

Maharashtra: COVID-19 Goes Viral in Cities, Shadow Looms Over the Countryside

04/05/2020



This is the first of a two-part analysis of Maharashtra's COVID-19 epidemic.

Maharashtra is the Indian state hit hardest by the coronavirus epidemic, having nearly 30% of all cases and 40% of all deaths due to COVID-19 in the country. Despite large scale efforts by the Maharashtra government, major transmission continues in existing hotspots like Mumbai, which the most cases among India's cities, and more twice as Delhi, and in clusters in other parts of the state.

This worrisome situation in the state regarded as the country's economic powerhouse raises several questions. What has been the trajectory of the epidemic, and what is the current nature of disease transmission? How do Maharashtra's strategies compare with those of other states like Kerala, which have achieved better containment? Were important opportunities for control missed, and can refocusing strategies now help seize what opportunities remain?

The Maharashtra Public Health Analysis Group is a voluntary group of public health professionals, and has attempted to address some of these questions by rapidly analyzing national-level COVID-19 data. (Editor's note: The author is a member of the group.)

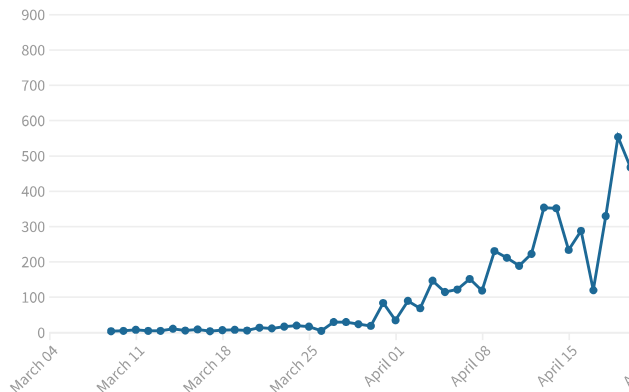
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Sharp rise in cases from April

The number of cases and deaths in Maharashtra has risen dramatically since April, and at an accelerating pace.

New COVID-19 cases in Maharashtra

Daily, from March 29 to April 29, 2020.



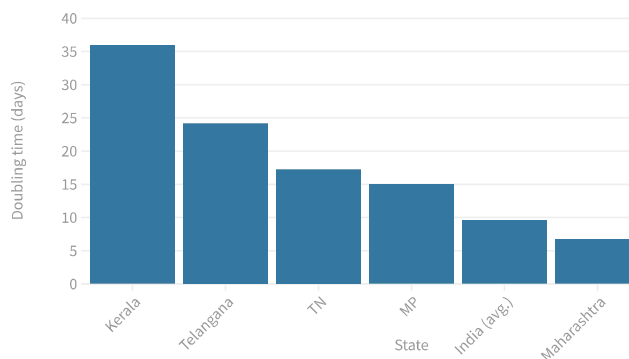
Source: Press bulletins, DGIPR Maharashtra

A Flourish chart (https://public.flourish.studio/visualisation/2229497/?utm_source=showcase&utm_campaign=visualisation/2229497)

This rapid spread is reflected in its relatively low doubling time.

Doubling time in Maharashtra

On April 25, as a seven-day rolling average.



Source: RESPONSE – Maharashtra daily dashboard (internal), April 26, Maharashtra government presentation

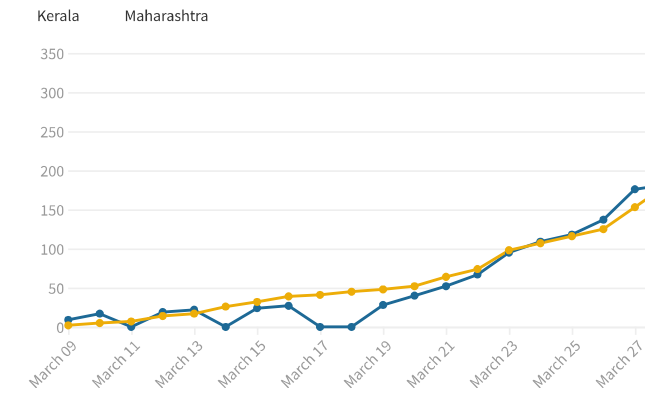
A Flourish chart (https://public.flourish.studio/visualisation/2229581/?utm_source=showcase&utm_campaign=visualisation/2229581)

The trajectories of the epidemics in Maharashtra and Kerala make for a study in contrast. In March, Maharashtra and Kerala had a comparable number of cases despite Maharashtra having three-times as many people. However, from early April, the curves diverge drastically, with Kerala largely containing the spread of the virus and Maharashtra, not.

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COVID-19 cases

In Maharashtra and Kerala, March 2020.

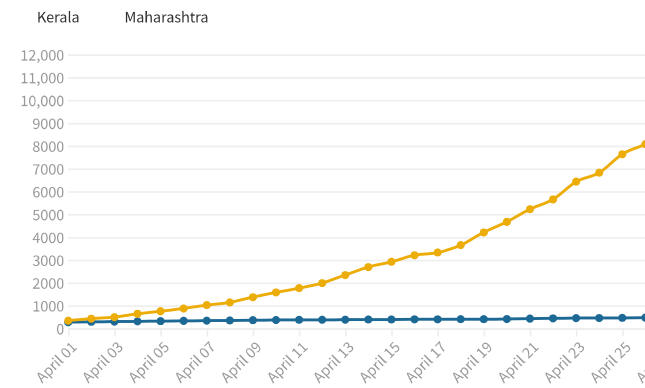


Source: Maharashtra: Press bulletins, DGIPR Maharashtra, Kerala: Government of Kerala dashboard

✳ A Flourish chart (https://public.flourish.studio/visualisation/2229640/?utm_source=showcase&utm_campaign=visualisation/2229640)

COVID-19 cases

In Maharashtra and Kerala, April 2020.



Source: Maharashtra: Press bulletins, DGIPR Maharashtra, Kerala: Government of Kerala dashboard

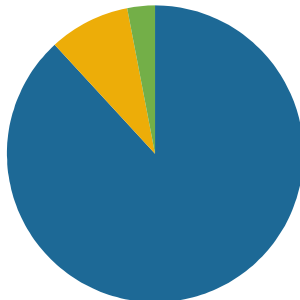
✳ A Flourish chart (https://public.flourish.studio/visualisation/2229679/?utm_source=showcase&utm_campaign=visualisation/2229679)

The difference in fatalities is even more stark: in Maharashtra, 521 people died of COVID-19, while only four have died thus far in Kerala.

Concentration in urban areas

Distribution of COVID-19 cases

Across Maharashtra's districts, April 30.



4 8 24

Source: COVID-19 Monitoring Dashboard, Public Health Department, Government of Maharashtra, accessed April 30.

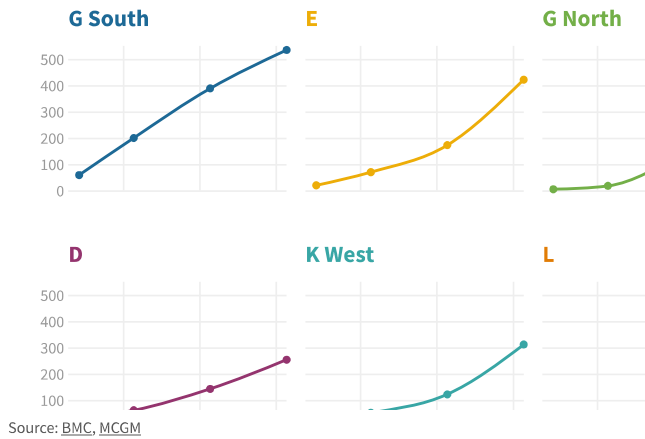
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As in many parts of the country, Maharashtra's COVID-19 is highly concentrated in a few urban areas. Just four districts – Mumbai city and suburban area, Pune and Thane – host 88% of the state's cases, while 24 other districts together, forming two-thirds of the state, have just 3% of all cases.

Indeed, the epidemic is even more concentrated in the state's two largest urban centres: the Mumbai metropolitan region and Pune. Two things are obvious going by the data for selected wards in Mumbai over a 20-day period in April.

Cases by ward in Mumbai

On April 4, 9 16 and 23.



✳ A Flourish chart (https://public.flourish.studio/visualisation/2229992/?utm_source=showcase&utm_campaign=visualisation/2229992)

First, just as Mumbai and Pune host so many of Maharashtra's cases, some specific wards in Mumbai host most of the city's cases, especially G South, D, E and G North, indicating the virus spread through a cluster.

Second, the number of cases has risen sharply in some areas. For example, in the G South ward, the number of cases more than doubled in a five-day period from April 4 to 9, and then nearly doubled in the next week, from April 9 to 16. In the E ward, the number of cases increased sixfold in the fortnight from April 9 to 23.

In many of these wards, the number of cases doubled week on week in this entire period. This swift multiplication supports our argument that – moving beyond close contact with people who recently travelled abroad – more generalised community transmission could be underway in these urban clusters.

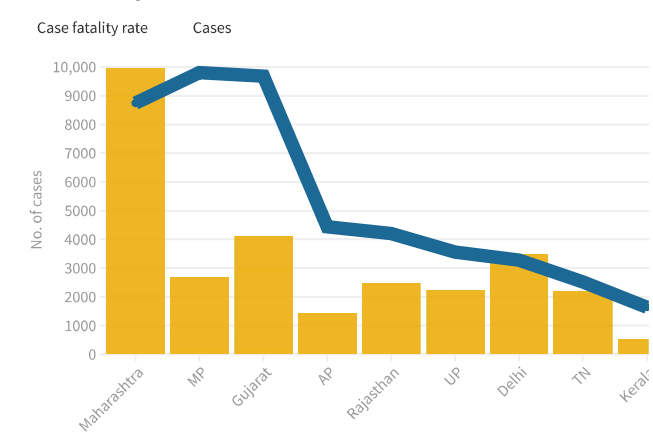
Information of the contact backgrounds of people with COVID-19 in Maharashtra, though available for a limited period, substantiates this assertion. On March 27, 81% of those with COVID-19 in Maharashtra were either recent travellers or their contacts. This picture quickly changed in 10 days: by April 7, the number of cases among travellers and their contacts had levelled off while 'awaited' and 'inconclusive' cases – presumably neither travellers nor their contacts – made up 81% of all cases.

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High case fatality rates

Another worrisome feature of the COVID-19 epidemic in Maharashtra is the high-case fatality rate among people with the infection. Compared to other Indian states that have a large number of cases, including Madhya Pradesh and Gujarat, Maharashtra has higher case fatality rates: i.e. more patients with COVID-19 die in Maharashtra than in other states.

Case fatality rate in states



Source: MOHFW, April 30

✳️ A Flourish chart (https://public.flourish.studio/visualisation/2230076/?utm_source=showcase&utm_campaign=visualisation/2230076)

Although we're not in a position to ascribe any single reason for this rate, it's certainly a matter of concern because a high case-fatality rate combined with the growing number of cases implies the number of deaths will rise steeply in the coming weeks.

Another striking detail, which requires further analysis, is a large variation in the case fatality rate across major COVID-19 clusters in Maharashtra's different urban areas.

Case fatality rates due to COVID-19

In select municipal corporation areas of Maharashtra, April 24.

Municipal corp.	Cases	Deaths	Case fatality rate
Nagpur	132	1	0.76
Thane	373	4	1.07
Navi Mumbai	162	3	1.85
Kalyan	158	3	1.9
Vasai Virar	128	3	2.34
Mumbai	6644	270	4.06
Mumbai	6644	270	4.06
Aurangabad	103	7	6.8
Malegaon	171	12	7.02
Pune	1062	79	7.44

Source: Public Health Department, Maharashtra (COVID-19-related updates)

✳️ A Flourish data visualization (https://public.flourish.studio/visualisation/2230133/?utm_source=showcase&utm_campaign=visualisation/2230133)

There is a ninefold variation between the case-fatality rates in Nagpur and in Malegaon, although they have a similar number of people with COVID-19. Similarly, Pune's case-fatality rate is twice as high as that of Mumbai.




One factor that could be partly responsible for these observations is different levels of COVID-19 testing. If the overall rate of testing is lower, only the more clinically apparent cases may get tested; and death is more common among patients with severe COVID-19 infections.

There are other potential factors. For example, an [analysis](#) of the first 50 COVID-19 deaths in Mumbai showed that in half of all patients who eventually died, the test result came back positive just an hour before or after death, which indicates delayed testing. It's also possible that the quality of clinical care is inadequate or uneven, leading to more deaths in some areas. We need to urgently investigate this issue to understand why case-fatality rates are high where they are.

Overall, we can conclude that the spread of COVID-19 in certain urban Thane – has accelerated since early April, linked to the possible emergent transmission. So the government missed an important opportunity to act at an early stage here through intensive strategies. Now, the virus is spreading swiftly in other districts like Nagpur, Nashik and Aurangabad, which are emerging as new hotspots. However, in the majority of districts, the number of COVID-19 cases is still low (altogether fewer than 40), so intensive strategies might still be feasible here, and the state should implement them before they also become hotspots.

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This article was drafted by Abhay Shukla based on a recent report prepared by the Maharashtra Public Health Analysis Group. Along with Shukla, members of the group include Shweta Marathe, Muneer Mammi Kutty, Archana Diwate, Harsha Joshi, Pooja Chitre, Neha Naik, Mayank Sharma and Dipak Abnave. Several group members are associated with the Jan Swasthya Abhiyan.

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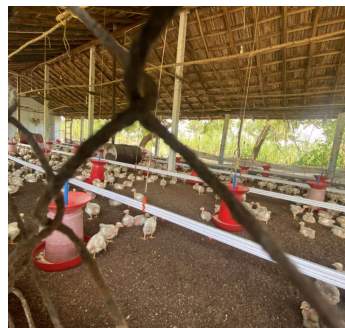
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