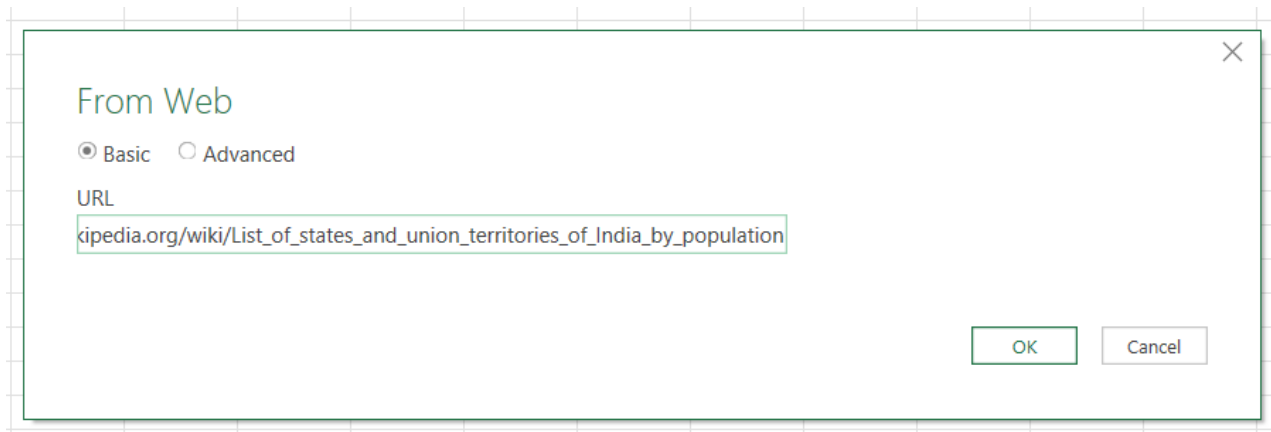
EXTRACTION:

I took the population data of all states across India from Wikipedia.

Link to download data:

https://en.wikipedia.org/wiki/List_of_states_and_union_territories_of_India_by_population

Then go to data tab in excel and select data from web option and paste above given URL and press ok.



TRANSFORMATION:

Perform the necessary changes

Applied changes are visible under applied steps section.

= Table.ReplaceValue("#Removed Errors1","NCT of Delhi","Delhi",Replacer.ReplaceText,{"State/UT"})							Query Settings
Rank	State/UT	1.2 Population	% National Share (%)	% Decadal growth (200...	Rural population	%	PROPERTIES
1	Uttar Pradesh	199812341	16.51%	20.20%	155317278		Name
2	Maharashtra	112374333	9.28%	20.00%	61556074		Population
3	Bihar	104099452	8.60%	25.40%	92341436		All Properties
4	West Bengal	91276115	7.54%	13.80%	62183113		APPLIED STEPS
5	Madhya Pradesh	72626809	6.00%	16.30%	52557404		Source
6	Tamil Nadu	72147030	5.96%	15.60%	37229590		Navigation
7	Rajasthan	68548437	5.66%	21.30%	51500352		Changed Type
8	Karnataka	61095297	5.05%	15.60%	30069335		Promoted Headers
9	Gujarat	60439692	4.99%	19.30%	34694609		Changed Type1
10	Andhra Pradesh	49577103	4.10%	11.00%	34966693		Renamed Columns
11	Odisha	41974219	3.47%	14.00%	34970562		Changed Type2
12	Telangana	35003674	2.89%	13.58%	21395009		Removed Columns
13	Kerala	33406061	2.76%	4.90%	17471135		Removed Errors
14	Jharkhand	32988134	2.73%	22.40%	25055073		Removed Errors1
15	Assam	31205576	2.58%	17.70%	26807034		Replaced Value
16	Punjab	27743338	2.29%	13.89%	17344192		
17	Chhattisgarh	25545198	2.11%	22.60%	19607961		
18	Haryana	25351462	2.09%	19.90%	16509359		
19	UT1	16787941	1.39%	21.20%	419042		
20	Jammu and Kashmir	12267032	1.01%	23.60%	9064220		
21	Uttarakhand	10086292	0.83%	18.80%	7036954		
22	Himachal Pradesh	6864602	0.57%	12.90%	6176050		
23	Tripura	3673917	0.30%	14.80%	2712464		
24	Meghalaya	2966889	0.25%	27.90%	2371439		
25	Manipur	2570390	0.21%	18.60%	1793875		
26	Goa	1458545	0.12%	8.20%	551731		
27	Arunachal Pradesh	1383727	0.11%	26.00%	1066358		
28							

profiling based on top 1000 rows

PREVIEW DOWNLOADED AT 11:34 AM

LOAD:

After the necessary changes are made click CLOSE AND LOAD to get the data to the required sheet

JOINING DATASETS

Before performing the analysis on our data lets join our datasets to ne another.

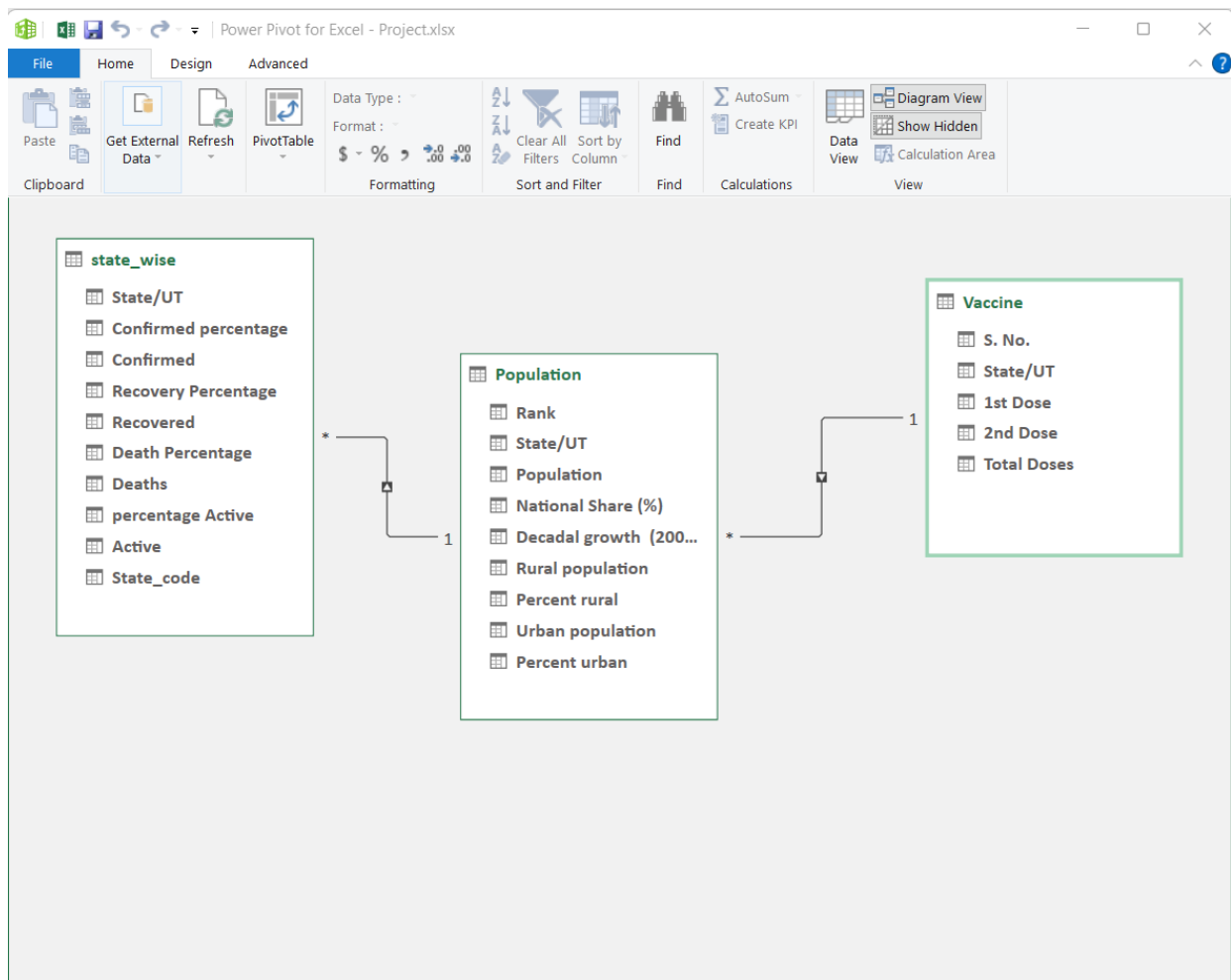
I have joined my all three datasets based on state name column: STATE/UT

STEPS TO JOIN:

To join these data sets we have to addon power pivot from microsoft excel add ons

After adding power pivot go to manage data option and click it.

Then join the data sets as shown below.



ANALYSIS ON DATA

State wise covid analysis

Analyze the data from all states to know about the severity in spread of covid-19

1. Confirmed Vs Recovered:

Description:

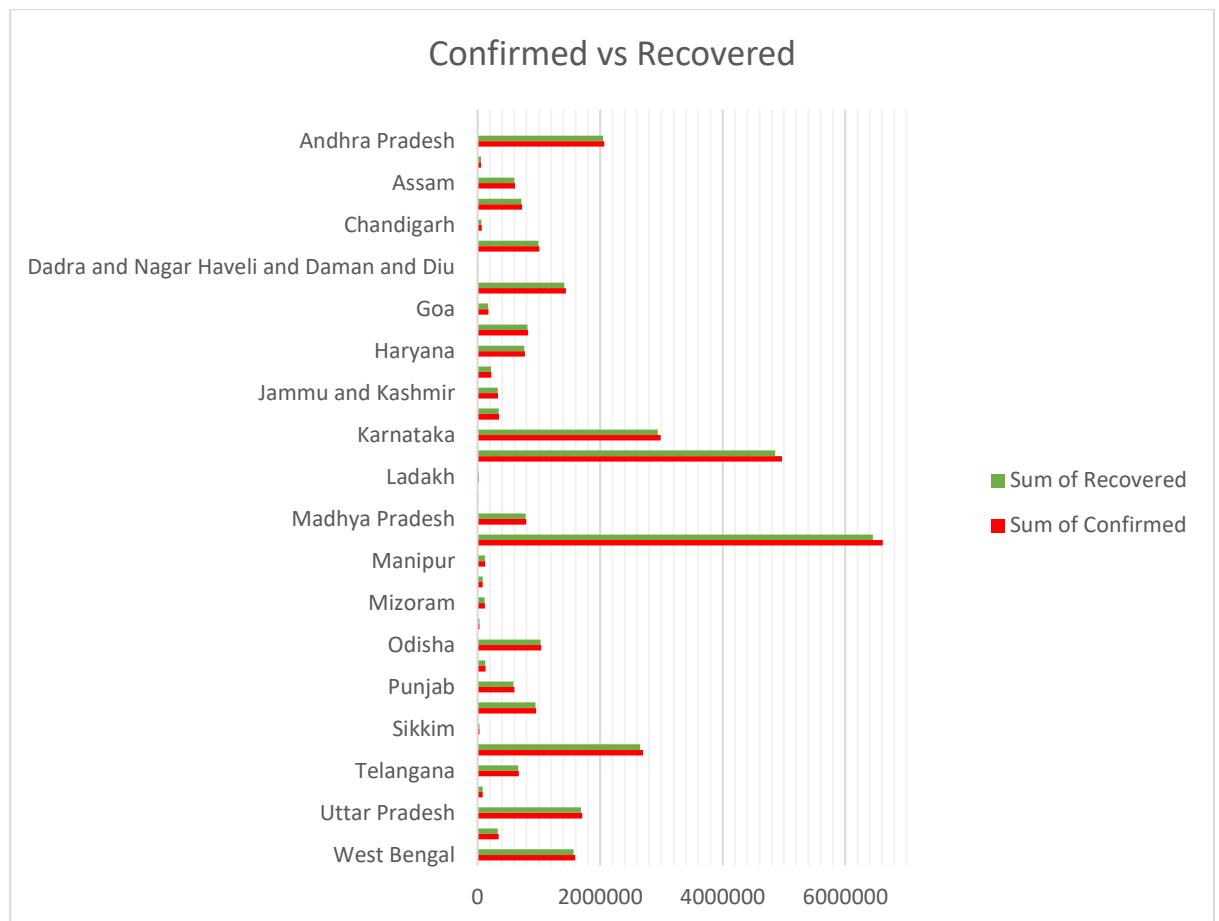
Get the data into a pivot Table

Select states as columns and get the no. of confirmed vs no of recovered cases of covid-19.

Requirements:

Pivot table skills, graphs

Analysis Results:



2.Top 10 States with Covid-19

Description:

Visual Representation of top 10 states with covid 19.

Project a graph with total no of confirmed cases across states.

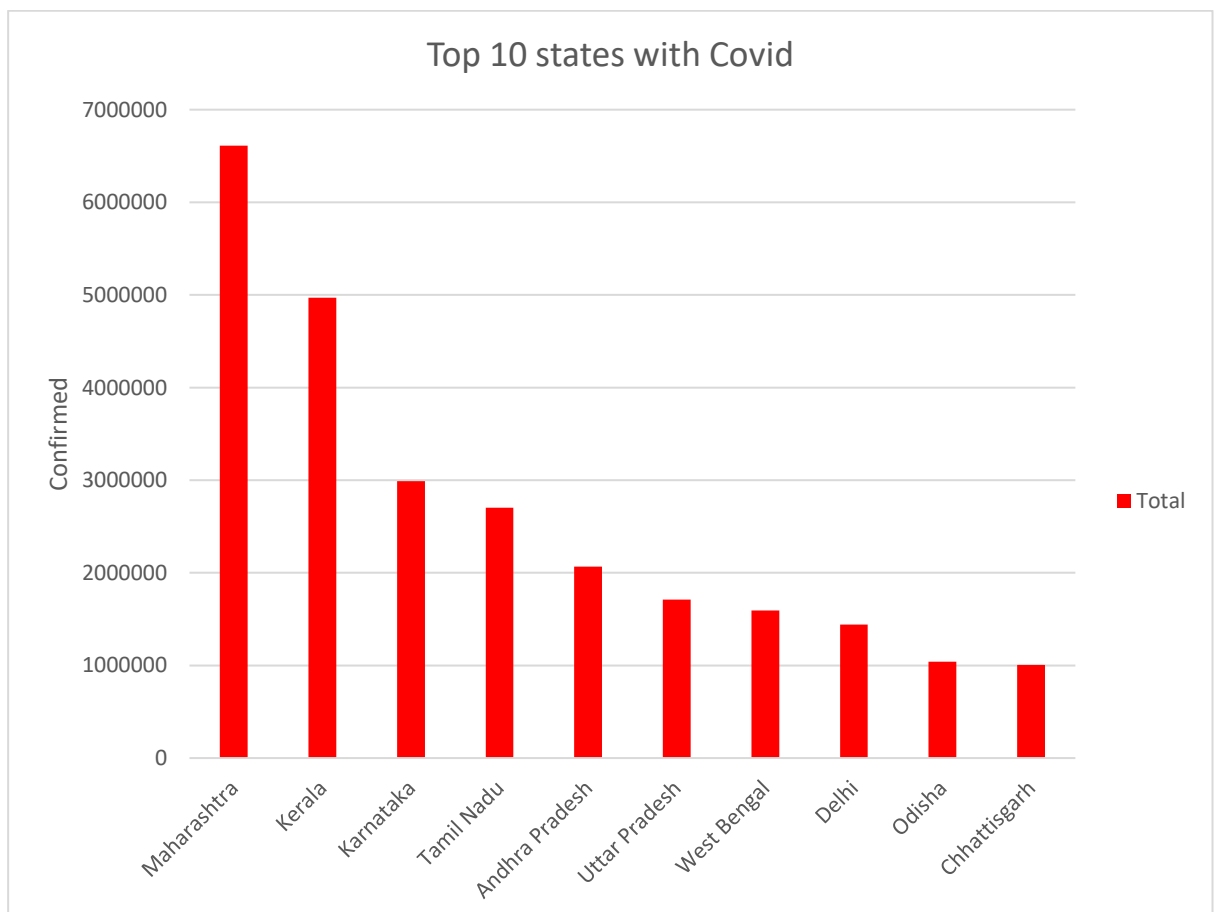
Sort the confirmed cases column as largest to smallest

Filter the data to show top 10 states.

Requirements:

Pivot table skills, sorting, applying filters, graphs

Analysis Results:

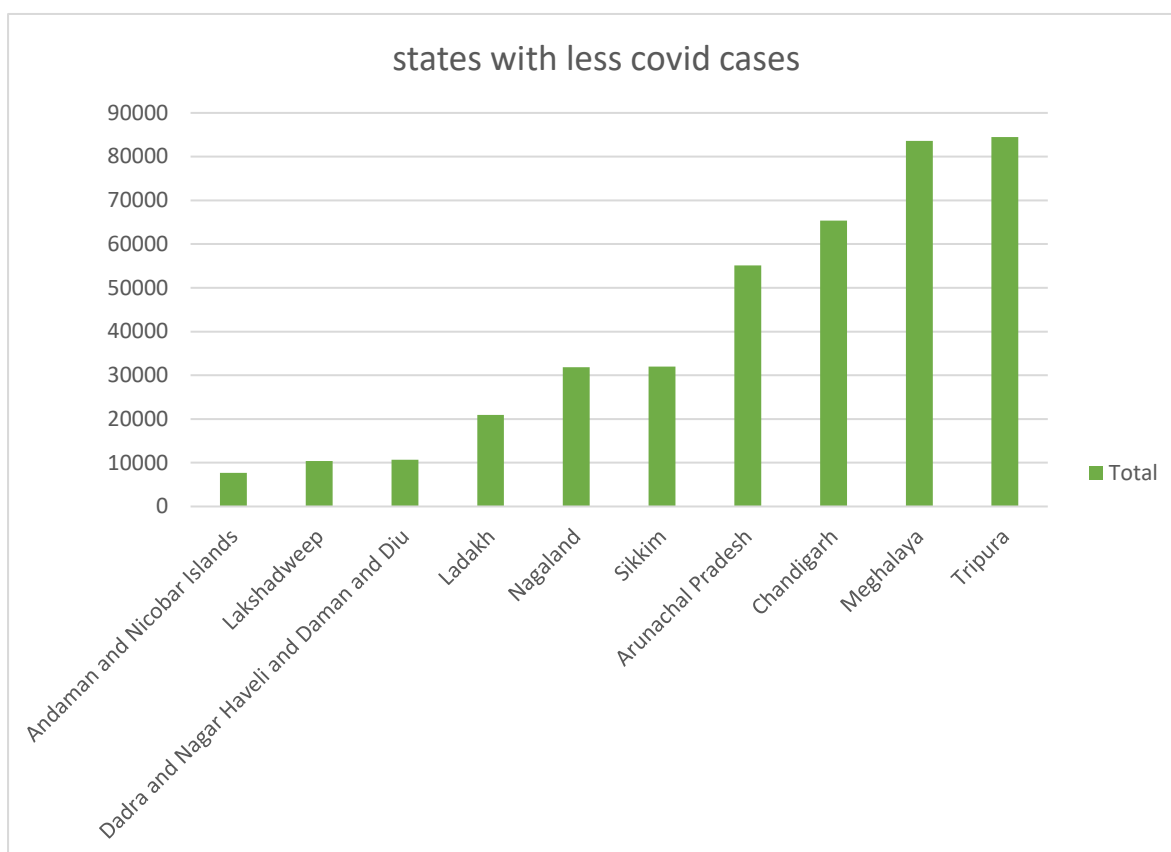


3.States with less covid

Process:

Follow the same as above but this time filter the data to get last 10 states

Analysis Results:



4.States with high Recovery rate:

Description:

Get the data into a pivot Table

Select states as columns and get the no.of recovered cases of covid-19.

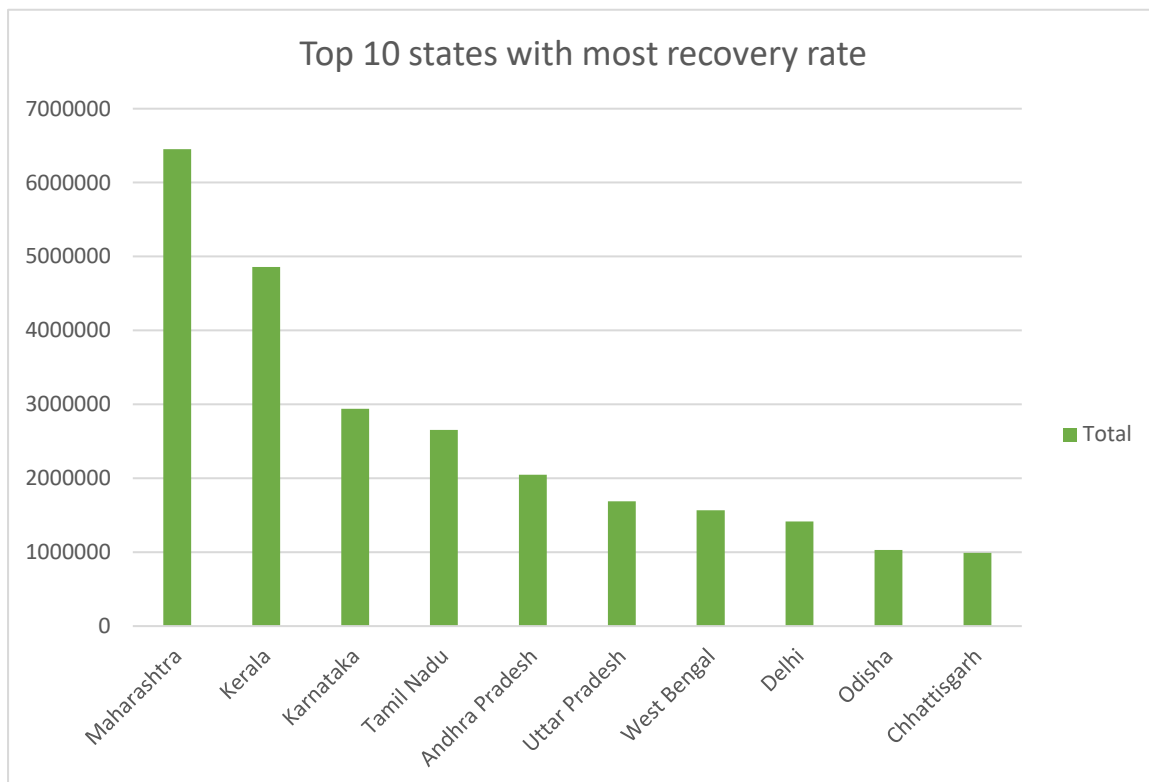
Sort the recovered cases column as largest to smallest

Filter the data to show top 10 states

Requirements:

Pivot table skills, sort, filter, graphs

Analysis Results:

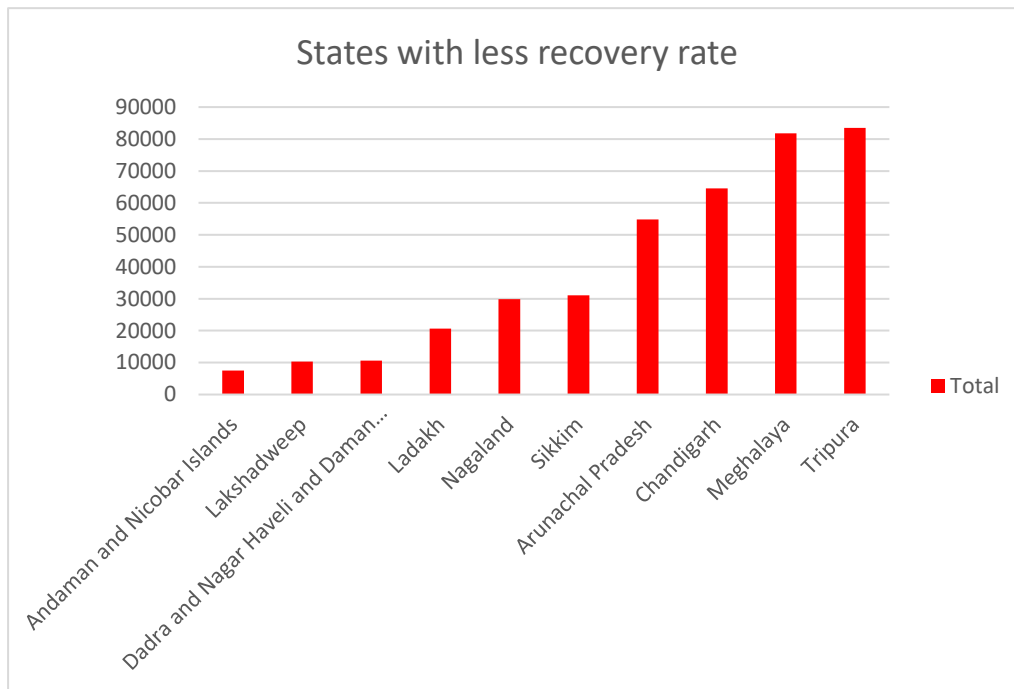


5.States with less recovery rate:

Process:

Follow the same as above but this time filter the data to get last 10 states

Analysis Results:



Vaccine data Analysis

Analyze the data from all states to know about the Vaccination against covid-19

1.Comparison of Doses:

Description:

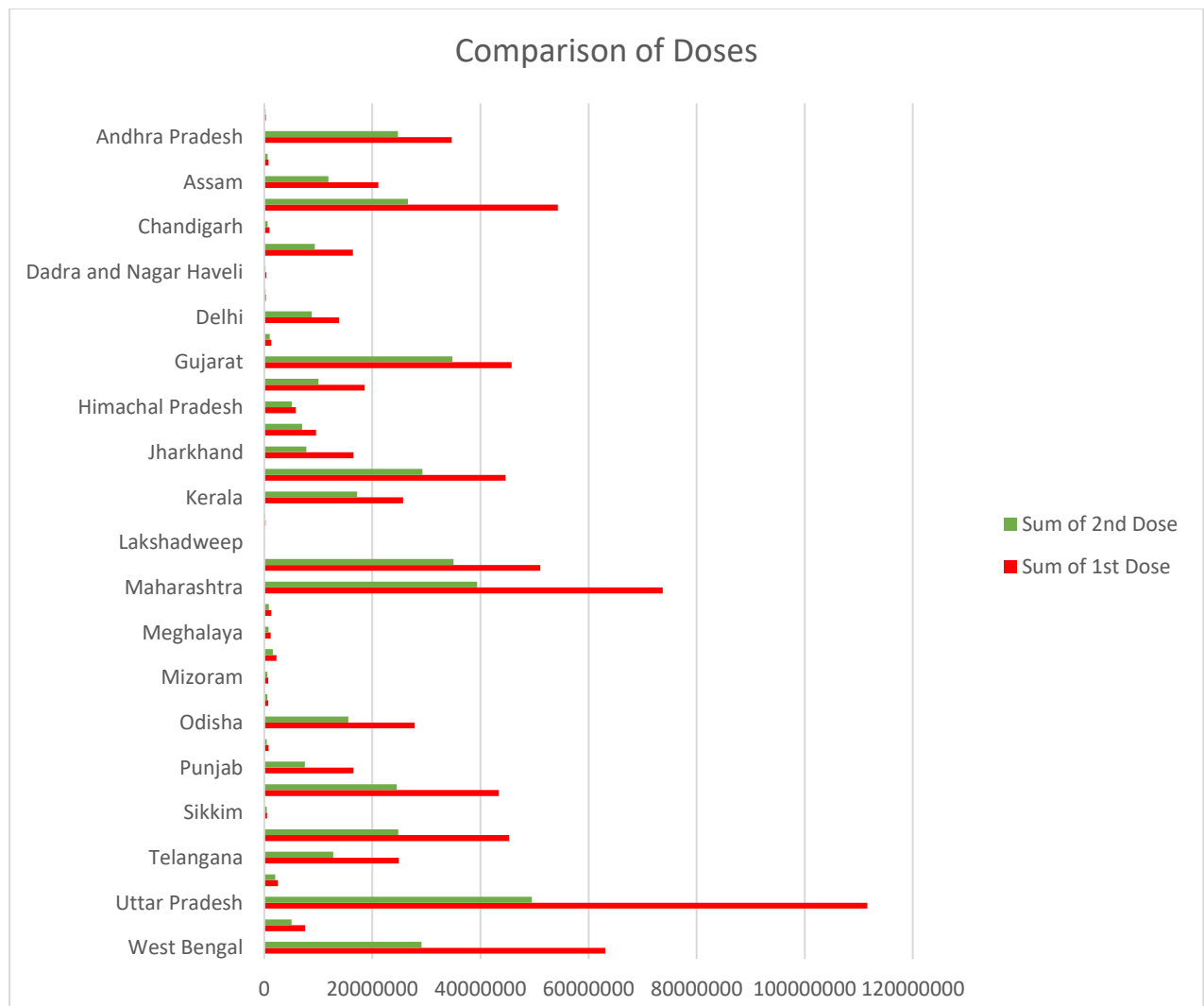
Get the data into a pivot Table

Select states as columns and get the no.of first Dose vs no.of second Dose vaccine of covid-19.

Requirements:

Pivot table skills, graphs

Analysis Results:



2.Top 10 fully Vaccinated States:

Description:

Get the data into a pivot Table

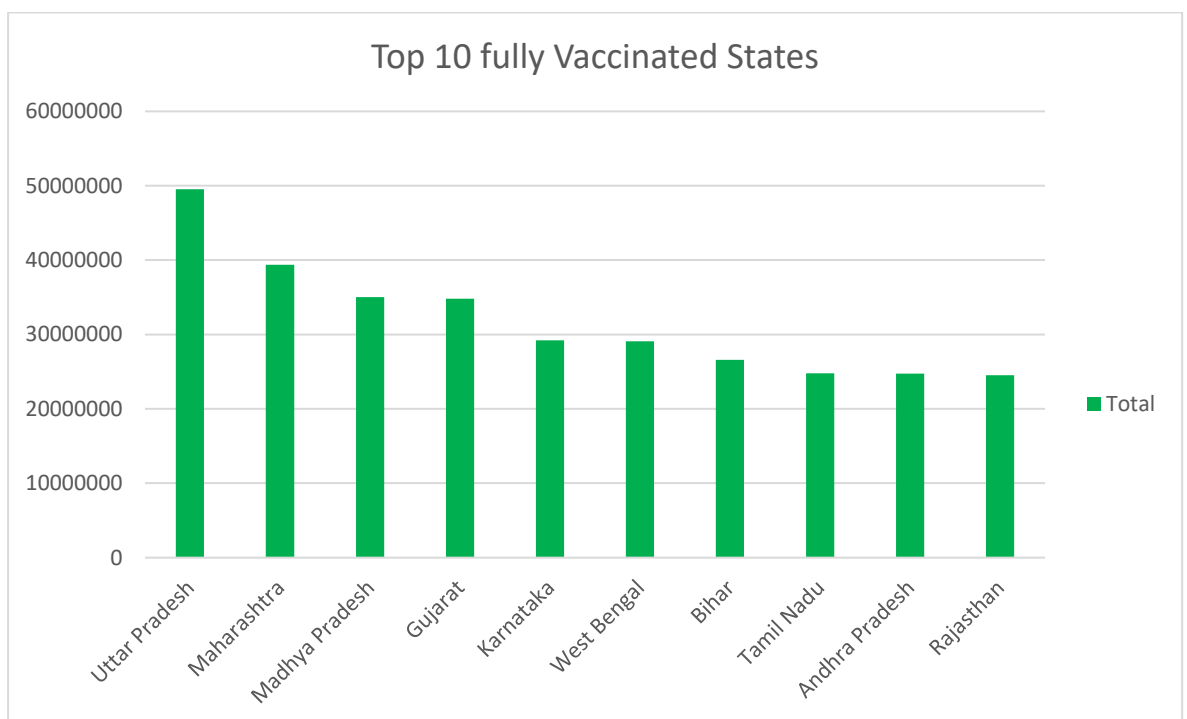
Select states as columns and get the no.of second Dose vaccine of covid-19.

Sort the data as largest to smallest and filter top 10 states.

Requirements:

Pivot table skills, sorting, filters, graphs

Analysis Results:

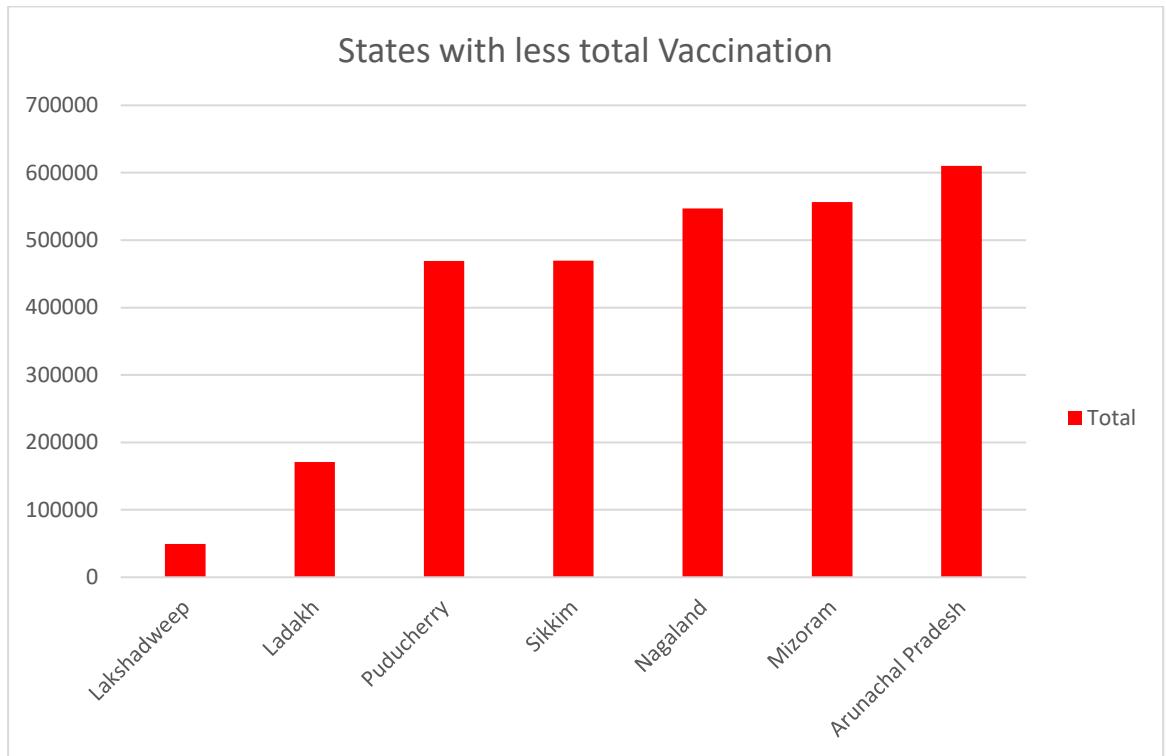


3.States with less total Vaccinations

Process:

Follow the same as above but filter to get last 10 states.

Analysis Results:



Population Analysis

Using the data from the population dataset to bring the population of each states in to picture and analyzing the data keeping the population in view to know how the heavily populated states are performing compared to less populated states.

1.Population vs Confirmed cases:

Description:

Get the data into a pivot Table

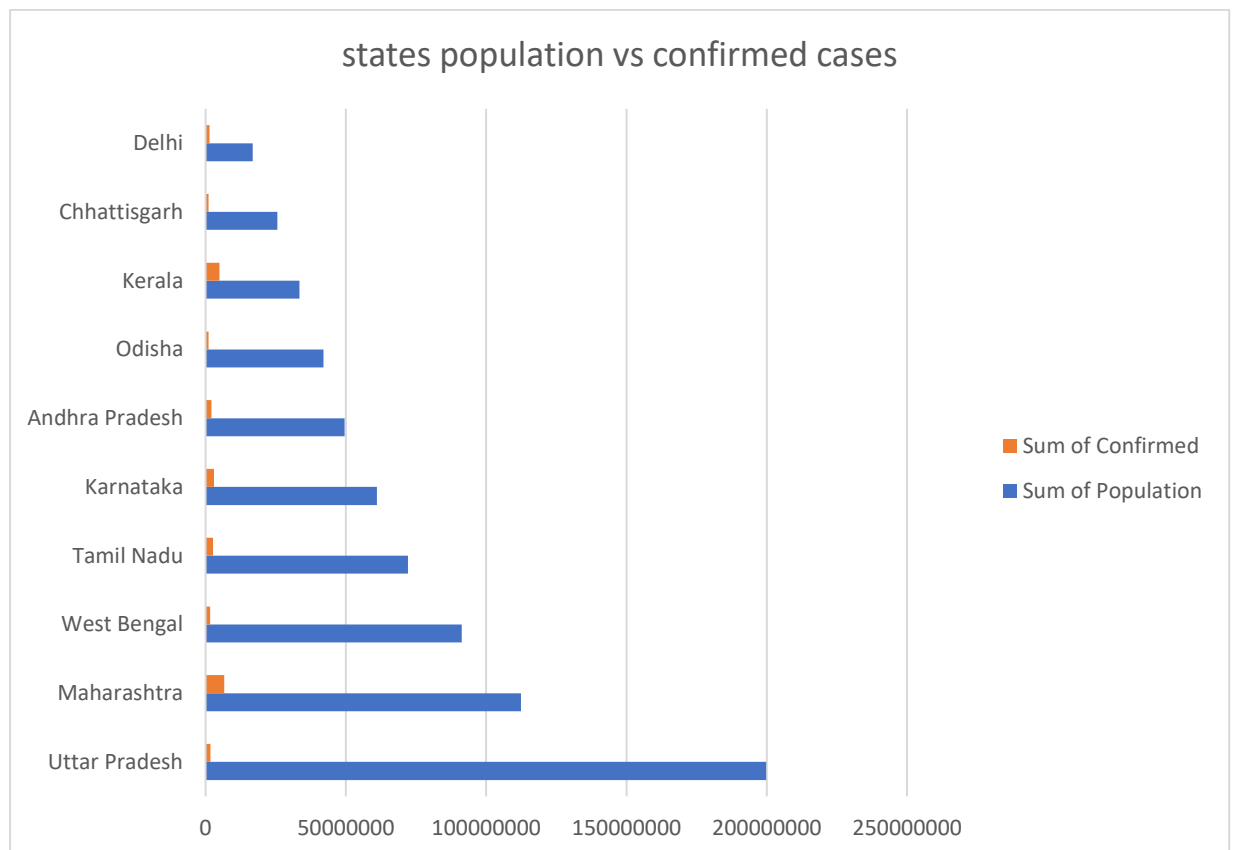
Select population of states as columns from population dataset and get the no.of confirmed cases from state_wise dataset.

Sort the population as largest to smallest and filter top 10 states.

Requirements:

Pivot table skills, sorting, filters, graphs

Analysis Results:



2.Top 10 Populated states vs Vaccination:

Description:

Get the data into a pivot Table

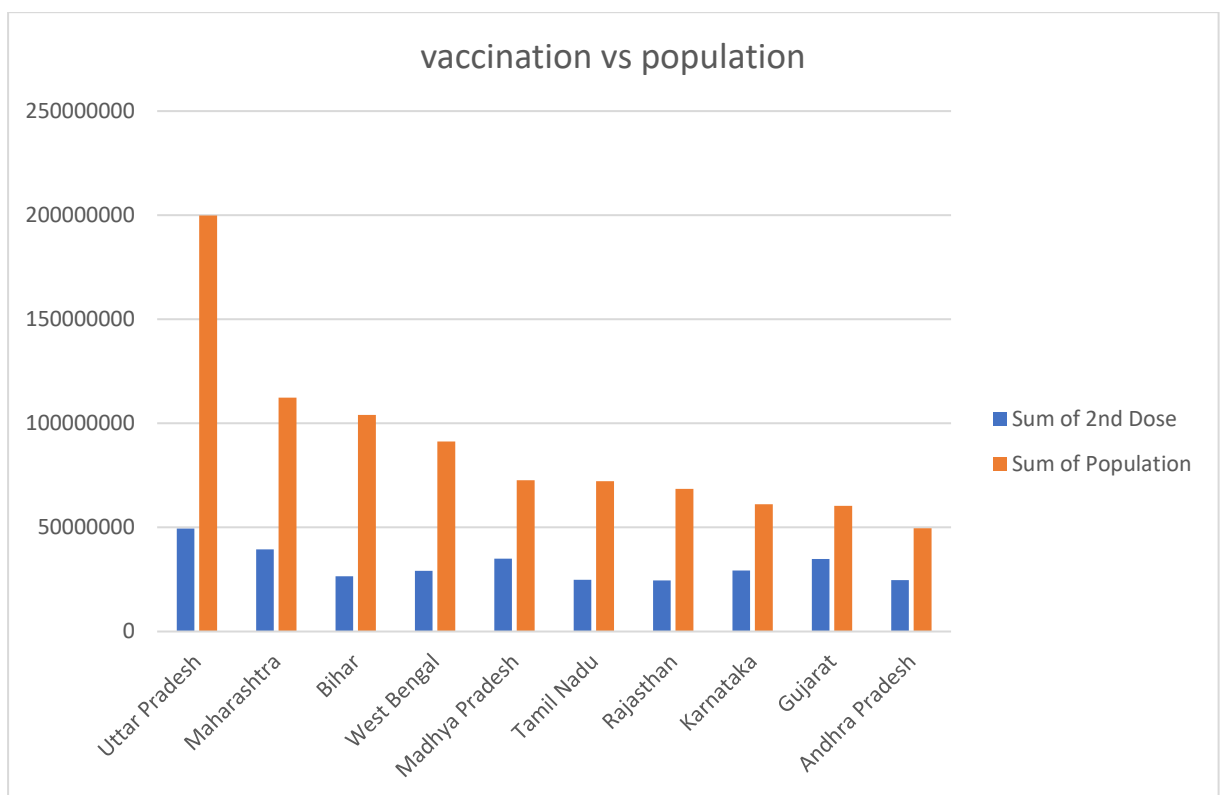
Select population of states as columns from population dataset and get the no.of second dose cases from vaccine dataset.

Sort the population as largest to smallest and filter top 10 states.

Requirements:

Pivot table skills, sorting, filters, graphs

Analysis Results:



RESULTS

DASHBOARD PREPARATION

Covid Dashboard Preparation

DASHBOARD:

Covid -19 DashBoard of India							
Total Cases		Total Active		Total Recovered		Total Deaths	
No	3,42,85,612	No	1,52,606	No	3,36,61,339	No	4,58,470
%	100.00%	%	0.45%	%	98.18%	%	1.34%
Highest Total Case		Highest Active		Highest Recovered		Highest Death	
No	66,11,078	No	79,266	No	64,50,585	No	1,40,216
?	Maharashtra	?	Kerala	?	Maharashtra	?	Maharashtra
Lowest Total Cases		Lowest Active		Lowest Recovered		Lowest Deaths	
No	7,651	No	2	No	7,518	No	4
	Andaman and Nicobar Islands		Dadra and Nagar Haveli and Daman and Diu		Andaman and Nicobar Islands		Dadra and Nagar Haveli and Daman and Diu
?		?		?		?	

1.TOTAL CASES:

No = {Total no of confirmed cases across all states }

Formula= {=MAX (state_wise [Confirmed])}

Percentage= {percentage of total cases }

Formula= {no of cases/total cases }

FOR TOTAL ACTIVE, TOTAL RECOVERED, TOTAL DEATHS:

Follow the same as above and select respective columns as required.

- Active cases column for total active
- Recovered cases column for total recovered
- Deaths column for total deaths

2.HIGHEST TOTAL CASES:

No = {Maximum no of cases state wise}

Formula= {=MAX (state_wise! C3:C38)}

? is used to denote from which state the above-mentioned cases are taken

Formula= {=INDEX(state_wise!A3:A39,MATCH('Covid
DashBoard'!G14,state_wise!C3:C38,0))}

FOR ALL THE REMAINING SECTIONS:

Follow the same as above but change the respective column as required

Vaccine Dashboard Preparation

DASHBOARD:

Covid 19 Vaccine Tracker of India					
Total Vaccinations		1st Dose		2nd Dose	
No	1,23,25,02,767	No	78,62,61,176	No	44,62,41,591
%	100%	%	63.79%	%	36.21%
Highest Total Vaccinations		Highest 1st Dose		Highest 2nd Dose	
No	16,11,46,868	No	11,16,20,542	No	16,11,46,868
?	Uttar Pradesh	?	Uttar Pradesh	?	Uttar Pradesh
Lowest Total Vaccinations		Lowest 1st Dose		Lowest 2nd Dose	
No	1,04,616	No	55,399	No	49,217
?	Lakshadweep	?	Lakshadweep	?	Lakshadweep

1.TOTAL VACCINATIONS:

No = {Total no of vaccinations across all states }

Formula= {=SUM (Vaccine[Total Doses])}

Percentage= {percentage of total vaccination }

Formula= {no of vaccinations/total vaccinations }

FOR FIRST DOSE AND SECOND DOSE SECTIONS:

Follow the same process as above and change the respective columns

- Use first Dose column for first dose
- Use second dose column for second dose

2.HIGHEST TOTAL VACCINATION:

No = {Maximum no of Total vaccinations}

Formula= {=MAX (Vaccine [Total Doses])}

? which state

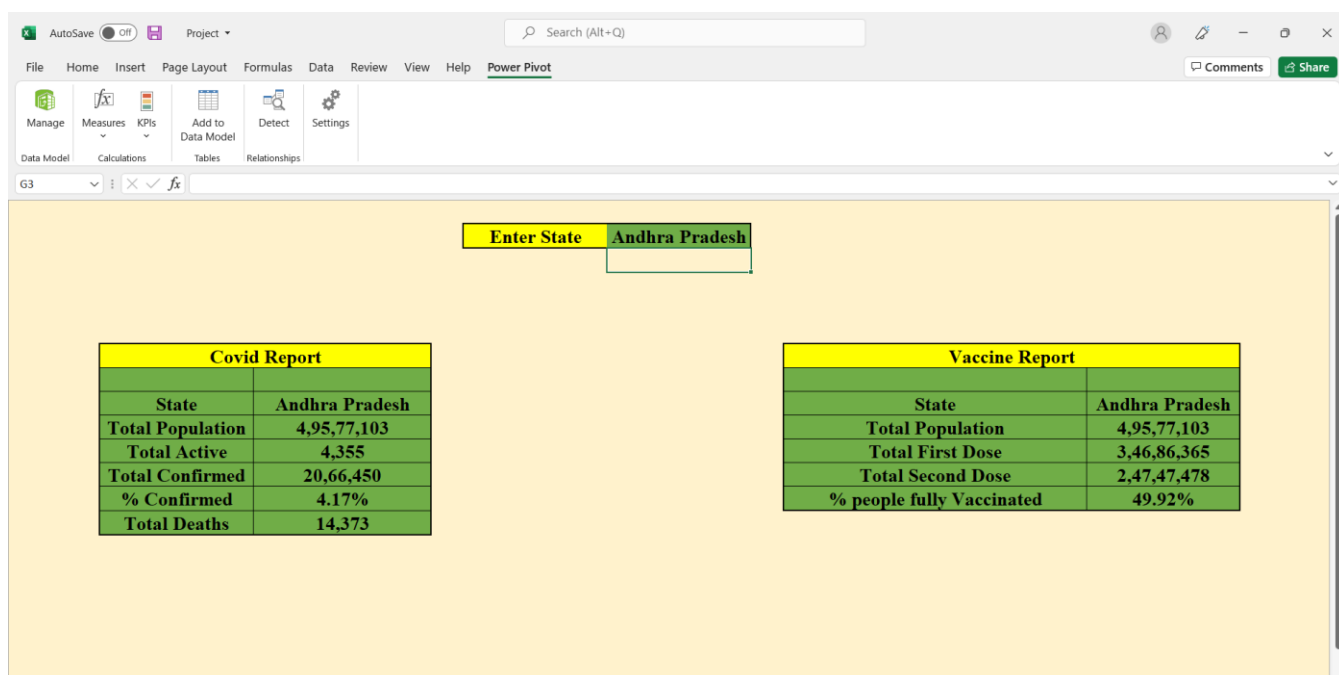
Formula= {=INDEX (Vaccine [State/UT], MATCH('vaccine
DashBoard'!I12,Vaccine[Total Doses],0))}

FOR ALL THE REMAINING SECTIONS

Follow the same process and change respective columns

SEARCH BOARD

BOARD:



Usage:

Just type the name of the state in the enter state cell to get all the info about that state as shown above.

Formulae used in Vaccine Report Table:

Item	Formula
State	=G\$2 { getting from the state typed by user }
Total Population	=INDEX(Population[Population],MATCH(Search!D9,Population[State/UT],0))
Total First Dose	=INDEX(Vaccine[1st Dose],MATCH(Search!J9,Vaccine[State/UT],0))
Total Second Dose	=INDEX(Vaccine[2nd Dose],MATCH(Search!J9,Vaccine[State/UT],0))
% fully Vaccinated	=J12/J10

Formulae used in Covid Report Table:

Item	Formula
State	=G\$2 {getting from the state typed by user}
Total Population	=INDEX(Population[Population],MATCH(Search!D9,Population[State/UT],0))
Total Active	=INDEX(state_wise!I3:I39,MATCH(Search!D9,state_wise!A3:A39,0))
Total Confirmed	=INDEX(state_wise!C3:C39,MATCH(Search!D9,state_wise!A3:A39,0))
% Confirmed	=D12/D10
Total Deaths	=INDEX(state_wise!G3:G39,MATCH(Search!D9,state_wise!A3:A39,0))

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