

FAQ on PCR molecular testing for SARS-CoV-2 virus.

* Please note that this FAQ pertains only to PCR molecular testing for SARS-CoV-2 virus. Antibody and antigen testing are not covered in this FAQ.

1. What is the “gold” standard approach for testing for the SARS-CoV-2 virus?

Testing approaches for SARS-CoV-2 remain under study for symptomatic patients. We know that there are variations in the level of virus detected depending on the site of sampling and the timing of the sample after symptoms develop. Most consider nasopharyngeal sampling the gold standard when sampling from the upper respiratory tract.

2. What specimens do people use to test for the SARS-CoV-2 virus?

Generally, there are 3 general locations from which samples can be collected to identify the virus - nasal, oral, and lower respiratory. Nasal samples include nasopharyngeal, nasal mid-turbinate, and anterior nasal. Oral includes oral fluid (saliva) and oropharyngeal. Lower respiratory samples include sputum, or bronchoalveolar specimens.

3. What collection approach provides the most reliable samples for symptomatic patients?

The best studied sample is nasopharyngeal (NP). NP samples also have the most studies in early symptomatic patients, and is thought to have as high as mid 90s sensitivity in early disease. When compared to NP, other samples perform variably. When comparing to other sample types, it's important to consider both ease of collection and sensitivity. Oral samples are the easiest to collect and can be done simply by providers or patients. However, this has the broadest range of sensitivity with some studies suggesting as high or better than Nasopharyngeal (90%), but also having the lowest sensitivity (66%) of the specimen types depending on techniques.¹⁻³ Alternatively Oropharyngeal (OP) swabs tend to have lower viral loads, but rates of detection in early symptomatic appear to be relative close to NP.⁴ Anterior nares and mid turbinate appear to have roughly the same sensitivity and specificity as the nasopharyngeal without the variation in sensitivity seen with oral samples.^{2,4-6} While the oral sampling was used during the shortages of swabs, the CDC does not currently recommend using these types of specimens.⁷ There are more data currently with mid-turbinate than anterior nares approaches, and both are easy to collect and can be done by providers or patients.

4. What about lower respiratory samples?

Lower respiratory samples perform the best overall in symptomatic patients.^{1,8} Especially later in the disease process, sputum may remain positive for several weeks longer than upper respiratory specimens.^{8,9} However, these samples are challenging to collect, requiring more PPE and have significantly increased risk of exposure risk to providers and others in the area of collection.

5. When is the peak viral shedding for COVID-19 disease patients?

Peak viral loads appear to happen around 4-6 days after symptom onset for upper respiratory specimens.^{10,11} The viral loads drop off quickly 7 days after onset of symptoms and decline rapidly with the majority of patients no longer having detectable virus around 14 days. However, a few patients will have detectable virus out to 6 weeks and beyond from upper respiratory samples.

6. When should SARS-CoV-2 positive patients be retested?

Individuals who are previously positive should not be retested within a minimum of 6 weeks unless directed based on clinical symptoms. High numbers of infected individuals may shed RNA post infection and may be placed on unnecessary isolation and utilize resources that are better reserved for patients with new symptoms. Shedding may last in excess of 6 weeks in some patients. Retesting to show clearance is not helpful in clinical management and does not correlate with infectivity.¹¹ It is unclear whether prior infection creates immunity, and there are active studies ongoing at the CDC to try to address this question.

7. If patient test is negative, when should patient be retested?

Individuals who have a negative test may have a false negative or a true negative test. A false negative test means that the test is negative, even though you have an infection. This happens more frequently early in an infection and depending on the collection approach (as described in question #3).

Even if a negative test result is a true negative, it is important to remember that when the test result for PCR molecular testing for SARS-CoV-2 is negative, it is only negative at that point in time. The individual may have converted to being test-positive by the time the test is resulted (depending on the turnaround time of the test). Individuals can also be exposed to the virus at any time and may subsequently be test-positive shortly after the true negative result. Therefore, re-testing is indicated if you develop symptoms consistent with COVID later. Patients can check their symptoms using [CDC Symptoms Self-Checker](#).

8. Should we be testing asymptomatic people?

Routine testing of asymptomatic individuals is not recommended.

9. Is there a difference in test performance when testing asymptomatic individuals?

Testing in asymptomatic individuals is challenging because they shed less virus (e.g. lower viral load). They are more likely to have a false negative result. This makes testing this group more challenging.

10. What sample approach should we use in asymptomatic people or people early in infection?

If you are going to test asymptomatic people or people early in infection, it is important to use the most sensitive testing approach available. Although collection of a nasopharyngeal sample is uncomfortable, it would be the best approach. Other nasal approaches are also reasonable based on current studies.

References

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