



India's epidemic adviser fears coronavirus crisis will worsen

India has confirmed more than 700,000 cases of COVID-19 so far, making it the world's third-worst-hit country. Major cities such as Delhi and Mumbai are particularly badly affected, with hospitals struggling to accommodate critically ill patients. The current surge in infections follows a two-and-a-half-month India-wide lockdown that began on 25 March and severely disrupted the economy and livelihoods. Jayaprakash Muliyil, an epidemiologist at the Christian Medical College in Vellore in the state of Tamil Nadu, has been advising the Indian government on COVID-19 surveillance. He talks to *Nature* about some of the factors affecting India's epidemic.

Do you think the outbreak in India is charting a different path from outbreaks in other badly hit countries, such as the United States, Italy or Spain?

It is. It is spreading much faster here, and the infection rates are higher. The general population's anxiety about the disease is low. People will willingly go out into the market today, and take fewer precautions to protect themselves. Consequently, at least in cities, the epidemic is growing very rapidly. And we know it is spreading in rural areas, too. The whole trajectory of the infection is moving upwards more sharply than in many other

countries. What happened in many Western countries is that when a big city like London was affected, other cities reacted strongly and reduced transmission. So, everywhere else, the doubling time got longer, but in some Indian cities it is short.

India is reporting that its mortality rate is among the lowest in the world. Is that accurate?

The mortality per million people in India is expected to be lower because of the low average age of India's population. (Older people are more likely to die from this infection.) So, we can take some comfort in the fact that deaths are fewer, especially in the rural population.

But the problem with death as an indicator is that a COVID-19 death has to be certified as such. The only way to do this is through an RT-PCR test (a reverse-transcription polymerase chain reaction test, which looks for viral genetic material in nose and throat samples). And with a population of 1.3 billion, what do you think is the proportion of people that has access to this kind of testing? It is very low.

So, it is very difficult to count all deaths due to COVID-19. There is no way you can get it done, unless rapid tests become more widely available. Remember that at least half of all

deaths will happen in the rural villages where around 66% of our population live. And there are no real mechanisms to ascertain causes of deaths in these villages.

What do you think of the Indian government's response to the epidemic so far?

The lockdown all over the country was not the right response. It brought misery to untold numbers of people and destroyed lives. And we haven't been able to repair its consequences for society. That was unfortunate. If we had planned the lockdown better, we would have still had losses, but they wouldn't have been greater than what we are experiencing now.

The lockdown did have one benefit: everyone became aware of this thing called COVID-19. It is not easy to communicate this to everyone in India, with its many remote regions, but because of the lockdown, people heard about it. The concept of an infectious disease is not easy for many to understand. In many rural areas, measles is considered to be caused by a goddess visiting a village. So is chicken pox. There, when you introduce the term virus, it doesn't make sense to many groups of people.

What should cities with large outbreaks do now?

Many cities are quarantining people returning from COVID-19-affected states or countries in public facilities and hotels. I would say that should stop, and these people should quarantine at home. Most of them won't know whether they have been infected, because they might not have been tested. And when the number of infected people is already high in the community, quarantining incoming travellers in public facilities, which is very labour-intensive, is not economical.

Instead, we should focus on a reverse quarantine for elderly people — where the old and the vulnerable are quarantined from others to protect them. We should also put money into hospitals, and provide oxygen for patients. That manoeuvre will save lives.

Interview by Priyanka Pulla

This interview has been edited for length and clarity.



Temperature screening in Mumbai, India, during the COVID-19 pandemic.