

Huge Study of Coronavirus Cases in India Offers Some Surprises to Scientists

The rate of death went down in patients over 65. Researchers also found that children of all ages became infected and spread the virus to others.



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With 1.3 billion people jostling for space, India has always been a hospitable environment for infectious diseases of every kind. And the coronavirus has proved to be no exception: The country now has more than six million cases, second only to the United States.

An ambitious study of nearly 85,000 of those cases and nearly 600,000 of their contacts, published Wednesday in the journal *Science*, offers important insights not just for India, but for other low- and middle-income countries.

Among the surprises: The median hospital stay before death from Covid-19, the illness caused by the coronavirus, was five days in India, compared with two weeks in the United States, possibly because of limited access to quality care. And the trend in increasing deaths with age seemed to drop off after age 65 — perhaps because Indians who live past that age tend to be relatively wealthy and have access to good health care.

The contact tracing study also found that children of all ages can become infected with the coronavirus and spread it to others — offering compelling evidence on one of the most divisive questions about the virus.

And the report confirmed, as other studies have, that a small number of people are responsible for seeding a vast majority of new infections.

An overwhelming majority of coronavirus cases globally have occurred in resource-poor countries, noted Joseph Lewnard, an epidemiologist at the University of California, Berkeley, who led the study. But most of the data has come from high-income countries.

“It still surprises me that it took until this point for a lot of data to come out of a low- or middle-income country about the epidemiology of Covid,” he said.

In particular, he added, few studies anywhere have done contact tracing at the scale of the study.

“I think it’s some of the most important data we collect in an epidemic in order to decide what kinds of interactions are safe, and what kinds are not,” he said. And yet, “data like this has not really been published very much.”

Though its overall total of cases is huge, the per capita number of cases reported daily in India — and in many other low-income countries, including in Africa — is lower than in Spain, France or even the United States. And its number of deaths has not yet topped 100,000 — which has surprised some scientists.

India “is a place where you would expect a disease like this to roar through, at least in the older populations,” said Dr. Krutika Kuppalli, an infectious disease expert at the Medical University of South Carolina. “They haven’t seen that as much as you would expect.”

India recorded its first case of Covid-19 on Jan. 30 in an Indian citizen evacuated from China. The government began screening travelers from China and other countries on Feb. 7 and extended these efforts to travelers by sea and land on March 15. The country shut down on March 25 but reopened two months later, despite soaring rates of infection.

The study focused on two southern Indian states, Andhra Pradesh and Tamil Nadu, which together have a population of about 128 million, and represent two of the five Indian states with the most cases. They also have among the most sophisticated health care systems in the country.

Contact tracers reached more than three million contacts of the 435,539 cases in these two states, although this still did not represent the full set of contacts. The researchers analyzed data for the 575,071 contacts for whom test information was available.

“I think what they were able to do is actually really remarkable, to be quite honest,” said Dr. Kuppalli, who has spent time in Tamil Nadu doing public health work. Contact tracing has proved difficult enough to do in the United States, she said. “I can’t imagine what it would be in a place like India, where it’s such a more crowded, crowded area.”

The contact tracing data revealed that the people infected first — known as index cases — were more likely to be male and older than their contacts. That may be because men are more likely to be out in situations where they might be infected, more likely to become symptomatic and get tested if they do become infected, or perhaps more likely to respond to contact tracers’ calls for information, Dr. Lewnard said.



A health worker performed a coronavirus test at a college near Gauhati, India, on Sept. 30, 2020. India’s six million cases is second only to the United States. Anupam Nath/Associated Press

He and his colleagues also looked at infections in contacts by age and sex, and found that infected people tend to spread the virus to those of similar ages.

That’s not surprising because people generally tend to mix with their own age groups, Jeffrey Shaman, an epidemiologist at Columbia University in New York, said: “That’s a fairly robust result.”

For example, more than 5,300 school-aged children in the study had infected 2,508 contacts but were more likely to spread the virus to other children of a similar age. Because the researchers were not able to get information for all of the contacts, they could not assess the children’s ability to transmit relative to adults. But the finding has relevance in the school debate, as some people have argued that children spread the virus to a negligible degree, if at all.

“The claims that children have no role in the infection process are certainly not correct,” Dr. Lewnard said. “There’s, granted, not an enormous number of kids in the contact tracing data, but those who are in it are certainly transmitting.”

Over all, the researchers found, 71 percent of the people in the study did not seem to have transmitted the virus to anyone else; instead, just 5 percent of people accounted for 80 percent of the infections detected by contact tracing.

This is different from the idea of “super spreader” events in which a single person infected hundreds of people at a crowded gathering, Dr. Lewnard said.

The researchers noticed a key difference in those who did become sick and were hospitalized: They died on average within five days of being hospitalized, compared with two to eight weeks in other countries. The patients in India may deteriorate faster because of other underlying conditions like diabetes and high blood pressure or poor overall health, Dr. Lewnard said.

Access to health care may also play a role, said Dr. Ashish Jha, dean of the School of Public Health at Brown University, who has advised the Indian government on its health care infrastructure before the pandemic.

Although India has some excellent hospitals, most hospitals in the country are ill-equipped, have few beds and fewer doctors, Dr. Jha said. Most people in India also do not have health insurance that would allow them care from private hospitals.

“There are going to be these large financial barriers that make people wait until they get very, very sick,” Dr. Jha said.

Conditions may be similarly dire in other resource-poor nations. The amount of time patients may spend in the hospital is a “key planning parameter” for governments preparing for outbreaks, Dr. Lewnard said, and longer hospital stays can create bottlenecks during a surge.

Among those infected, the researchers found an overall case-fatality rate of 2 percent. The rate rose sharply with age, as it did elsewhere. But unlike in other countries, after age 65, the deaths sloped downward again.

“It leads to a younger death distribution over all in the population than you would project,” Dr. Lewnard said. The difference was not fully accounted for by the distribution of ages in the population.

At 69 years, the life expectancy in India is 10 years lower than in the United States. The Indians who survive into old age may be more likely to survive the disease because of better health and access to health care, he and others said.

A majority of Indians have a hardscrabble existence, earning a living as farmers, factory workers or day laborers, Dr. Jha said.

“Those jobs are physically very, very demanding, and they have high fatality rates,” he added. “They are just much less likely to make it into their late 70s or 80s compared to people who are white-collar workers.”

Dr. Jha said he appreciated the study over all, but cautioned against extrapolating its findings too far. He is from the state of Bihar, among the most rural and poor states in India, whereas Andhra Pradesh and Tamil Nadu, the two states in the study, are among the best equipped to deal with an outbreak, he said.

“It is really important to understand this is not the experience of Bihar, this is not the experience of D.R.C.,” he said, referring to the Democratic Republic of Congo. “This is a much rosier picture than what you are likely to see in those places.”

But other experts were impressed with the scale and scope of the study. “India has been the nexus of the most cases recorded for the last three, four weeks,” Dr. Shaman said.

“To see it in the Indian milieu is very important,” he said. “We can’t just study it in a few countries and then walk away.”

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