STATUS AND PERFORMANCE OF INDIAN STATES IN FIGHT AGAINST COVID-19
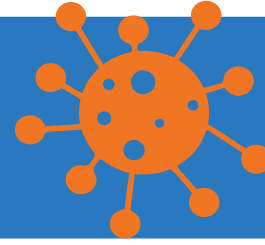
Prepared by: Dipu Biswas and Kamakshi Thapa

Presented by: Kamakshi Thapa

Content
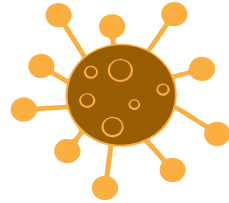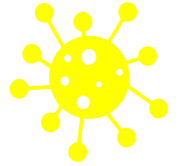
Introduction
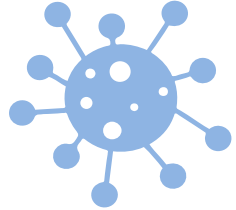
31,888,501
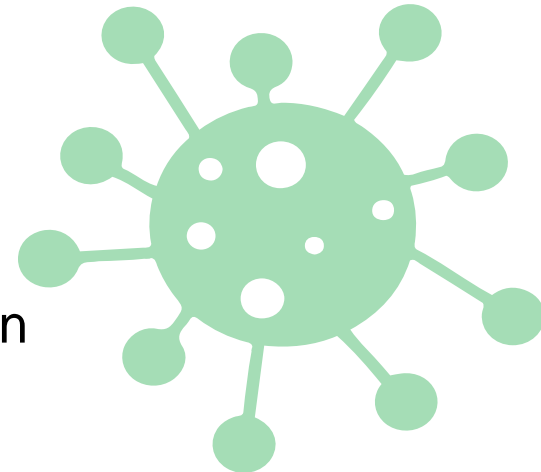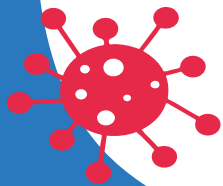Coronavirus Cases

977,380
Deaths

Source: https://www.worldometers.info/coronavirus/

Countries, where early and comprehensive public health measures were implemented, they have successfully suppress the transmission of COVID-19 pandemic below the threshold of their health system

SOAP KILLS CORONA

Testing along with other public measure has become a formidable weapon against the COVID-19 pandemic as countries are gradually lifting their restriction prior to an effective treatment or vaccine
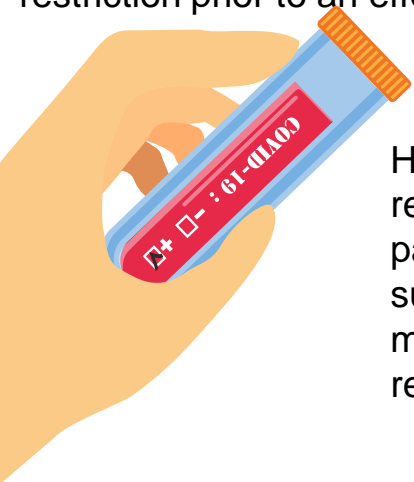
However country like India which has initially responded proactively against the COVID-19 pandemic with early travel advisories & restriction, surveillance, quarantine, lockdown and containment measure gradually showed declined in its responsive measure largely in testing rates.

COVID-19 as a "Notified Disaster"

☑ Centre government invoked **"Epidemic Disease Act, 1987"** and **"The Disaster Management Act, 2005"** , which entitle the union government to take necessary measures of quarantine, restriction in interstate migration to prevent the outbreak of disease..

☑ **Reserve Bank of India** and **Finance Ministry of India** introduced monetary and financial measure in response to COVID-19

☑ Government issued guidelines for social distancing, surveillance, travel advisories & restriction, **lockdown**, containment zones, contact tracing, and health facilities.

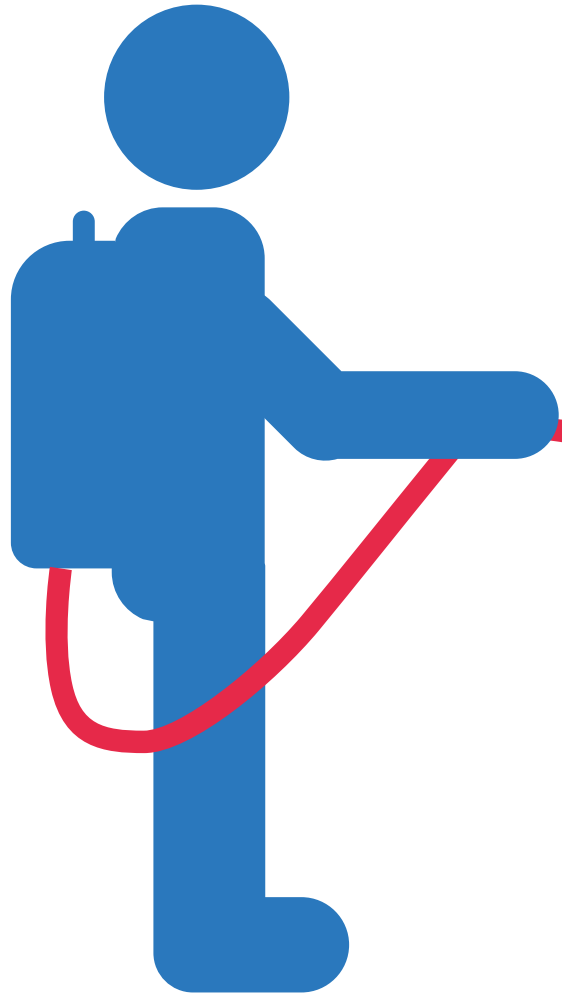| 1.0	2.0	3.0	4.0
25 March till 14 April 2020	**till 3 May 2020**	**till 17 May 2020**	**till 31 May 2020**

Objective
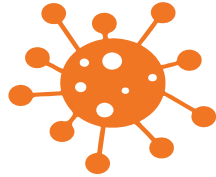
To understand the trajectory of COVID-19 and make a comparative analysis of the states/ Union Territories (UTs).

28 Sates and 8 Union Territories (UTs)

To assess the effectiveness of preparedness and responsive measures adopted by various state/UTs to control the COVID-19 outbreak
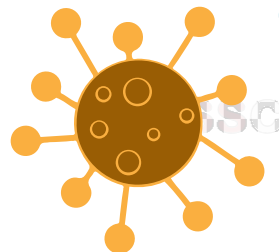
Methodology
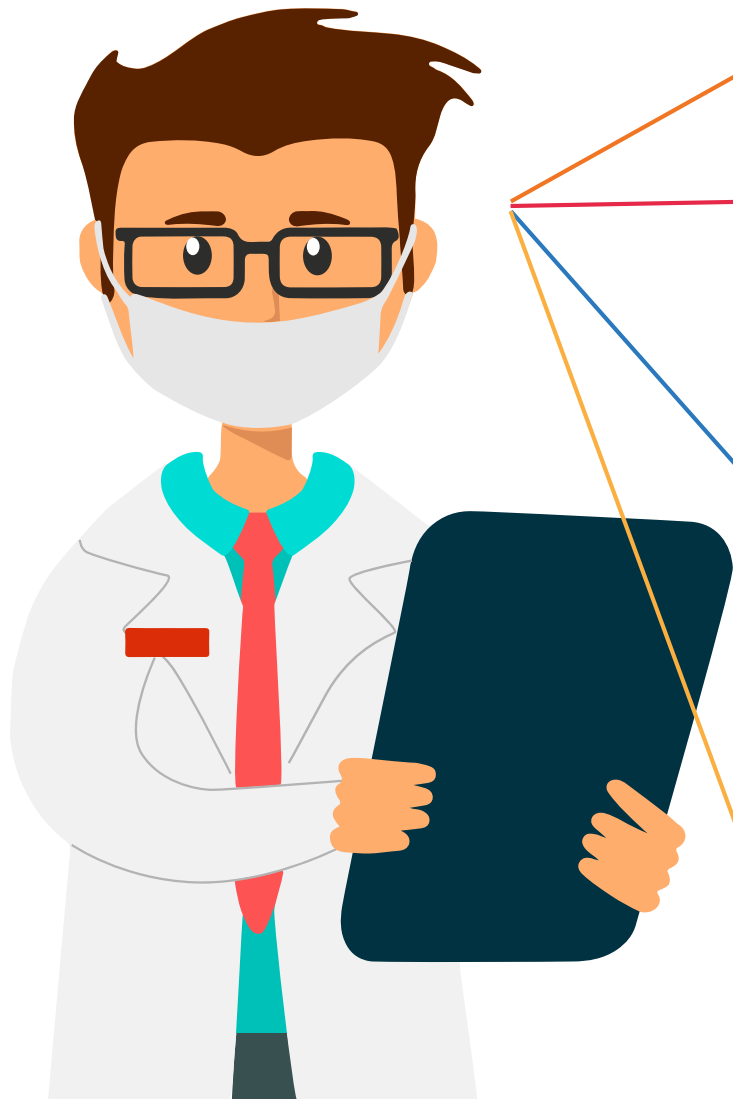
Data collection

Variables

Data analysis

Findings & conclusion

Testing statistics which is available on open source repository: https://www.kaggle.com/sudalairajkumar/covid19-in-india?select=IndividualDetails.csv

Positive Per Million Population: Number of COVID-19 positive cases per million population

Test Per Million Population: Amount of testing in relation to the population of an area

Test Positivity Rate: Percentage of tests conducted whose results are positive

TRAJECTORY OF COVID-19 CASES IN DIFFERENT STATES/UTS

STATE'S PERFORMANCE IN FIGHT AGAINST COVID-19

COVID-19 Positive Per Million Population

Trend analysis

Test Per Million Population – Test Positivity Rate
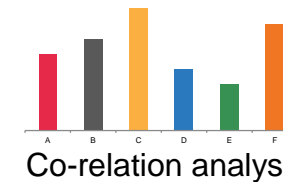
Co-relation analysis

Test Per Million – Positive Per Million

Test Positivity Rate – Test Per Million
Test Positivity Rate – Positive Per Million

Analysis
TRAJECTORY OF COVID-19 CASES IN DIFFERENT STATES/UTS
COVID-19

COVID-19 Positive Per Million

LOCKDOWN 1.0   LOCKDOWN 2.0   LOCKDOWN 3.0   LOCKDOWN 4.0   UN-LOCK

Andaman and Nicobar Islands	Andhra Pradesh	Arunachal Pradesh
Assam	Bihar	Chandigarh
Chhattisgarh	Dadra and Nagar Haveli and Daman and Diu	Delhi
Goa	Gujarat	Haryana
Himachal Pradesh	Jammu and Kashmir	Jharkhand
Karnataka	Kerala	Ladakh
Madhya Pradesh	Maharashtra	Manipur
Meghalaya	Mizoram	Nagaland
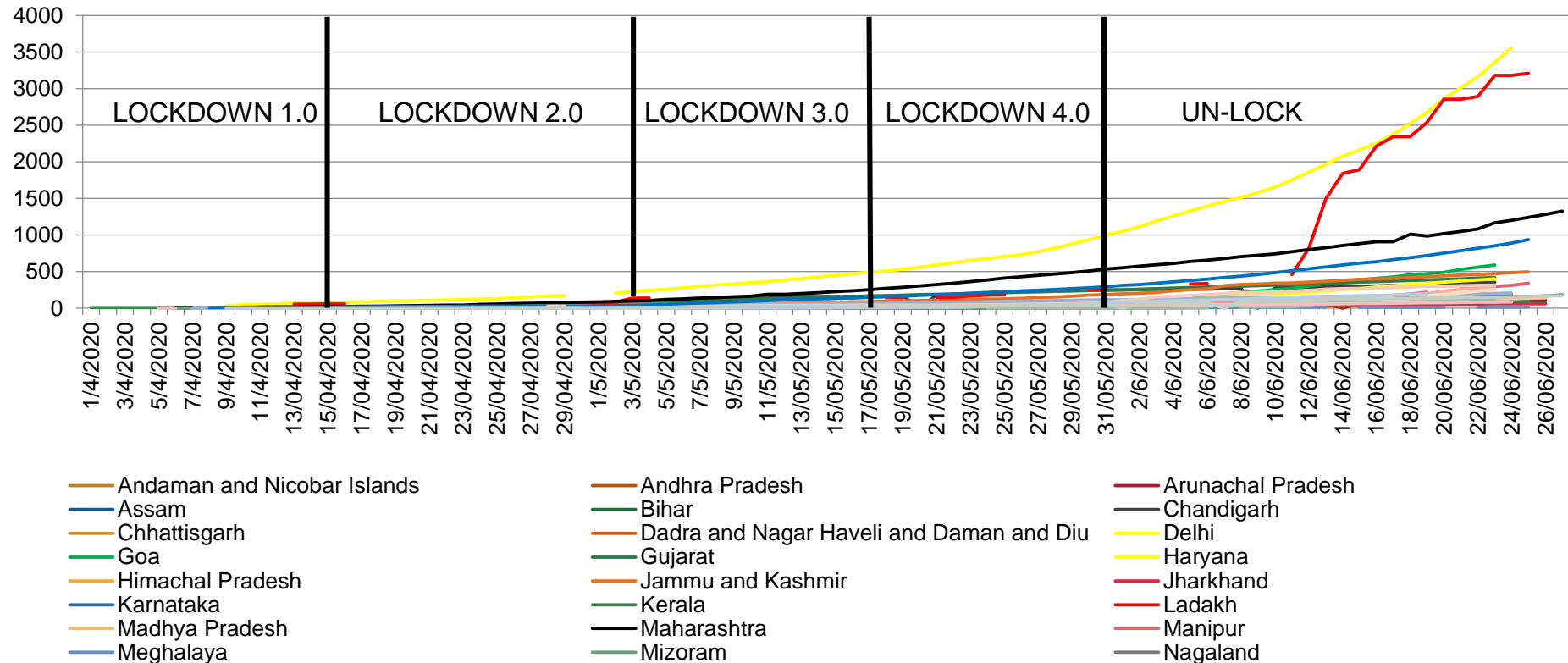
Delhi stands for highest in all time and tends to increase rapidly by the end of lockdown 3.0.
Maharashtra stands after Delhi for long time regarding COVID-19 positive cases per million.
Ladakh had low rate of positive per million till the end of lockdown, afterwards it experienced sudden increase in cases
Tamil Nadu has evidenced gradual increase till end of lockdown, but thereafter it has increased rapidly

Co-relation Between Test Per Million And Positive Per Million According To Date

COVID-19

Date	Correlation value	Date	Correlation value	Date	Correlation value	Date	Correlation value	Date	Correlation value	Date	Correlation value
2/4/2020	0.537	16/04/2020	.729**	1/5/2020	.607**	16/05/2020	0.358	1/6/2020	0.322	16/06/2020	.587**
3/4/2020	0.679	17/04/2020	.477*	2/5/2020	.472*	17/05/2020	.399*	2/6/2020	0.336	17/06/2020	.607**
5/4/2020	.825*	18/04/2020	.759**	3/5/2020	.617**	18/05/2020	.389*	3/6/2020	0.338	18/06/2020	.571**
6/4/2020	0.939	19/04/2020	.672**	4/5/2020	.604**	19/05/2020	.362*	4/6/2020	0.34	19/06/2020	.653**
7/4/2020	.896**	20/04/2020	.772**	5/5/2020	.390*	20/05/2020	.411*	5/6/2020	0.302	20/06/2020	.594**
8/4/2020	0.546	21/04/2020	.621**	6/5/2020	0.377	21/05/2020	0.324	6/6/2020	0.3	21/06/2020	.578**
9/4/2020	.835**	22/04/2020	.687**	7/5/2020	.416*	22/05/2020	0.272	7/6/2020	0.336	22/06/2020	.648**
10/4/2020	.831**	23/04/2020	.724**	8/5/2020	.393*	23/05/2020	0.325	8/6/2020	0.316	23/06/2020	.651**
11/4/2020	.863**	24/04/2020	.548**	9/5/2020	.502**	24/05/2020	0.313	9/6/2020	0.34	24/06/2020	.648**
12/4/2020	.867**	25/04/2020	.728**	10/5/2020	.441*	25/05/2020	0.32	10/6/2020	0.304	25/06/2020	.845**
13/04/2020	.774**	26/04/2020	.709**	11/5/2020	.418*	26/05/2020	0.352	11/6/2020	0.345	26/06/2020	0.119
14/04/2020	.745**	27/04/2020	.555**	12/5/2020	.478*	27/05/2020	0.339	12/6/2020	.459*	27/06/2020	-0.114
15/04/2020	.740**	28/04/2020	.669**	13/05/2020	.435*	28/05/2020	0.342	13 /06/2020	.560**		
		29/04/2020	.521**	14/05/2020	.413*	29/05/2020	0.341	14/06/2020	.595**		
		30/04/2020	.554**	15/05/2020	.422*	30/05/2020	.362*	15/06/2020	.562**		

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Among 89 days of the dataset, there is significant correlation among these two variables for 59 days. Hence it can be argued that **there is evidence for being high rate of COVID-19 positive because of high rate of testing capacity**.

STATE'S PERFORMANCE REGARDING FIGHT AGAINST COVID-19

Co-relation Between Test Positivity Rate And Test Per Million According To State   COVID-19

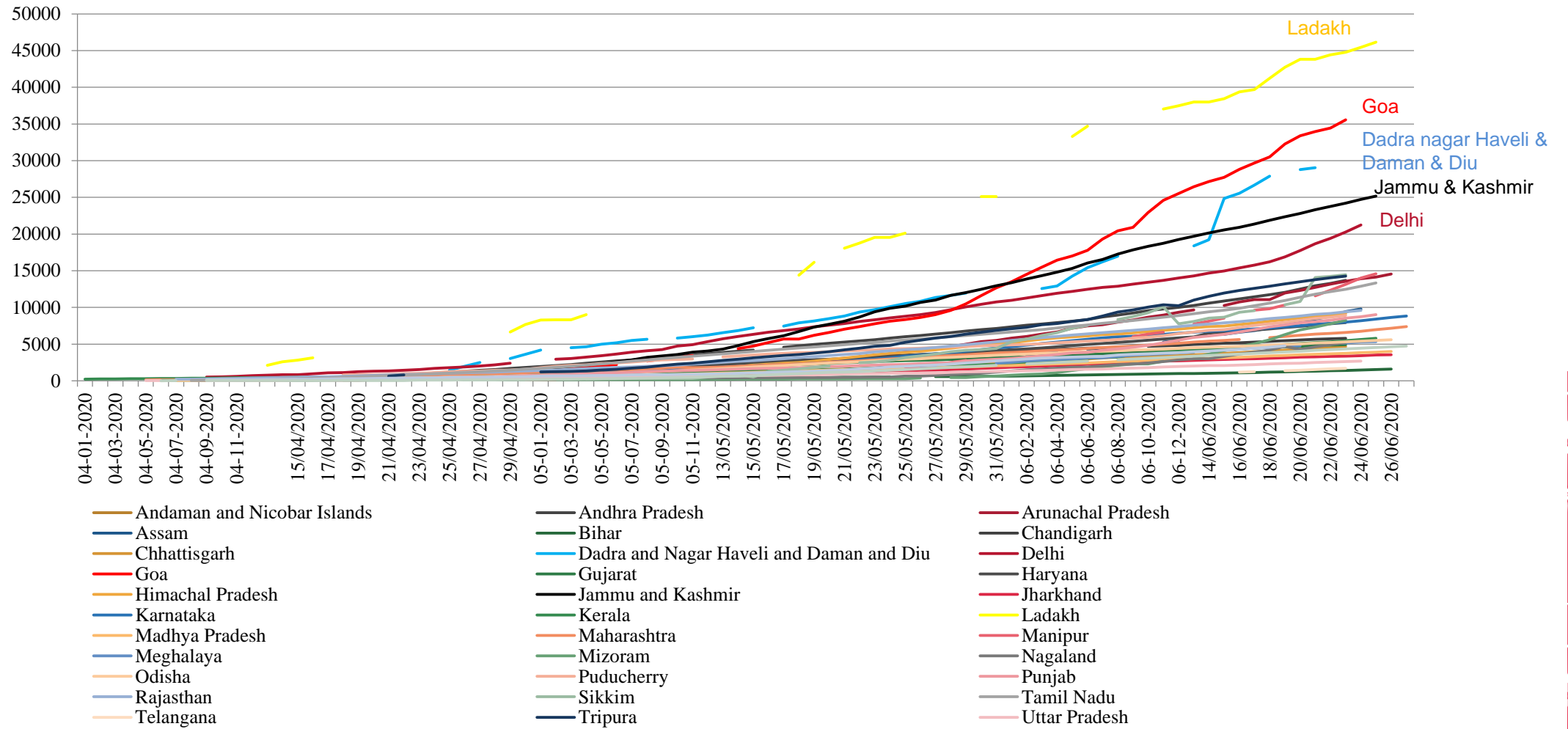| State	Correlation value	State	Correlation value
Andaman and Nicobar Islands	-.854*	Madhya Pradesh	-.801**
Andhra Pradesh	-.564**	Maharashtra	.961**
Arunachal Pradesh	.768**	Manipur	.962**
Assam	.851**	Meghalaya	-.740**
Bihar	.888**	Mizoram	.574**
Chandigarh	-.231*	Nagaland	.876**
Chhattisgarh	.873**	Odisha	.780**
Dadra & Nagar Haveli and Daman & Diu	.915**	Puducherry	.907**
Delhi	.836**	Punjab	-.722**
Goa	.437**	Rajasthan	-.721**
Gujarat	.862**	Sikkim	.739**
Haryana	.368**	Tamil Nadu	.185
Himachal Pradesh	-.217	Telangana	.991**
Jammu and Kashmir	-.581**	Tripura	.861**
Jharkhand	.789**	Uttar Pradesh	-.350**
Karnataka	.022	Uttarakhand	.855**
Kerala	-.370**	West Bengal	-.283*
Ladakh	.720**		
**. Correlation is significant at the 0.01 level (2-tailed).			
*. Correlation is significant at the 0.05 level (2-tailed).			

Co-relation Between Test Positivity Rate And Positive Per Million According To State

COVID-19

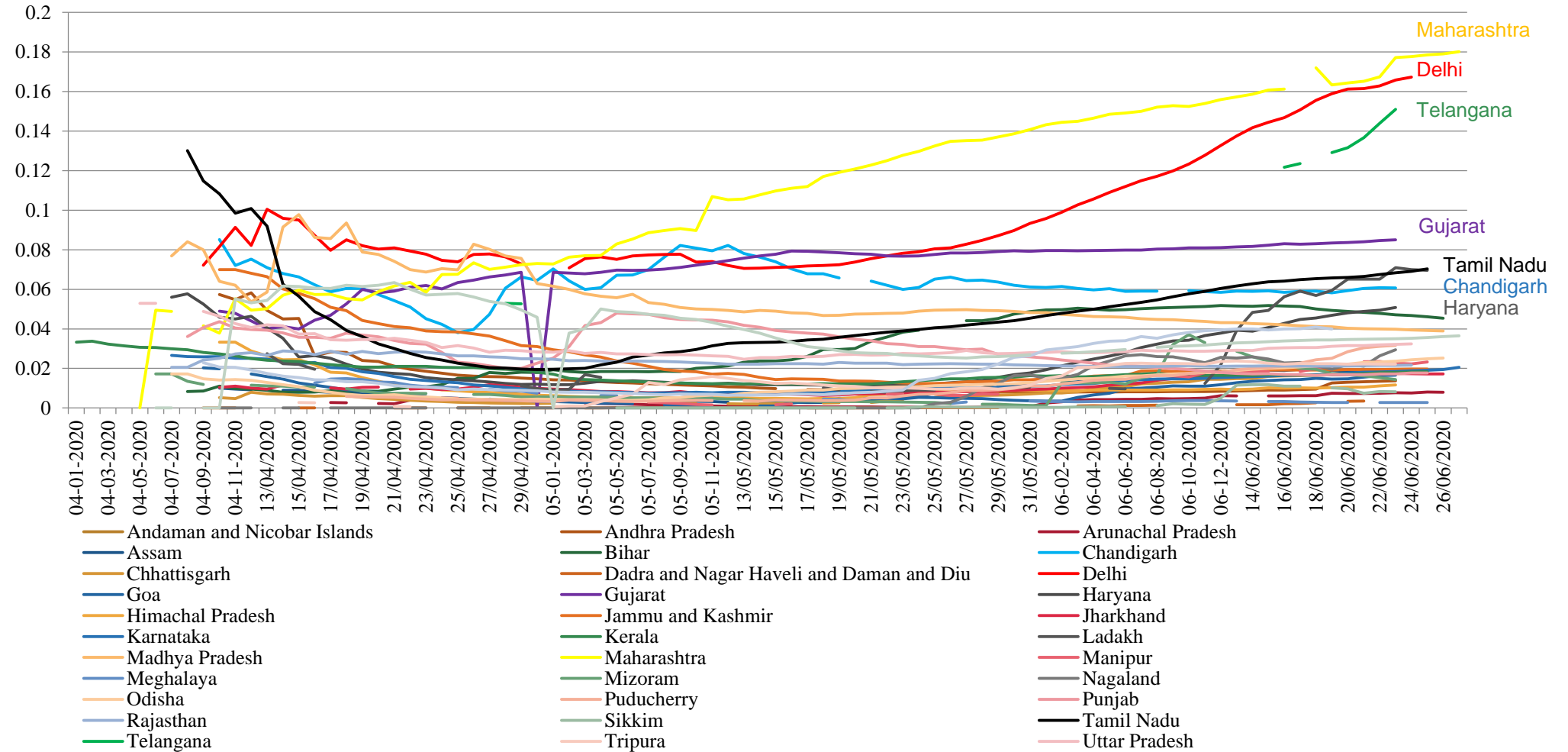| State	Correlation value	State	Correlation value
Andaman and Nicobar Islands	-.192	Madhya Pradesh	-.812**
Andhra Pradesh	-.453**	Maharashtra	.938**
Arunachal Pradesh	.894**	Manipur	.941**
Assam	.877**	Meghalaya	-.681**
Bihar	.902**	Mizoram	.755**
Chandigarh	-.169	Nagaland	.766**
Chhattisgarh	.955**	Odisha	.879**
Dadra & Nagar Haveli and Daman & Diu	.982**	Puducherry	.985**
Delhi	.946**	Punjab	-.552**
Goa	.564**	Rajasthan	-.713**
Gujarat	.849**	Sikkim	.963**
Himachal Pradesh	-.099	Tamil Nadu	.305**
Jammu and Kashmir	-.484**	Telangana	.986**
Jharkhand	.900**	Tripura	.886**
Karnataka	.187	Uttar Pradesh	-.299**
Kerala	-.252*	Uttarakhand	.933**
Ladakh	.973**	West Bengal	-.560**
**. Correlation is significant at the 0.01 level (2-tailed).			
*. Correlation is significant at the 0.05 level (2-tailed).			

Negative correlation has been identified for states namely **Andaman and Nicobar island, Andhra Pradesh, Chandigarh, Himachal Pradesh, Jammu and Kashmir, Kerala, Madhya Pradesh, Meghalaya, Punjab, Rajasthan, Uttar Pradesh and West Bengal** due to the fact that test positivity rate has declined with increase in testing capacity and increase in COVID-19 positive cases.
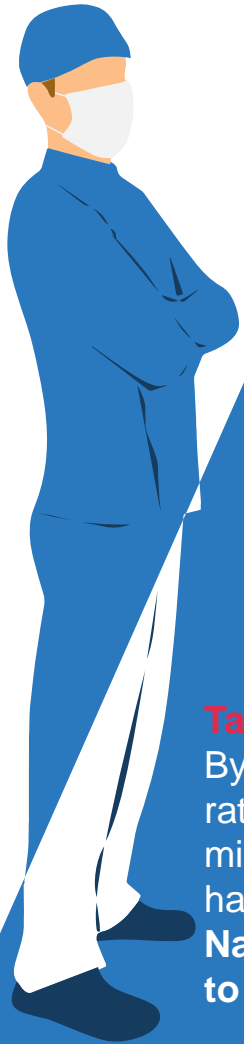
Test Per Million Population

Chart showing Test Per Million Population over time with curves for Indian states and union territories. Notable labeled lines: Ladakh, Goa, Dadra nagar Haveli & Daman & Diu, Jammu & Kashmir, Delhi.

Legend:
- Andaman and Nicobar Islands
- Andhra Pradesh
- Arunachal Pradesh
- Assam
- Bihar
- Chandigarh
- Chhattisgarh
- Dadra and Nagar Haveli and Daman and Diu
- Delhi
- Goa
- Gujarat
- Haryana
- Himachal Pradesh
- Jammu and Kashmir
- Jharkhand
- Karnataka
- Kerala
- Ladakh
- Madhya Pradesh
- Maharashtra
- Manipur
- Meghalaya
- Mizoram
- Nagaland
- Odisha
- Puducherry
- Punjab
- Rajasthan
- Sikkim
- Tamil Nadu
- Telangana
- Tripura
- Uttar Pradesh

COVID-19

Test Positivity Rate


COVID-19

Maharashtra:
Highest test positivity rate among all the states and it is the only State which has not experienced even slightest fall in the trend during the lockdown period, test positivity rate has constantly grown. In the other hand testing capacity is not even in top ten states and it has not increased considering test positivity rate. Thus it can be argued that the testing capacity, which is responsibility of respective state government, **Maharashtra has failed to provide infrastructure as per necessity throughout the time.**

Delhi:
Gradually test positivity rate has declined and was stagnant in-between implementation of lockdown to lockdown 3.0, but suddenly after relaxation of lockdown it has started to rise rapidly. The rate of test per million has increased in relation with increased rate of positive cases and increased test positivity rate. Thus it can be argued that **Delhi has tried well to provide medical infrastructure as per the situation.**

Tamil Nadu:
By the end of lockdown 2.0 and initialization of regulated inter-state movement test positivity rate has started rising in rapid manner. In the other hand the number of COVID positive per million is also in rapid increase manner from this period, but with all this the testing capacity has also been increased in coordination of the situation. **Thus it can be argued that Tamil Nadu, up to some extent, has succeeded to provide infrastructural facilities according to the situation.**
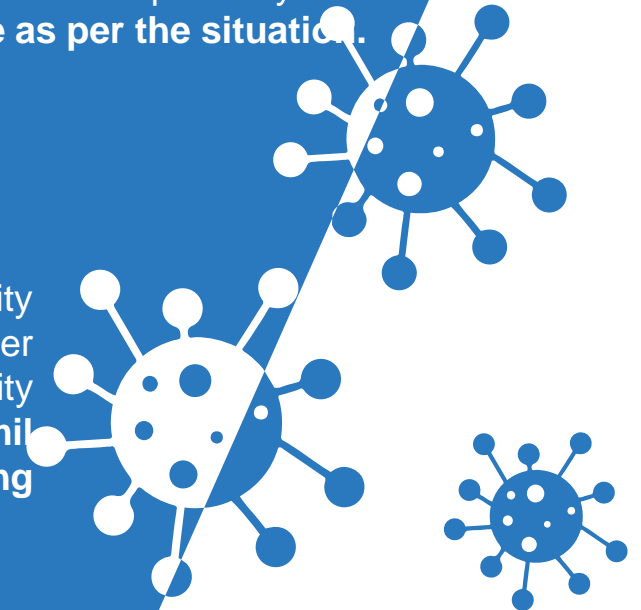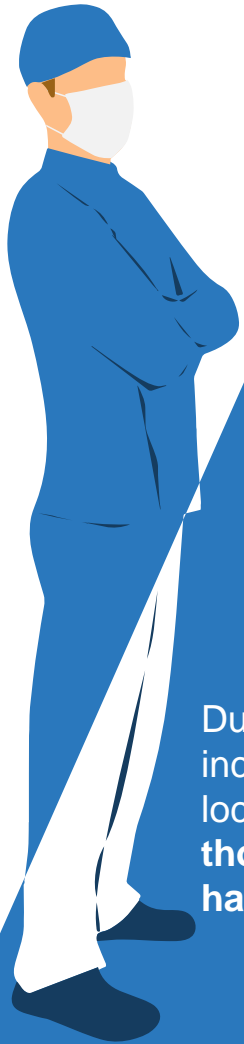
Haryana:

The rate was high in early stage and experienced reduction in rate from mid- April and remain stable till June and with the unlocking phase the number of COVID positive per million and the test positivity rate has increased, but the testing capacity has not increased as per this change. Thus it can be argued that the **state government has not succeeded to provide infrastructure according to the situation.**

Gujarat:

During the lockdown 2.0 and 3.0 it has experienced rise in test positivity rate and thereafter it has managed to make stable its test positivity rate. Regarding test per million, it has raised its testing capacity gradually throughout the time. Thus it can be stated that **Gujarat, though has raised its infrastructure not according to situation but gradually, has succeed to manage its infrastructural demand regarding testing capacity.**

Chandigarh:

During lockdown 2.0 and 3.0 it has evidenced growth of test positivity rate, though it has increased the testing capacity in the same growth rate as earlier, and during and after lockdown 3.0 it has succeed to make test positivity rate decline. In overall it can be argued that **though it has not raised its testing capacity in immediate requirement, but in overall it has managed the situation well regarding creation of testing capacity.**
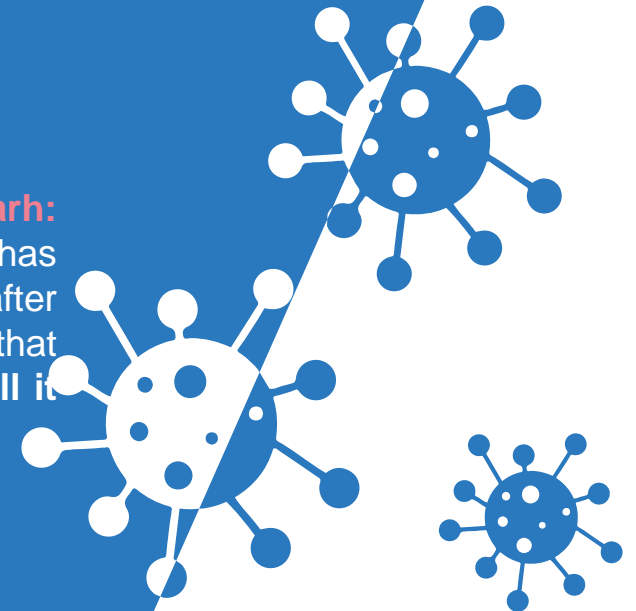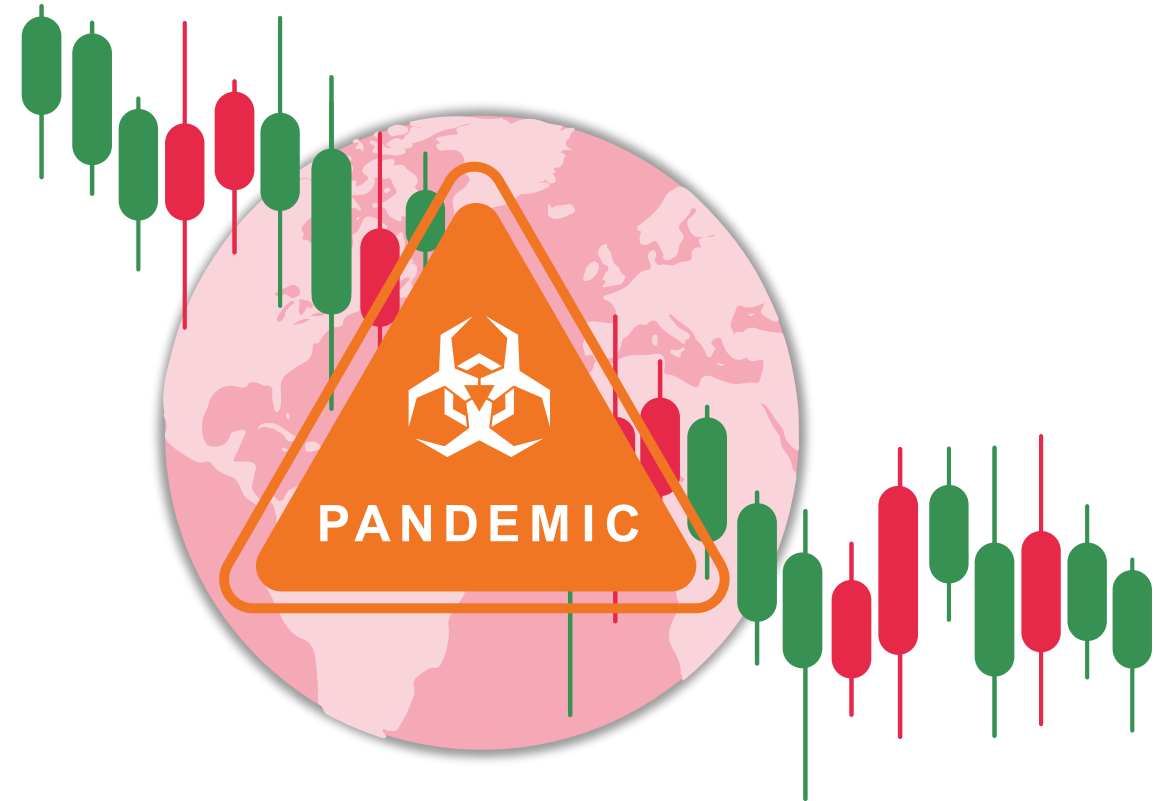
Discussion and Conclusion

In this context it can be argued that the more number of COVID-19 positive cases, which is result of more rate of testing, indicates good effort from the side of respective state government to fight against COVID-19 pandemic

On the other hand it can be said that the states with less figure of COVID-19 positive cases, does not necessarily in a good situation, rather it may be respective state government's failure to detect the situation.

Further analysis shows, few states/UTs including Delhi, Tamilnadu, Ladakh have effectively managed the pandemic by facilitating testing capacity while states/UTs of Maharashtra, Telangana, Haryana has failed to provide infrastructure in terms of testing capacity as per need.

In other hand some states/UTs of Gujarat and Chandigarh has not respond in immediate basis as per situation in terms of increasing testing capacity but in long run they have managed the situation well through gradual increase of testing capacity.

Lastly, it can be concluded that the **number of COVID-19 positive cases is not a true representative of the situation, rather it is a mixed outcome of the spread of COVID-19 and state government's effort to facilitate the testing capacity.**