

COVID 19: Mega Cities Trends and Analysis

As on 4th July 2019



Demographic features of Mega Cities in India from COVID management point of view

- 7 Mega Cities in India – Ahmedabad, Bengaluru, Chennai, Delhi, Hyderabad, Mumbai, and Kolkata
- Among the 50 most populated cities in the world. Delhi and Mumbai are 2nd and 3rd most populated cities in the world
- Constitutes 7.7% of India's total population
- Average Population density is 5562 / Sq Kms
- Occupies 1% of total land of India, currently has 54 COVID Positive case / Sq Km
- 45% share of positive COVID cases
- 56.5% share of COVID 19 deaths
- Cities having robust Data management systems and high data integrity have displayed higher degree of manoeuvrability of the pandemic
- 35% of the hospitalisation cases are related to infections and respiratory *
- 60% of the hospitalisation cases over quintile class of household expenditure are in 3rd, 4th, and 5th quintiles *
- 95% of the source of funding hospitalisation expenses are from household income (savings) 80% and borrowings (14%) *
- While treating the COVID patients, nearly 1000 Doctors are infected with COVID and unfortunately 50+ of them have succumbed. Most of these cases have occurred in mega cities.

Case Positivity Growth Pattern

- Globally, 99% of the COVID cases are in mild/very mild category.
- Analysis of nations having over 100K COVID cases as well as trend in India confirms that the number of positive cases is directly proportion to the number of testing. Higher the number of testing, higher will be the number of positive cases.
- 30-Day Moving average growth rate of case positivity in mega cities is 100%. If the same pattern continues in the coming weeks, then the cumulative positive cases in 7 mega cities could cross 5,00,000 cases in July from current total number of positive cases of 3,00,000

Emerging Mortality Trend

- Each of the mega city has its own pattern in terms of positivity and mortality
- Skilled and motivated manpower resources will be key to reduce the mortality
- 30-Day Moving growth rate of mortality is 100%. Strong indication of overstretch of Healthcare Infrastructure in mega cities
- In one of the mega city, 40% of the patients did not survive two days in hospital and atleast 1 in every 10 patients died within 24 hours of reaching the hospital. One of the reasons attributed by experts is the delayed admission*
- Death audits showed 36% of the dead had a combination of diabetes and hypertension, 22% had just diabetes, 12% had hypertension, less than 20% had no comorodities. This indicates the need for revisiting the testing strategy in Mega cities.**

Lockdown and Unlock

- Some of the mega cities are using lockdown as one of the key lever of controlling the growth of COVID cases.
- After 100 days of identifying 1st COVID case in the country, there is a strong need for a robust methodology to evaluate the option of using lockdown and also measuring the outcome in terms of growth of positivity and mortality.

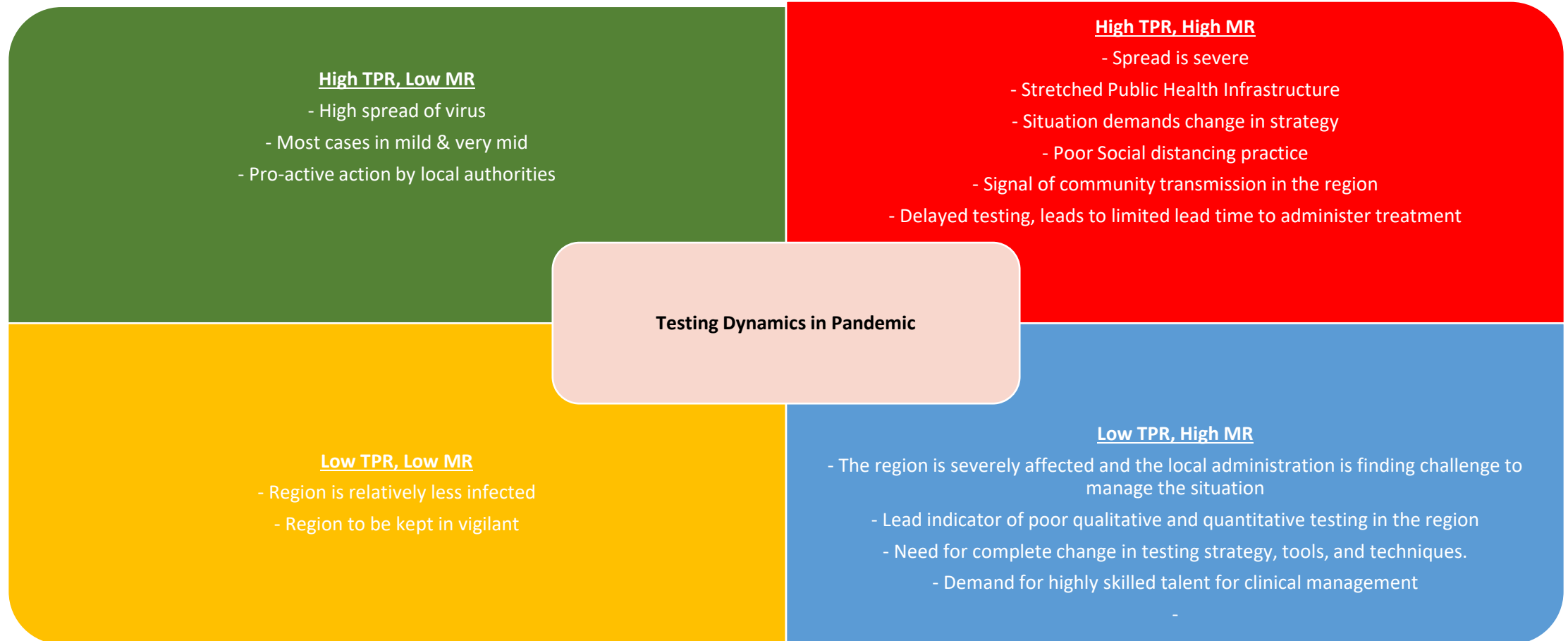
Critical Medical Infrastructure

- Some of the recent initiative indicates increase in basic bedding infrastructure. However, in order to revive critical COVID patients, beds with oxygen, ICU Beds, and Ventilator is vital. Data available in the public domain indicates that, some of the mega cities are in the verge of 100% utilisation of some of the mentioned critical infrastructure.
- In mega cities preference for private hospital is high, particularly amongst quintiles – 3,4, and 5 of the population. Accurate information about vacancy in private hospital would help people to seek medical intervention in the initial stage which considerably enhances the probability of complete cure within shortspan.

Test Positivity Rate (TPR)

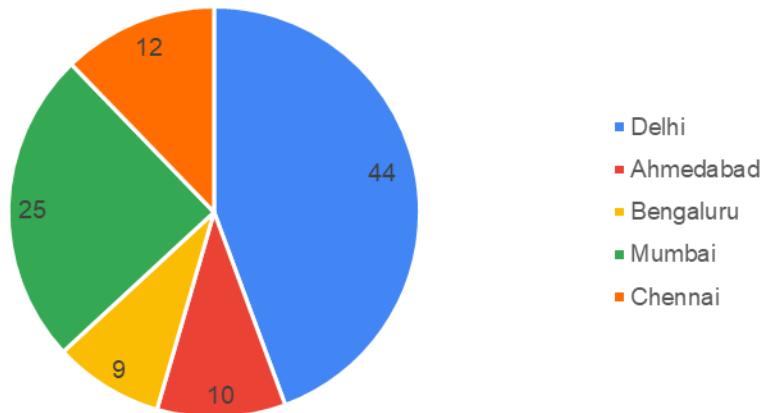
- TPR is the % ge of positive tested cases from the total number of tests conducted in a particular region.
- According to WHO, TPR above 5% is strong indicator of severity of spreading od virus
- Significance of TPR in managing a pandemic
 - TPR is used to measure the spread of the virus in a particular region. Higher the TPR, higher is the spread of the virus and vice-versa.
 - TPR measured in juxtaposition with Mortality Rate (MR) will reflect the quality of testing conducted in a region.

Virus Spread Assessment Matrix (VAM)



Note: Hyderabad and Kolkata testing data not available

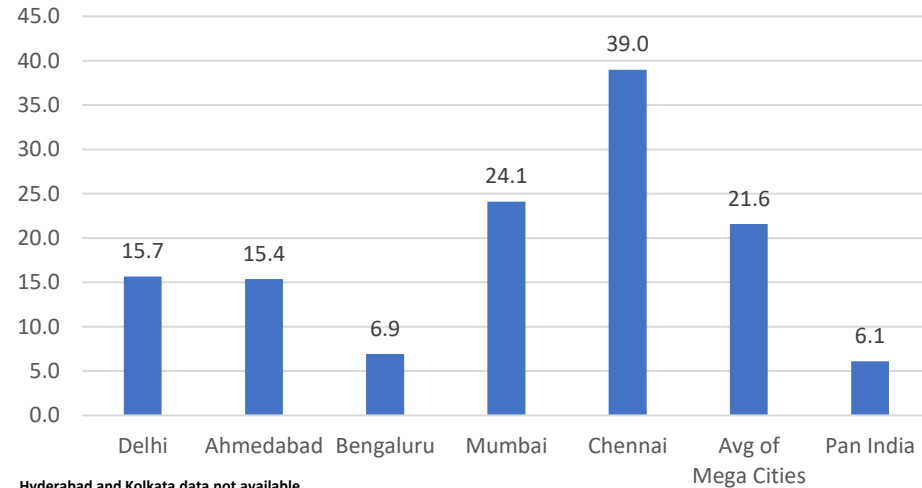
% share of COVID Testing



Cumulatvely, 1.4 Million tests conducted in Mega Cities

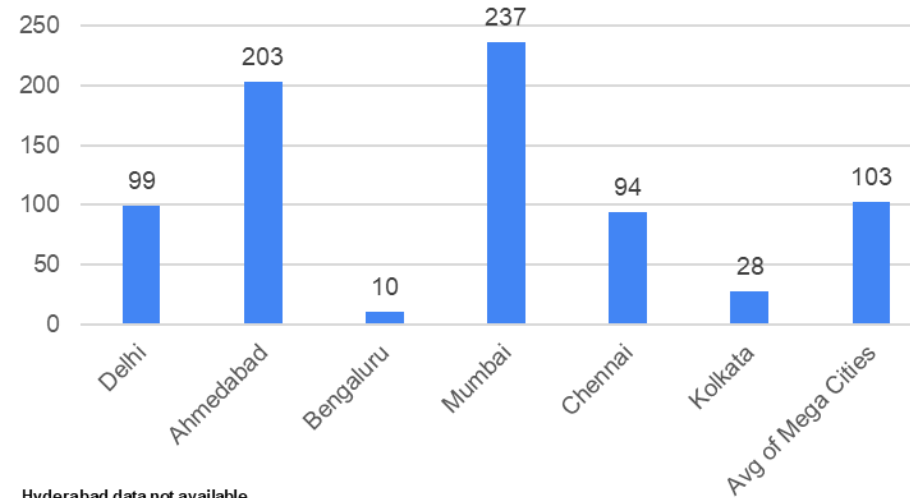
Hyderabad and Kolkata data not available

Test Positivity Rate (%)



Hyderabad and Kolkata data not available

Death Per 1 Mn Population (DPM) in Mega Cities



Hyderabad data not available

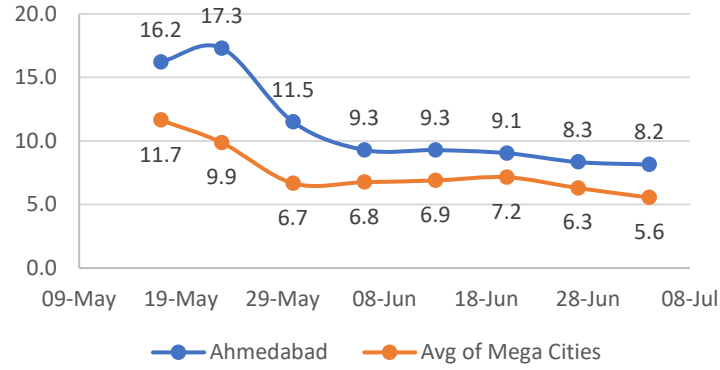
CLOSED CASES FATALITY RATE (CCFR)

- Closed Cases: Cases which has an outcome: (1) Recovered / Discharged (2) Deaths
- As on date, 8% closed cases in the world has unfortunate outcome of death.
- In India, CCFR is 5% whereas in Mega Cities it is slightly higher at 5.6%
- The Government of India has set a target of 1% death rate. In order to achieve it, 99% of the COVID infected patients need to recover.

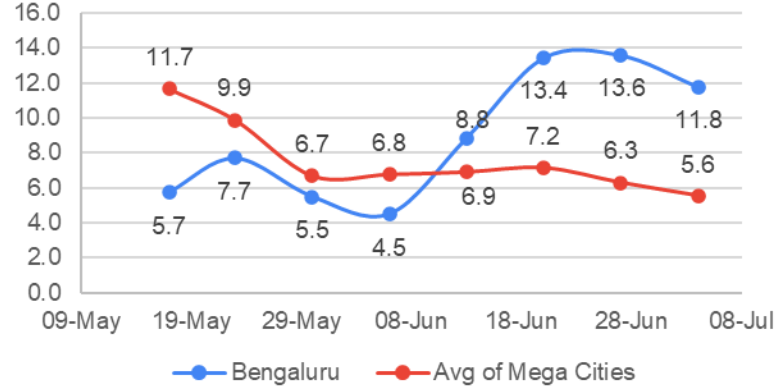
Closed Cases Fatality Rate of Mega Cities *



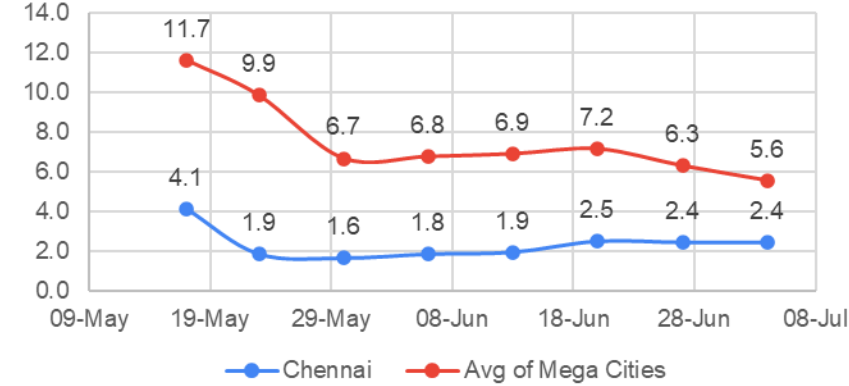
Closed Cases Fatality Rate %



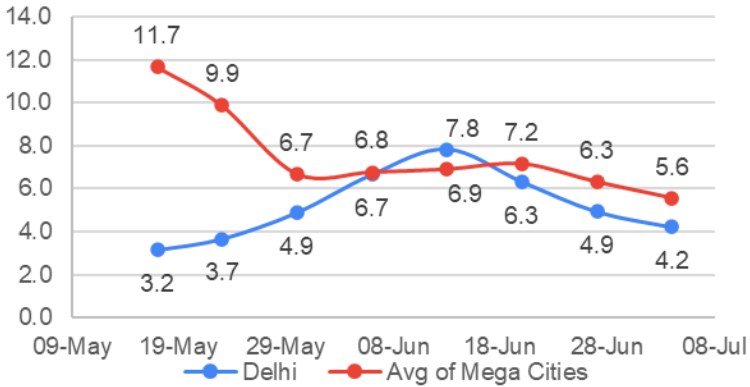
Closed Cases Fatality Rate %



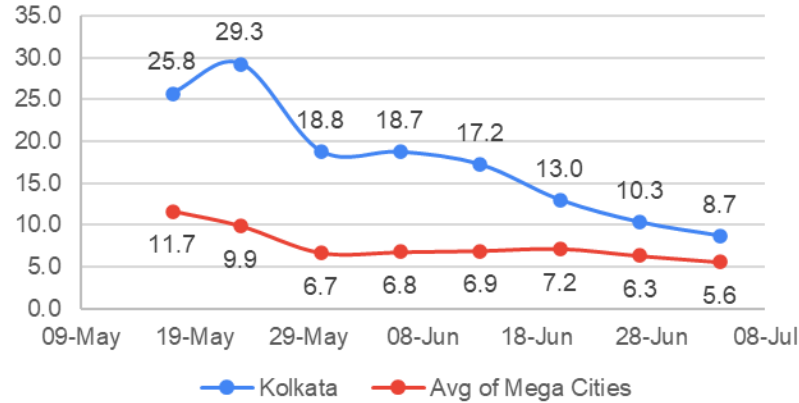
Closed Cases Fatality Rate %



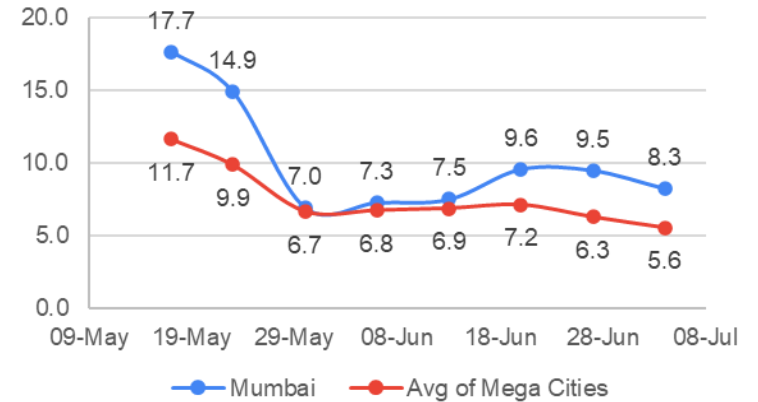
Closed Cases Fatality Rate %



Closed Cases Fatality Rate %



Closed Cases Fatality Rate %

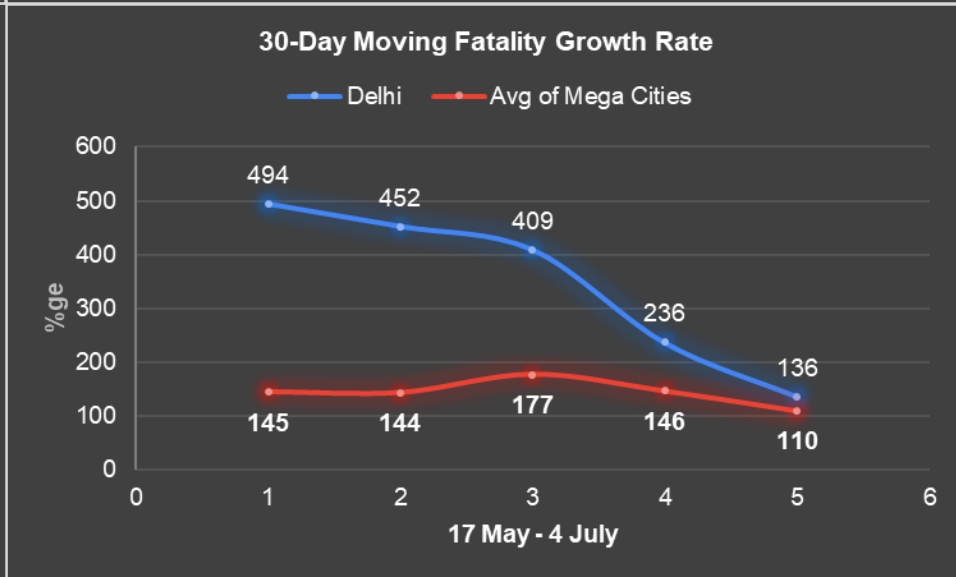
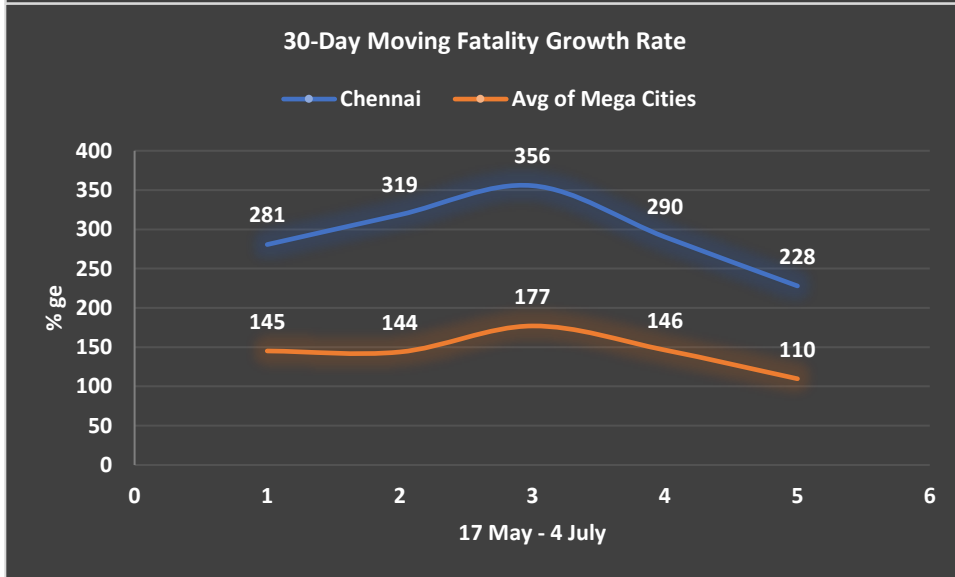
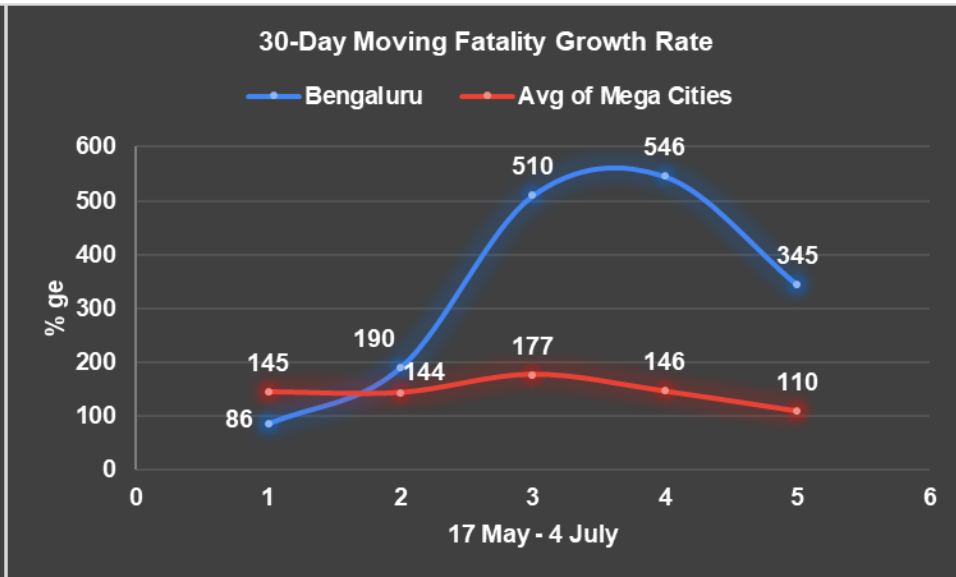
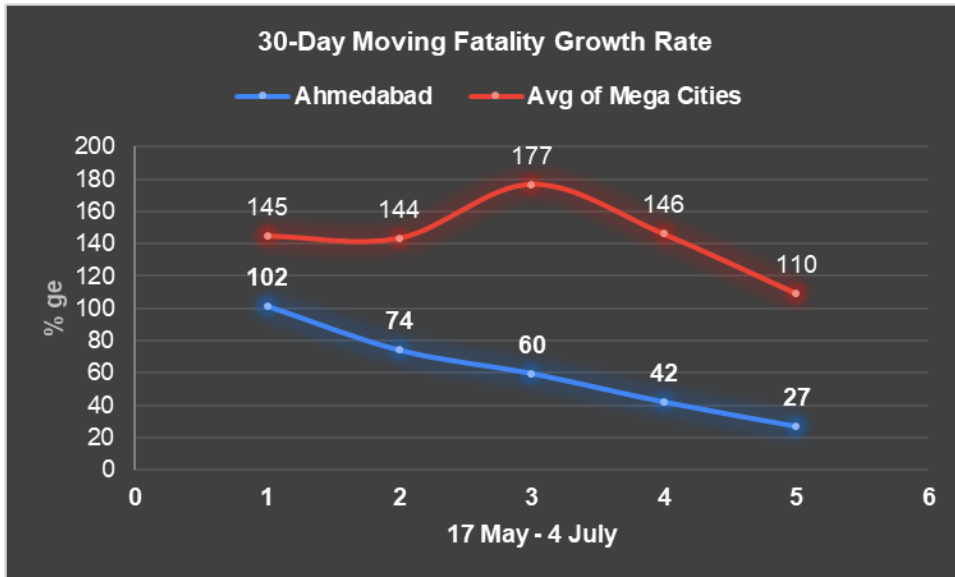


* Hyderabad: Accurate number of deaths was not available in the public domain.

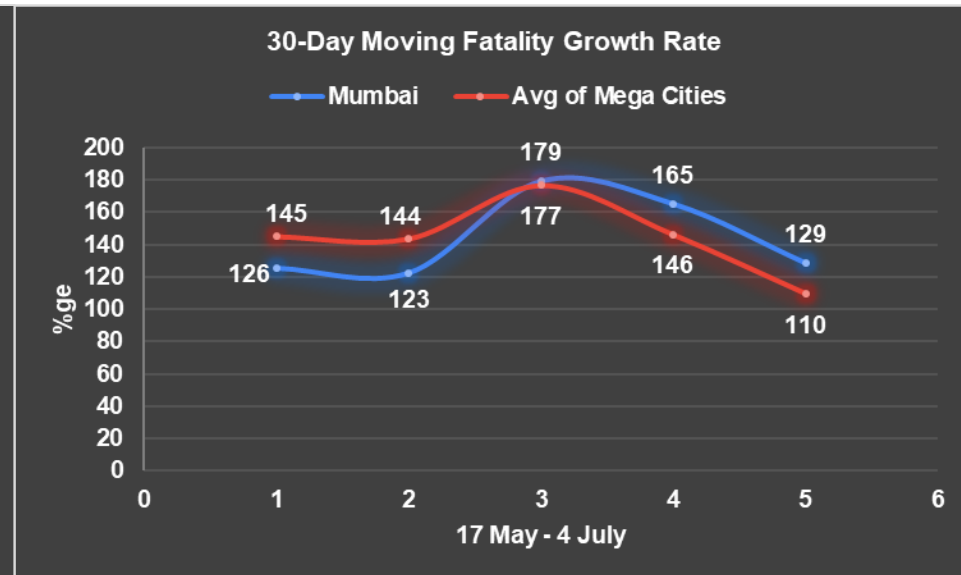
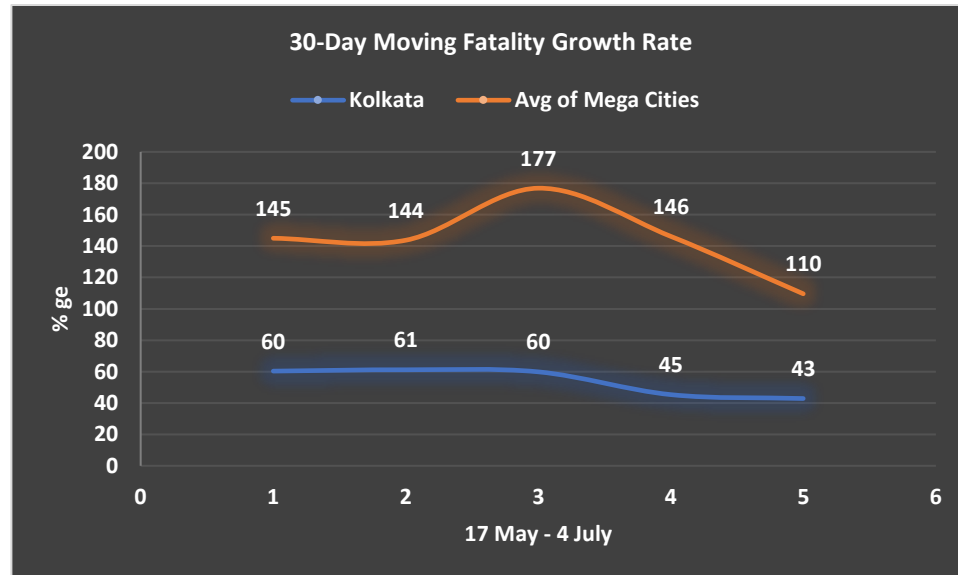
30-Day-Moving Average Growth Rate

- A moving average is a technique to get an overall idea of the trends in a data set; it is an average of any subset of numbers. The moving average is extremely useful for forecasting long-term trends, particularly when the base-value keep increasing/decreasing for the given period of time.
- 30-Day-Moving Average growth rate of COVID cases
 - This indicates the velocity at which the virus is spreading in a particular region, in a given time.
 - Consistent increase in moving average growth rate confirms the high velocity of virus spread.
- 30-Day-Moving Average growth rate of COVID mortality
 - This indicates the efficacy of clinical intervention. If there is consistent increase in 30-day moving average growth rate, it implies the delayed as well as lower efficacy of medical intervention

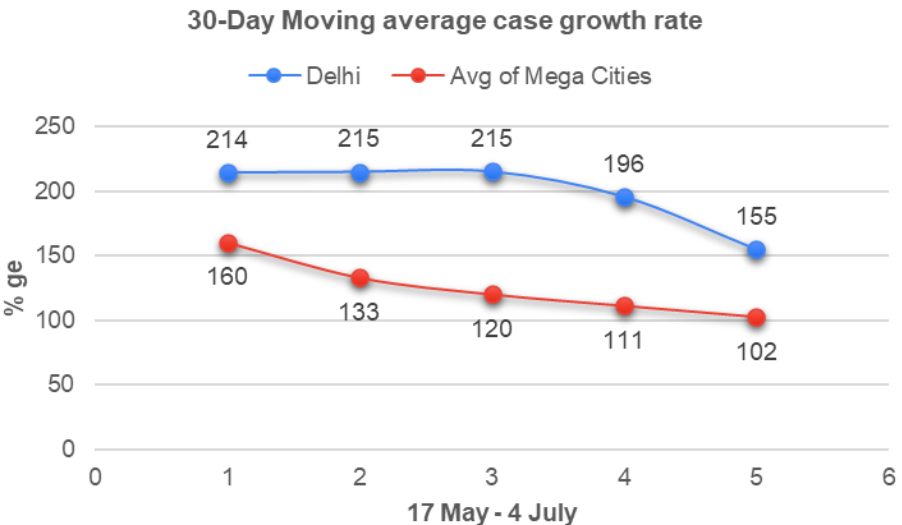
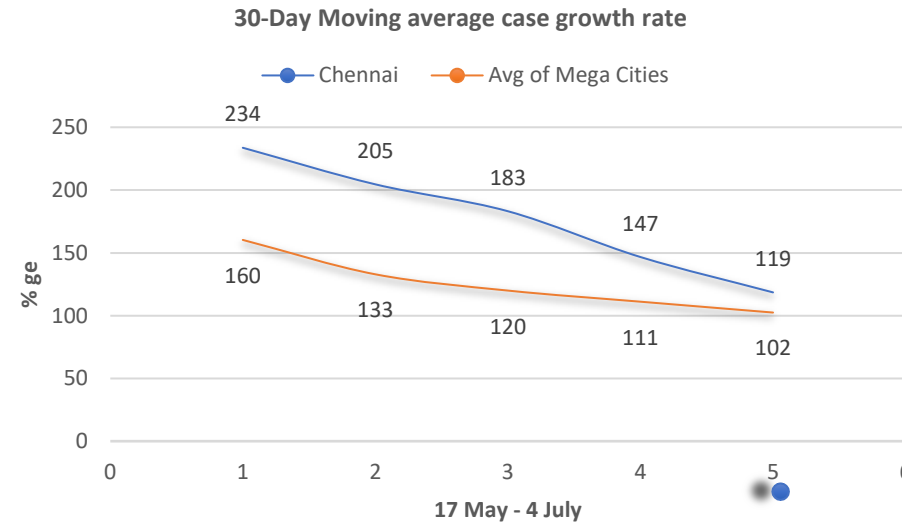
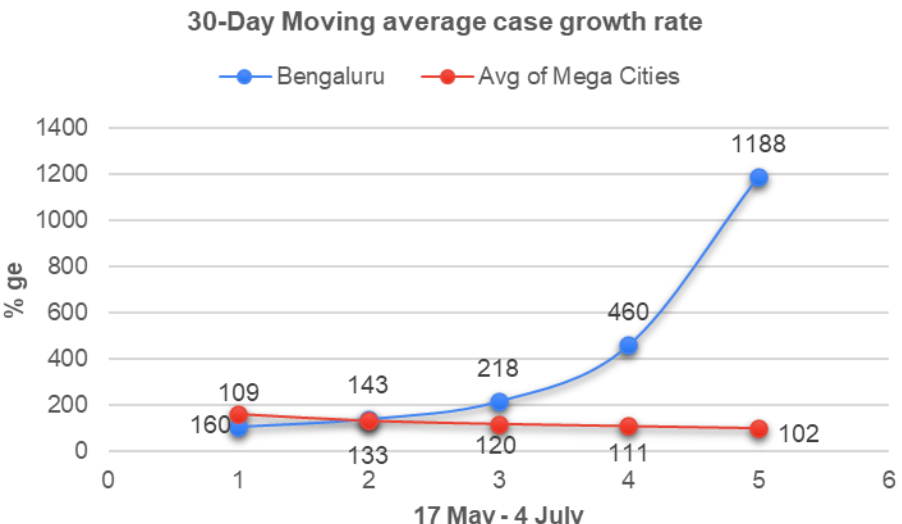
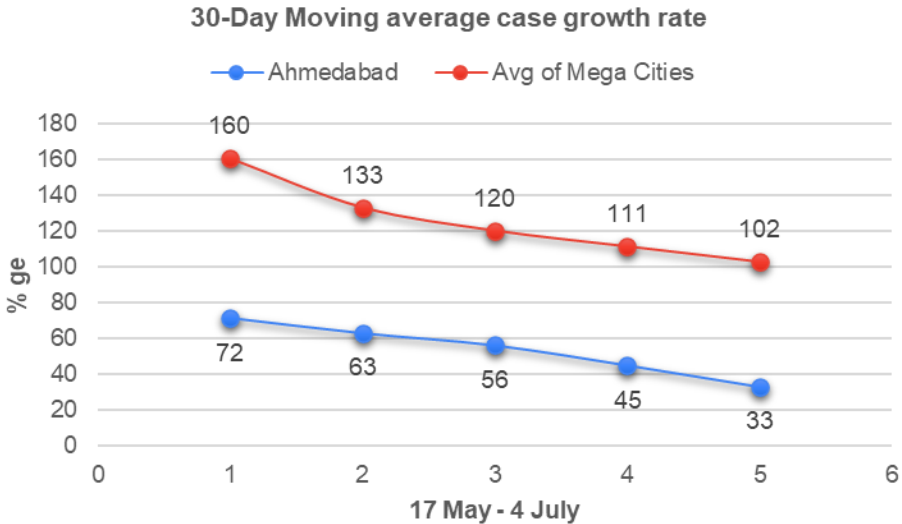
30-Day Moving Average Growth of COVID Fatality in Mega Cities



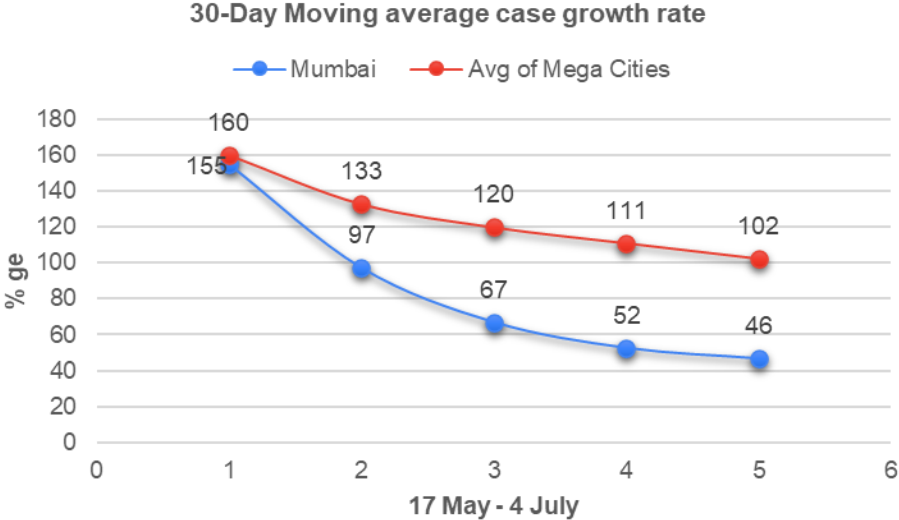
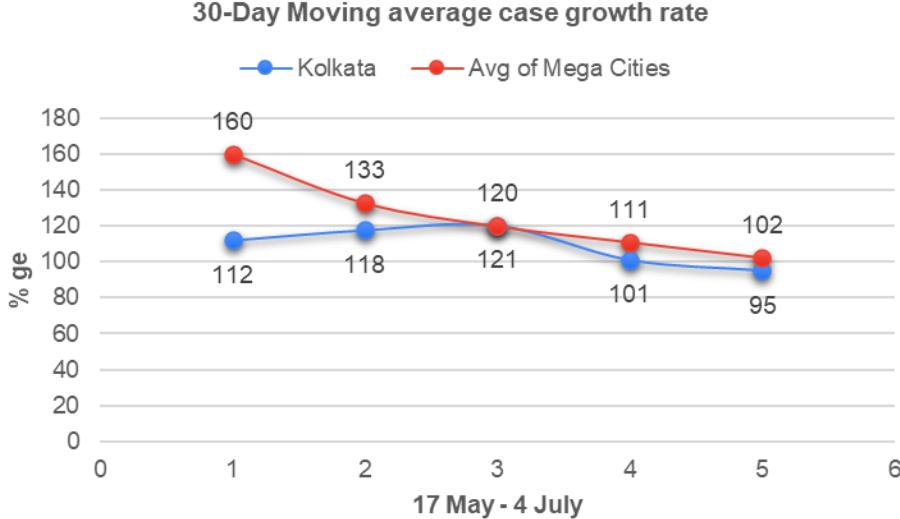
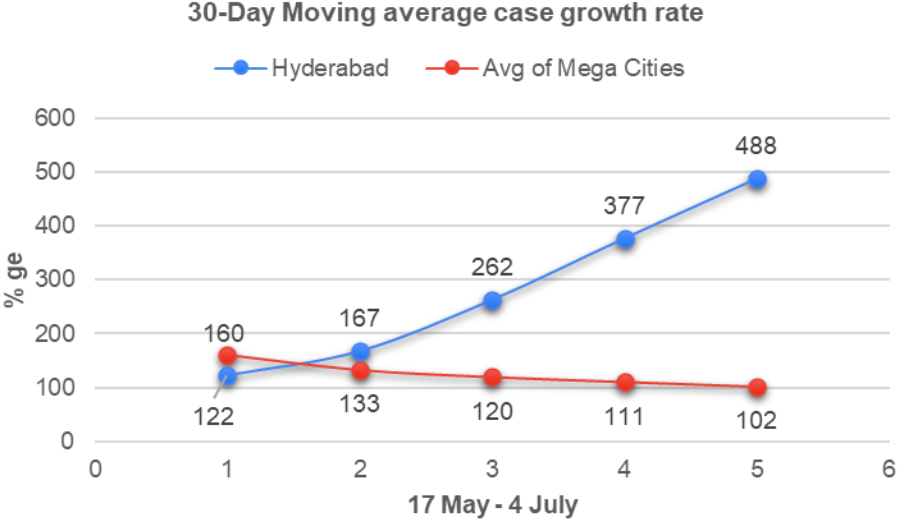
30-Day Moving Average Growth of COVID Fatality in Mega Cities



30-Day Moving Average Growth of COVID Positive Cases in Mega Cities



30-Day Moving Average Growth of COVID Positive Cases in Mega Cities



Dedication to the Nation

Proxima-PHFI Pandemic & Epidemic Management System (PPEMS) is a joint development of Public Health Foundation of India (PHFI) and Proxima. PPEMS provides customised dashboard for stakeholders who are directly managing the pandemic.

Over last 8 weeks, PPEMS has been tested with the publicly available COVID 19 data. The system provides sharper insights on the emerging pattern of the Pandemic and systematically highlights regions which needs immediate and specific attention.

PPEMS is the voluntary efforts of researchers and analysts at Proxima and PHFI in dedication to the nation

Data source and disclaimer

1. The data collated and analysed based on secondary data. The primary sources are:
<https://www.mohfw.gov.in/> <https://www.covid19india.org/> www.google.com; www.wikipedia.org;
<https://www.worldometers.info/coronavirus/#countries>
2. The user of this presentation is advised to revalidate the shared data from authorised public institutions.

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Thank you