

CORONAVIRUS

Relevant for: Developmental Issues | Topic: Health & Sanitation and related issues

A security staff stops a man as he checks the body temperature of people entering the Bombay Stock Exchange building in Mumbai on March 16, 2020. | Photo Credit: [AFP](#)

The story so far: With the number of [COVID-19](#) cases accelerating in India, health authorities are now broadening the pool for testing. On Friday night, the Indian Council of Medical Research (ICMR) issued guidelines for a new testing strategy to effectively track COVID-19 cases. The focus remains on finding imported infections and testing their contacts who show symptoms, the new guidelines say all hospitalised patients with severe acute respiratory illness, shortness of breath and having fever and cough will be tested for COVID-19. And asymptomatic direct and high-risk contacts of an infected person should be tested between the fifth day and 14th day of coming into contact with the patient.

To rapidly determine whether someone with symptoms of cough, fever and breathlessness is infected, hospital authorities are doing an RT-PCR (real time reverse transcriptase-polymerase chain reaction) test. This process involves collecting a nasal or throat swab from a patient suspected of having the disease. These are two sites (the nose and back of the throat) where the virus can be collected, and the swab picks up the cells where the virus might be. Replication happens in the upper respiratory tract. These are frozen and sent to one of the designated government centres for a result.

[Coronavirus](#) | [Testing is the easiest thing to do, says community health expert Gagandeep Kang](#)

A sample is also sent to the National Institute of Virology (NIV) to recheck the diagnosis.

To check for the SARS CoV-2 virus, the sample is passed through a machine, which is part of the diagnostic kit. The RNA, or ribonucleic acid, which is the genetic material of a virus, is isolated from the sample and it is on this that further tests are done.

Based on what is known about the structure of coronaviruses in general and what emerging research about SARS CoV-2 suggests, research organisations around the world have marked out locations on the SARS COV-2 genome that differentiate it from other coronaviruses, particularly SARS-CoV that was identified in China in 2003. On the basis of this, protocols or steps are prescribed for testing agencies to follow to determine the presence of SARS CoV-2. Enter primers and probes. Primers are small pieces of DNA and research laboratories, both private and public, have designed customised primers that bind only to a specific combination of DNA bases. It is the uniqueness of a sequence of DNA bases that differentiates species as well as strains within it.

With an enzyme, the virus's RNA is converted into DNA and the appropriate primer — like a key that can only open the right lock — zooms into the virus's genome and amplifies it.

This amplification is necessary as there is an extremely limited amount of the viral genome and detecting it requires that a sufficient amount of the material is synthesised. A fluorescent dye, or the probe, is added during the testing process. The probe only lights up when DNA is detected. When many samples are tested simultaneously, only those with the SARS CoV-2 in them will light up, thus confirming its presence. These tests can yield results within hours and are extremely accurate provided they are appropriately conducted by trained, qualified personnel.

[Data | India's coronavirus testing rates are among the lowest in the world](#)

Currently, testing for SARS-CoV-2 can only be done by 79 laboratories. The ICMR's approach so far was to focus on those who showed symptoms of the disease and had a travel history from countries with SARS CoV-2 cases; their contacts who show symptoms and symptomatic health-care workers managing patients with 'severe acute respiratory distress'.

This excluded, as several doctors and critics pointed out, those who may show symptoms but do not have a travel history. On Friday, a committee of experts, mostly from government institutions that advises on testing strategy, led the ICMR to expand these criteria to include all symptomatic health workers, hospitalised patients with severe respiratory illness and a five and 14-day follow-up with close contacts of confirmed cases, even if they do not show symptoms.

[Coronavirus | WHO's 'test, test, test' prescription not for India, says ICMR](#)

Testing is free but it costs the government 4,500 per test. The probes are imported and the ICMR has ordered a million of them. Spending money optimally, is important in the ICMR's scheme of things. Testing anyone and everybody with symptoms, ICMR officials reckon, would lead to reagents (chemicals used in the process) and probes being 'wasted', as according to them, large numbers could test negative. This would, going ahead, make resources scarce if instances of community transmission (when it is no longer possible to trace the contact history of someone who tests positive) are confirmed and infections are widespread. So far, only 10% of the ICMR's available capacity has been utilised and random sampling (that is testing 20 samples of severe respiratory illness) at 60-odd locations has yielded no positive cases.

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Therefore, they surmise, there has been no instance of community transmission as yet. With the blanket ban on international commercial flights from March 22 to March 29, screening of borders and quarantine measures imposed by States and commercial establishments and screening, and then following up with the contacts of positive cases, ICMR officials feel the spread of the infection can be controlled. Testing high-risk groups and broadening the criteria gradually also allow the government to track better, isolate and care for individuals who test positive.

The ICMR has opened a window for private sector health-care laboratories which have a supply chain of primers, probes and reagents to apply for permission to conduct tests. There are 16 Indian companies which have made their own diagnostic kits but await validation by the NIV, the only designated authority. Most of the kits will be imported and involve licensing deals with multinational companies.

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The ICMR has requested the private laboratories, if and when they are allowed, to offer "tests for free". As of March 21, 15,701 samples from 14,811 individuals have been tested and 271 have been confirmed positive. Nearly 850 samples that were randomly tested for community transmission have tested negative.

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