

COVID-19 Testing: What different types can – and can't – tell us

Testing has been a challenge for the United States and globally. However, its importance in our response is clear. Understanding of which tests support what decisions is critical as we navigate these complex conversations.

The United States now has good evidence that social distancing can mitigate some of the worst health impacts from COVID-19. Our national conversation has shifted to planning for a safe and steady relaxation of those restrictions to allow for a return to more active civic, social and economic lives.

Despite muddled and incomplete information, policy and medical leaders have recently made important progress on how to reduce social restrictions while continuing to protect the health of our communities. The relaxation of restrictions must be well-coordinated, informed by what we know and are learning about COVID-19, and supported by a well-resourced and sustained public health effort.

Reliable, accurate testing

The widespread availability of accurate COVID-19 testing is fundamental to the successful easing of restrictions. It's necessary to understand the disease's movement in our communities, its pattern in populations, and the development and duration of immunity for those who have recovered.

Testing has been a complicated challenge for the United States and globally. However, its importance in our response is clear. Having a sound understanding of which tests support what decisions is critical as we debate and promote efforts to relax social restrictions, resolve supply chain and logistics challenges, and make economic choices.

That knowledge is also an important defense against the purchase and deployment of inaccurate and unreliable testing that doesn't support high-quality decision making for individuals, care delivery systems, government agencies and employers as we work to reanimate our economy and our society.

Two types of testing

There are two types of tests currently used for COVID-19: a nasal swab test that looks for infection, and a blood test that looks for antibodies.

Testing for infection

The nasal swab test is the best way to confirm someone is currently infected and can pass the virus onto others. This is the most valuable in the test, trace, isolate and track strategy that is key to containing the spread of the disease.

- **How it's done:** A swab is inserted through the nose or mouth to get a direct sample of mucous from the nasopharynx, the part of the upper respiratory tract sitting behind nose and in the throat.
- **What it looks for:** It looks for the RNA, the genetic code of the actual virus, and is the best way to confirm a patient is infected. The disease is detectable in the nose before antibodies can be detected in the blood. Thus it can identify that a person is infected most quickly.

"LONDON —The two Chinese companies were offering a risky proposition: two million home test kits said to detect antibodies for *the coronavirus* for at least \$20 million, take it or leave it. ... There was one problem, however. The tests did not work."

– "U.K. Paid \$20 Million for New Coronavirus Test," *New York Times*, April 16, 2020.

- **How it can be used:** To effectively stop the spread, the test must be part of a robust response plan that includes public health workers systematically tracing contacts of infected individuals and implementing isolation and quarantine restrictions on those who may have and could spread the virus.

Resolving supply chain, sample gathering and test quality concerns with this type of testing is the most immediate and important challenge we need to address to safely begin easing social distancing restrictions.

Testing for antibodies

The second type of test, commonly referred to as serology, can confirm a person has or has recently recovered from COVID-19. This will be valuable in eventually learning how immunity develops and how long it lasts after a person has been exposed.

- **How it's done:** A blood sample is taken.
- **What it looks for:** It looks for antibodies to the SARS-CoV-2 virus, which causes COVID-19. These represent the immune system's effort to fight off the disease, and indicate the person has or recently had the illness. There are two types of antibodies involved in our response to the disease: IgM and IgG. They show up at different, overlapping times, and lag behind the detectable presence of the virus in a person's nose.
- **How it can be used:** Over time it will help us understand how well the tests indicate immunity and how long that immunity lasts.

The time it takes for antibodies to develop is the biggest reason serology tests are less useful in containing the spread of disease. There is too much opportunity for an infected person to spread the virus to others before this test would identify it.

IgM antibodies, which represent the body's early and less-specific response to the illness, generally show up about a week after a person's been infected. IgG antibodies show up on average 20 days after infection, and represent the body's more specific response to the virus. The latter is a better indicator of a more durable and specific immunity to COVID-19.

Serology tests could add great value in the understanding of how widely the illness has spread, including how many people have recovered. That will help us better understand the true mortality rate and have a more-informed health care system response. With time, this type of testing will also help us understand how long the immunity lasts, which may give us important insight into how a vaccine may work.

We don't know what immunity means yet

Unfortunately, we don't know yet how well COVID-19 serology tests indicate immunity to the disease, or how long the immunity might last. Close relatives of this virus circulate widely and cause 10 to 30 percent of the illnesses that we think of as the common cold. Those viruses trigger an immune protection that fades away after just one year. It's too early in the course of our learning about COVID-19 to know if it behaves similarly.

It is because of these uncertainties that the World Health Organization and Centers for Disease Control and Prevention have raised concerns about using so-called immunity certificates to reduce social distancing restrictions for those who have recovered from COVID-19. Additionally, their use incentivizes people to catch the disease in the hopes of recovering and having fewer social restrictions. It also furthers the risk of individuals and employers unknowingly purchasing unreliable or inaccurate tests in an effort to revive our economy and society more quickly.

While a return to the way we interacted and lived before the emergence of COVID-19 may be many months – if not years – away, success in the efforts to reduce social distancing restrictions is possible if done thoughtfully. Understanding the differences between tests and how each can be used to guide our emergence from this first phase of our response to this pandemic will help all of us successfully navigate this complex conversation.

To learn more about testing, visit cdc.gov/coronavirus or who.int/coronavirus.

