Fact Sheet for PCR, Antigen, and Serology Tests

PCR Tests

What Are PCR or Other Nucleic Acid Tests?
- One type of nucleic acid test is a polymerase chain reaction test, better known as PCR
- The PCR test amplifies and then detects the presence of COVID-19 virus’ genetic material
- Two additional nucleic acid tests are the loop-mediated isothermal amplification (LAMP) and Nucleic Acid Amplification Test (NAAT) tests, which both work similarly to the PCR test

Why Use PCR Tests?
- PCR is the preferred test for diagnosing COVID infections for people who are sick (symptomatic) and in people who aren’t experiencing any COVID symptoms (asymptomatic)
- Can be processed from many different types of samples
  - Nasopharyngeal – from the upper part of the throat, at the back of the nose
  - Oropharyngeal – from the part of the throat at the back of the mouth
  - Nasal swab – from the front or lower part of the nose
  - Saliva – from spit
  - Lower respiratory tract specimen – this type of specimen can only be retrieved from a special procedure that involves putting a tube in the windpipe
- Useful in informing decisions about diagnosis, isolation, and quarantine

Concerns About PCR Tests
- Conventional PCR tests must be processed in a lab, which can mean waiting a day or more between having the test done and getting a result
- Rapid PCR tests have lower sensitivities. This means the results may sometimes be a false negative, so a negative rapid nucleic acid test result in a symptomatic person may need a follow-up with another PCR test to confirm they are actually negative
- False negatives can also occur in asymptomatic people due to low pre-test probability, or the chance that the patient has the disease before they are tested
- Errors in test preparation or sample collection can sometimes cause false negatives in both asymptomatic and symptomatic people
Antigen Tests

What Is an Antigen Test?
An antigen test directly detects fragments of proteins from the COVID-19 virus. Antigen tests have been approved by the FDA to be used to test people with symptoms (symptomatic individuals).

Why Use Antigen Tests?
• Easy to perform almost anywhere with a non-invasive nose swab
• Provide results quickly
• Lower cost
• Good at confirming suspected COVID infections in people who are already sick

Concerns About Antigen Tests
• Only approved for people currently experiencing COVID symptoms
• More likely to have a “false negative” result. Thus, a negative antigen test result may need a follow-up PCR test in people who have COVID-19 symptoms
• Positive tests in asymptomatic people who have not been exposed may be “false positives” and need a follow-up PCR test for confirmation

FDA-Approved Antigen Tests
• Quidel Sofia SARS Antigen FIA assay
  ○ Accuracy best within 5 days from start of symptoms
• BD Veritor System for Rapid Detection of SARS-CoV-2
  ○ Accuracy best within 5 days from start of symptoms
• LumiraDx SARS-CoV-2 Antigen Test
  ○ Accuracy best within 12 days from start of symptoms
• Abbott BinaxNOW COVID-19 Ag CARD
  ○ Accuracy best within 7 days from start of symptoms

When Should Antigen Tests Be Used?
• You should use an antigen test when:
  ○ You need to determine if someone who appears sick has COVID-19 quickly
    • E.g., Rapid triage in Emergency Rooms or pre-hospital admission testing is recommended
  ○ You are in an area where access to PCR testing is limited
    • E.g., Rural hospitals, tribal areas, and other remote settings with limited access
  • If there is limited PCR testing capacity and you are in a high-risk setting where regular, frequent testing is recommended, such as:
    ○ Congregate setting (prisons, nursing homes, etc.) for staff or residents with symptoms or for routine testing to find cases

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Serologic (Antibody) Tests

What Is a Serologic (Antibody) Test?
- A serologic (antibody) test detects the presence of the antibodies in your blood that your body produces to fight against the proteins from a COVID infection and other infections (e.g., detects a prior COVID infection)

When Should Serologic Tests Be Used?
- As a surveillance tool, to estimate the number of COVID-exposed people in a given area
- As a clinical follow-up to a negative PCR test for some people where symptoms strongly point to a COVID infection
- For a child who is suspected of having Multisystem Inflammatory Syndrome in Childhood (MIS-C)

Concerns About Serologic (Antibody) Tests
Serologic (antibody) tests should not be used to conclusively determine if you currently have COVID or have previously had COVID because:
- The potential lag of up to 21 days before antibodies are detectable means they may miss the diagnosis of a current case
- Antibody levels decrease over time and someone who had COVID in the past may not have detectable levels of antibodies anymore
- It is not known for sure if a positive antibody test means you are definitely protected against getting infected again

At Home Testing
- The FDA has approved some kits where you collect your own nasal swab or saliva sample and send it to a lab for analysis
- The FDA has not approved any kits that allow you to process a COVID test in your home

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