Can Vaccination and Infection Rates Add Up to Reach COVID Herd Immunity?

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March 26, 2021 By Kaiser Health News and Carmen Heredia Rodriguez

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It's been a long, dark winter of COVID-19 concerns, stoked by high post-holiday case counts and the American death tally exceeding 530,000 lives lost. But with three vaccines — Pfizer-BioNTech, Moderna and Johnson & Johnson — now authorized for emergency use in the United States, there seems to be hope that the pandemic's end may be in sight.

A recent analysis by the Wall Street research firm Fundstrat Global Advisors fueled this idea, suggesting as many as nine states were already reaching the coveted "herd immunity" status as of March 7, signaling that a return to normal was close at hand.

"Presumed 'herd immunity' is 'the combined value of infections + vaccinations as % population > 60%,'" noted a tweet by a CNBC anchor based on a more complete analysis by the firm. That got us thinking: Does this calculation hold up?

First, do public health experts generally consider herd immunity to kick in at 60%? In addition, does current scientific thinking equate protection from the antibodies generated by past COVID-19 infections with the same degree of protection as a vaccination?

We decided to find out.

First, a review of herd immunity. Also known as community or population immunity, the term is used to describe the point at which enough people are sufficiently resistant — or have an immune response — to an infectious agent that it has difficulty spreading to others.

In this explainer, we noted that people generally gain immunity either from vaccination or infection. For contagious diseases that have marked modern history — smallpox, polio, diphtheria or rubella — vaccines have been the mechanism through which herd immunity was achieved.

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ground to cover. Fundstrat's analysis offered a rosier take. Although the site is located behind a paywall, the chart generated buzz on Twitter and in news outlets like the Daily Caller.

Fundstrat relied on a variety of sources — particularly, a data scientist and pandemic modeler named Youyang Gu — to determine what level of immunity a state needs to stamp out COVID-19, said Ken Xuan, the firm's head of data science research. From there, analysts created a chart intended to track the level of COVID immunity in each state. They calculated the number by adding the percentage of people estimated to have been infected with the virus to the percentage of people who had received the vaccine.

Xuan, who was quick to note that he is not a public health expert, said he and his team followed Gu's predictions and arrived at 60%, a figure he acknowledges is an assumption.

"The idea would be we don't know if 60% is true," he said. However, if states that have reached this threshold see steep declines in COVID cases, "then it's the number to watch."

What About the 60% Marker?

Throughout the pandemic, health experts have tended to set the magic number for herd immunity between 50% and 70% — with most, including Anthony Fauci, MD, the head of the National Institute of Allergy and Infectious Diseases, leaning toward the higher end of the spectrum.

"I would say 75 to 85% would have to get vaccinated if you want to have that blanket of herd immunity," he told NPR in December.

The experts we consulted were skeptical of the 60% figure, saying the mechanics of the Fundstrat analysis were relatively sound but oversimplified.

Ali Mokdad, chief strategy officer for population health at the University of Washington, said the level of immunity needed to reach this goal can vary due to several factors. "Nobody knows what is herd immunity for COVID-19 because it's a new virus," he said.

That said, Mokdad described using 60% as "totally wrong." Data from other communities around the world show COVID-19 outbreaks happening at or near that level of immunity, he said. Indeed, the city of Manaus in Brazil saw cases drop for several months, then surge despite three-fourths of their residents already having had the virus.

Josh Michaud, associate director for global health policy at KFF, described the 60% assumption as "off-base."

And some said it wasn't even the main point.

Jeff Engel, MD, senior adviser for COVID at the Council of State and Territorial Epidemiologists, said the question of herd immunity may not even be relevant because, regarding COVID-19, we may never reach it. The novel virus may become endemic, he said, which means it will continue circulating like influenza or the common cold. For him, lowering deaths and hospitalizations is

more important.

“The concept of herd immunity means that once we reach the threshold, it’s going to go away,” Engel said. “That’s not the case. That’s a false notion.”

Natural and Vaccine Immunity — Should They Be Lumped Together?

When asked why the Fundstrat analysis treated the two types of immunity as equivalent, Xuan said it was an assumption.

Here’s what current science supports.

Those who receive any of the three vaccines available in the United States enjoy a high level of protection against getting seriously sick and dying from COVID-19 — even after one dose of a two-shot series.

In addition, people who were infected and recovered from the virus appear to retain some protection for at least 90 days after testing positive. Immunity may be lower and decline faster among people who developed few to no symptoms.

Practically speaking, two experts said, natural and vaccine-induced immunity work the same way in the body. This lends credibility to Fundstrat’s approach.

However, some health experts consider vaccine-induced immunity to be better than the protection generated by the infection because it may be more robust, said Michaud. Researchers are still figuring out whether people who were infected with the virus but experienced mild or no symptoms generated an immune response as strong as those who developed more severe disease.

In fact, the Centers for Disease Control and Prevention cites the unknowns surrounding natural immunity and the risk of getting sick again with COVID-19 as reasons for those who had the virus to get a vaccine.

“They haven’t been studied well at all yet,” said Engel, in reference to asymptomatic people. “And maybe we’re going to discover that a large group of them didn’t develop really robust immunity.”

Both types of viral protection leave room for potential breakthrough infections, Michaud said. Neither offers “perfect immunity,” he said. And wild cards remain. How long do both types of immunity last? How do different people’s systems respond? How protected will people be from emerging coronavirus variants?

“It’s a witches’ brew of different factors to consider when you’re trying to estimate herd immunity at this point,” said Michaud.

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