

How Long Do Vaccine Protections Last? Science Can't Say for Sure

[Carey Goldberg](#) May 20, 2021, 1:00 AM HST

Protection from coronavirus vaccines is expected to wane, but [no one knows](#) when. It could be as soon as this fall for the first wave of people vaccinated last winter, and [many predict](#) that Covid boosters will soon join annual flu shots.

Ideally, anyone worried about fading vaccine protection could get tested for Covid-fighting antibodies, the primary defense against the virus. But as cancer patients and others with impaired immune systems are learning, it's not that simple.

"The good news is, we have an antibody test that can test for whether or not you've made antibodies in response to the vaccine," said Craig Bunnell, chief medical officer at the Dana-Farber Cancer Institute. "The bad news is that we don't yet know how to interpret the results."

The gap in knowledge and testing raises the prospect of heightened anxiety in the coming months for vaccine recipients wondering if they're still protected -- anxiety that could curb willingness to venture out in public. That in turn could put a renewed drag on the global economic recovery.

Scientists are racing to [figure out](#) the so-called correlates of protection against Covid; in other words, which test results assure immunity.

[New data](#) is coming out almost weekly that brings researchers closer to understanding which immune signatures reflect protection, said epidemiologist Michael Mina of the Harvard Chan School of Public Health.

But it's likely to be months before the picture is clear, he said.

It's also not yet known how long the vaccines last in general. They're so new that there hasn't been time to follow recipients for very long; [mounting evidence](#) suggests the antibody protection lasts [at least six months](#), but beyond that remains unclear.

It's the sort of post-vaccine limbo that those with impaired immune systems already know well.

"Immuno-compromised" people make up an estimated [3% of the population, including people](#) with blood cancers -- more than [1 million survivors](#) in the U.S. -- as well as those with autoimmune diseases, HIV and transplanted organs requiring anti-rejection drugs.

Michele Nadeem-Baker embodies their dilemma. She's fully vaccinated and chafing to fully return to the world after more than a year as a self-described "bubble woman" who leaves home in Boston's hilly Charlestown neighborhood only to take walks.

While new guidance from the U.S. Centers for Disease Control and Prevention lets other Bostonians rip off their masks outdoors and resume almost-normal lives, little changes for her. Her weak immune system means being vaccinated doesn't guarantee protection, and she sees no end to sheltering in place.

"I'm being told I can't get back into life," she said. "How can I find out for sure if I can? The only way to do that would be to get some scientific proof."

So last month, Nadeem-Baker, who has leukemia and is a cancer patient advocate, asked to be tested for coronavirus antibodies. The results: more frustration. Though she did have some of the disease-fighting proteins, she

said, her doctors told her she needed to keep acting as if she didn't, because they couldn't confidently interpret her score.

In the body's [complex array of defenses](#) against germs, antibodies act like the scouts, identifying and targeting intruders. They have powerful back-up troops, including ["memory" B cells and T cells](#) that ramp up to combat enemies they recognize. So antibody tests tell far from the whole story.

Say that "John Doe has an antibody level of 14 or 40 or 400 or 4,000," said Harvard's Mina, an authority on testing and antibodies. "Those numbers don't mean anything."

Establishing which antibody levels are enough for robust protection will require testing many people over time to determine when the virus can break through, he said.

Then again, a patient may have none of the specific antibodies measured but still have protection from other elements of the immune system, like those B and T cells. Or it could turn out that the specific antibodies being measured are not actually key to killing the virus, Mina added -- something like hundreds of bits of duct tape that are stuck all over an enemy's body but not over their nose and mouth, and so are not fatal.

Not a Good Sign

Among blood-cancer patients, more than 2,000 -- including Nadeem-Baker -- have [signed up](#) for free antibody testing as part of a study by the Leukemia & Lymphoma Society, said the national non-profit's chief scientific officer, Lee Greenberger.

"The research is happening as fast as it possibly can, so we understand the magnitude of the problem, and then figure out solutions for how we're going

to protect these patients," he said.

Early findings in cancer patients illustrate how dramatically Covid antibody responses vary by individual and by condition, Greenberger said. In one type of cancer, "40 or 50% of patients don't make antibodies," he said. "In another blood cancer, everybody makes antibodies."

Among healthy volunteers, almost all get robust antibody test results, he said, but because other arms of the immune system could offer protection, it's still unclear [what even a zero-antibody test result means](#), except that "it's a warning sign."



People draw blood for an antibody test in Santa Monica, California on Jan. 19.

Photographer: Valerie Macon/AFP/Getty Images

The upshot remains so murky that the CDC explicitly [says](#) "antibody testing

is not recommended for assessing immunity" after vaccination in people with immune issues.

Dana-Farber similarly [cautions](#) cancer patients that "unfortunately, there isn't any way to know with certainty whether the vaccine worked."

"As we gain more understanding of the test results, their meaning, and how to respond to those results, we may find that testing becomes useful," it said. "Until then, we recommend getting vaccinated and continuing to exercise precautions to reduce the risk of exposure."

Also still to be determined: How the general public will react if immunity seems to be fading and testing remains inconclusive, particularly if -- or rather, when, epidemiologists say -- new outbreaks arise.

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The economic impact is likely to be limited in countries with high vaccine uptake because any new outbreaks are likely to be localized, said John Ricco from the Penn Wharton Budget Model, which has been analyzing the economic impact of vaccines. But the prospect underscores one consistent finding, he said: "Dollars spent on any sort of vaccine research at this point have a very high return on investment."

'Don't Believe Them'

Research on new tools for measuring immunity is rapidly advancing, said Harvard's Mina, whose lab is working on them and runs tens of thousands of antibody tests a week.

He envisions mass testing to monitor immunity for Covid and other viruses --

both for individual awareness and for public health. But for that, antibody tests would need to be much cheaper than the current \$120 or so, he said.

Though there are several tests on the market, "If somebody is telling you that they're giving you an idea of how protected you are, I would say, don't believe them," he said.

[Weavr Health](#), a startup based in Cambridge, Massachusetts, is among companies preparing for when that changes. It's applied for emergency use authorization for an at-home, 10-minute antibody test.

Chief Executive Officer Linh Hoang cites [recent research](#) that found people who test negative for Covid antibodies have a ten-fold higher risk of catching Covid than people who test positive. He argues that though it's too early to interpret test results, indications are strong that antibodies offer "some level of protection," something like an "internal mask."



People register to receive Covid-19 vaccines at a site in Richmond, California, on April 15.

Photographer: David Paul Morris/Bloomberg

"The question mark is: What is the role of antibodies?" he said. "Is it like an N95 internal mask or a surgical mask? And maybe it varies from individual to individual."

Once it's clear what antibody test results mean, more research must determine how best to treat patients who get scant protection from vaccines, said Greenberger.

Options include giving patients antibody cocktails or possibly additional or different vaccines, he said. He has heard of a couple of patients quietly getting a third vaccine shot but cautions that all medical treatments must be tested carefully in clinical trials.

In Boston, Michele Nadeem-Baker waits hopefully for more certainty about both tests and treatments.

"It's not over yet for some of us," she said, "even if we get vaccinated."

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