Dry Swab RT-PCR Covid-19 Test

Why in News

Recently, the **Council of Scientific and Industrial Research**-**Centre for Cellular and Molecular Biology** (CSIR-CCMB) has got the permission of the **Indian Council of Medical Research** (ICMR) to commercially use the **dry swab RNA-extraction free testing method** for the **Covid-19.**

Key Points

- **About:**
    - Dry swab method has a consistency of 96.9%.
    - The comparison of **conventional** (swab-VTM-RNA extraction-RT-PCR) and the **simplified** (direct elution from dry swab-RT-qPCR) protocols suggested that dry swabs eluted directly into a simple buffered solution can support molecular detection of SARS-CoV-2 via endpoint RT-PCR without substantially compromising sensitivity.
- **Conventional Method:**
    - In the conventional testing method, **nasopharyngeal or oropharyngeal** swab samples are **collected by sample collection centres** from the suspected coronavirus patients. These are **then transported to testing centres,** sometimes even hundreds of kilometres away.
        - The **nasopharynx** is the **upper part of the pharynx** (throat) **behind the nose.**
        - The **oropharynx** is the **middle part of the pharynx just beyond the mouth** and includes the back part of the tongue (base of tongue), tonsils, soft palate (back part of the roof of the mouth), and the sides and walls of the throat.
    - The swab samples are generally placed in a liquid called **Viral Transport Medium** (VTM) and to avoid leakage, the samples are packed heavily that **adds on to sample processing times** at both the sample collection and testing centres.
    - **RNA extraction,** even with automation, takes **four hours for roughly 500 samples.** VTM and RNA extraction both add a **significant burden on money and time required** for mass testing.
- **New and Simplified Method:**
    - Dry swab technique **does not require VTM and RNA extraction process,** and can be directly used for RT-PCR testing.
    - It has the **potential of bringing the costs and time of testing by 40-50%** and the **screening can also be enhanced several-fold** with immediate effect while, at the same time, **making the whole process safer.**
    - It is **easy to implement** with **no requirement of new kits and existing manpower can perform this** with no additional training.
- **Benefits:**
    - It will **scale up the testing.**
    - More economical than **conventional** RT-PCR tests.
    - Quicker results

RT-PCR Test

- **Kary Mullis,** the **American biochemist** invented the PCR technique. He was awarded the **Nobel Prize for Chemistry in 1993.**
- Under the test, copies of a **segment of DNA** (deoxyribonucleic acid) are **created using an enzyme called Polymerase.**
    - The **'chain reaction'** signifies **how the DNA fragments are copied exponentially,** where one is copied into two, the two are copied into four, and so on.
- A **fluorescent DNA binding dye** called the **"probe"** is added to DNA, which shows the presence of the virus on a fluorometer.
- **Covid-19 is made of RNA** (ribonucleic acid), so to detect it, **RNA is converted into DNA** using a technique called reverse transcription.
    - Then the copies of the DNA are then made and amplified.

Source: TH