



## Mega Covid Testing Lab

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### Why in News

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The **Council of Scientific and Industrial Research (CSIR)** is working on developing mega labs to speed up testing as well as improve the accuracy of testing for **Covid-19** positive cases.

### Key Points

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- Large machines, called **Next Generation Sequencing machines (NGS)** will be modified to sequence 1,500-3,000 viral genomes at a go for detecting the SARS-CoV-2 novel coronavirus in these labs.
  - These machines are also used for **sequencing human genomes.**
  - The NGS also found **two lineages of coronaviruses** which were unknown in Indian populations so far.
- The CSIR has partnered with the US-based Illumina, a company that specialises in the manufacture of NGS machines.

Five NGS machines are currently available in India.
- So far, 3,086 sequences of the virus isolated from humans have been shared by 57 countries, with India sharing **nine whole genome sequences of the novel coronavirus (SARS-CoV-2)** with the **Global Initiative on Sharing All Influenza Data (GISAID).**

- **Benefits:**

- **Accuracy:** The NGS tests has a sensitivity of 97.53% as compared to 70%-80% accuracy of **RT-PCR (Reverse Transcription Polymerase Chain Reaction)** and 50% accuracy of antigen tests.
  - These tests detect the possible presence of the virus even in several instances where the RT-PCR tests miss out on them.
  - This is primarily because the RT-PCR test identifies the SARS-CoV-2 virus by exploring only specific sections of the virus whereas the genome method can read a **bigger chunk of virus genome** and thereby provide **more certainty**.
- **Confirmation:** NGS identified cases as either positive and negative when RT-PCR found them to be **'inconclusive'**. So this can also be used as a **confirmatory test**
- **Reliability:** It can also trace the evolutionary history of the virus and track mutations more reliably.

This can help identify more places where **SARS-COV-2** viruses differ from other related viruses.
- **Mass Testing:** According to the **Indian Council of Medical Research (ICMR)**, the NGS tests can space up from the present approx. 7.5 lakh tests per day to at least a **million per day**.
  - Unlike the RT-PCR that needs **primers and probes**, which is a key hurdle in operationalising such tests on a mass scale early on in the pandemic, the NGS does not need primers and probes, and only needs **custom reagents**.
  - **Primers** are short sequences of DNA used to amplify a particular DNA sequence. A **probe** is a small radioactively or fluorescently labelled DNA sequence used to identify a particular DNA sequence.
  - **Reagent** for DNA is designed to easily prepare DNA extracts from animal tissues that can be used directly in PCR.
- **Other Uses:** Establishing “hubs” capable of **whole genome sequencing** would help track significant mutations in the virus and can be repurposed for any kind of outbreak, be they of viral or bacterial origin.

NGS can also be used to develop **new diagnostic tests for Covid-19**.
- **Surveillance and Tracing :** Due to limited accuracy and capacity of existing tests, a sizeable population is **falsely negative**. NGS can help in serving a larger purpose of continuous surveillance of large pools like industrial hubs, commercial establishments or places where an outbreak is likely.

## Testing for Covid 19

Different methods of testing are being experimented in the country to trace **Covid-19** infection. Some of these include:

- **RT PCR Tests**
- **Rapid Antigen Detection Tests**
- **RTnPCR Tests**
- **Feluda Tests**
- **ELISA Antibody Tests**

**Source: TH**