Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Is India missing COVID-19 deaths?

Experts have questioned shortcomings and lack of clarity in vital registration, testing practices, and classification of COVID-19 deaths. Patralekha Chatterjee reports from New Delhi.

India has had 3·6 million cases of COVID-19, the third most in the world after the USA and Brazil, with 65 288 officially confirmed deaths from the disease as of Sept 1, 2020.

The Indian Government says that the national recovery rate has reached 77% and the case fatality rate is down to 1·8%, due to "timely and effective clinical management of the patients in critical care" according to an official statement on Aug 30. However, experts who spoke with *The Lancet* have pointed to several sources of uncertainty in India's COVID-19 mortality data.

It is unclear how suspected or probable COVID-19-attributable deaths are being included in mortality estimates. Indian Council of Medical Research (ICMR) guidelines stipulate that deaths of people with suspected or probable COVID-19 should be included in mortality data, based on WHO ICD-10 codes for COVID-19-related deaths. However, the guidelines are advisory. Information about whether state data on deaths include suspected and probable cases is not in the public domain and the Indian Ministry of Health and Family Welfare did not respond to *The Lancet*'s requests for clarification.

"For COVID-19, we have to throw the net more widely to capture all the deaths (confirmed and suspected) in order to understand the disease better and for its management" says Prashant Mathur, director of the National Centre for Disease Informatics and Research (NCDIR), an ICMR body. "It is important to correctly record the cause of deaths. But it is up to individual states to follow these guidelines. As per the existing law, NCDIR is not required to get data about suspected or probable deaths from states so I can't say whether deaths are being certified."

When asked about reports that some states had not recorded any suspected or probable COVID-19 deaths, Giridhara R Babu, an epidemiologist at the Public Health Foundation of India, pointed to general weaknesses in vital registration. He told *The Lancet* that in rural areas, where most of India's population lives, most deaths occur outside the hospital, which can delay registration. "Among the deaths registered under the civil registration system, only 22% are medically certified nationally with cause of death."

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Rijo John, public health policy analyst and senior fellow at the Centre for Public Policy Research in Kerala, said some under-reporting is happening. He told *The Lancet* that "while it is true that only 21% of all deaths are medically certified in India, we should not forget that more than 65% of the total COVID-19 deaths reported in India so far are from just four states, Maharashtra, Tamil Nadu, Karnataka, and Delhi. In all these states, the death registration is 100%."

Babu also highlighted shortcomings in wider surveillance. "[The] Integrated Disease Surveillance System is collecting the data on deaths due to COVID-19 from testing laboratories and hospitals, but misses deaths due to COVID-19 among those who were not tested." Babu told *The Lancet* that "verification of data and detailed examination of the death numbers from several hospitals and field offices needs to be done". He also emphasised the need for data on all-cause mortality to understand the effects of the epidemic. "Patients die due to underlying comorbid conditions and unavailability of critical care."

Different Indian states are using different COVID-19 diagnostic tests. "Comparing test positive rates between different states has become extremely difficult as more and more states are moving towards rapid antigen detection tests, which are known to have a high percentage of false negatives and not utilising the gold standard RT-PCR tests to full capacity", said John. Not all states are equally forthcoming with data on how many of each type of test is being used. "Given that we need more resources to scale up testing, knowing the cost-effectiveness of different testing types can be very useful in developing more effective testing guidelines", he said.

John called on the central government to enforce standards. "Although health is a state responsibility, the health ministry could at least release an advisory to make the data reporting standardised and transparent across states", he said. "It should be made mandatory for all states to report the break[down] of different test types as well as the positives from these."

Public pressure and media reports about alleged undercounting have begun to push many states to review their COVID-19 mortality data. "In several states, many of the 'missing' deaths were added later on to the tally after audits. For example, Tamil Nadu has added backlogs of 400-plus deaths. So did Maharashtra. West Bengal used to exclude all deaths due to comorbidities from COVID deaths, but they stopped such practices", John said.

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