EXPLAINER: How will we know we've reached herd immunity?

February 17 2021, by Candice Choi and Aniruddha Ghosal

In this Monday Jan. 11, 2021 file photo, people line up to receive a COVID-19 vaccine at the NHS Nightingale facility at the Excel Centre, London, one of the seven mass vaccination centers opened to the general public. Health officials around the world are racing to vaccinate enough people to stop the spread of the coronavirus—but what qualifies as "enough" is still an open question. (Jeremy Selwyn/Pool via AP)

Health officials around the world are racing to vaccinate enough people to stop the spread of COVID-19, but what qualifies as "enough" is still an open question.

The goal is to get to "herd immunity," which is when enough people have immunity, either from vaccination or a past infection, to stop uncontrolled spread.

Herd immunity doesn't make any one person immune, and outbreaks can still flare up. It means that a virus is no longer easily jumping from person to person, helping to protect those who are still vulnerable to catching it.

Nobody knows for sure what the herd immunity threshold is for the coronavirus, though many experts say it's 70% or higher. And the emergence of variants is further complicating the picture.

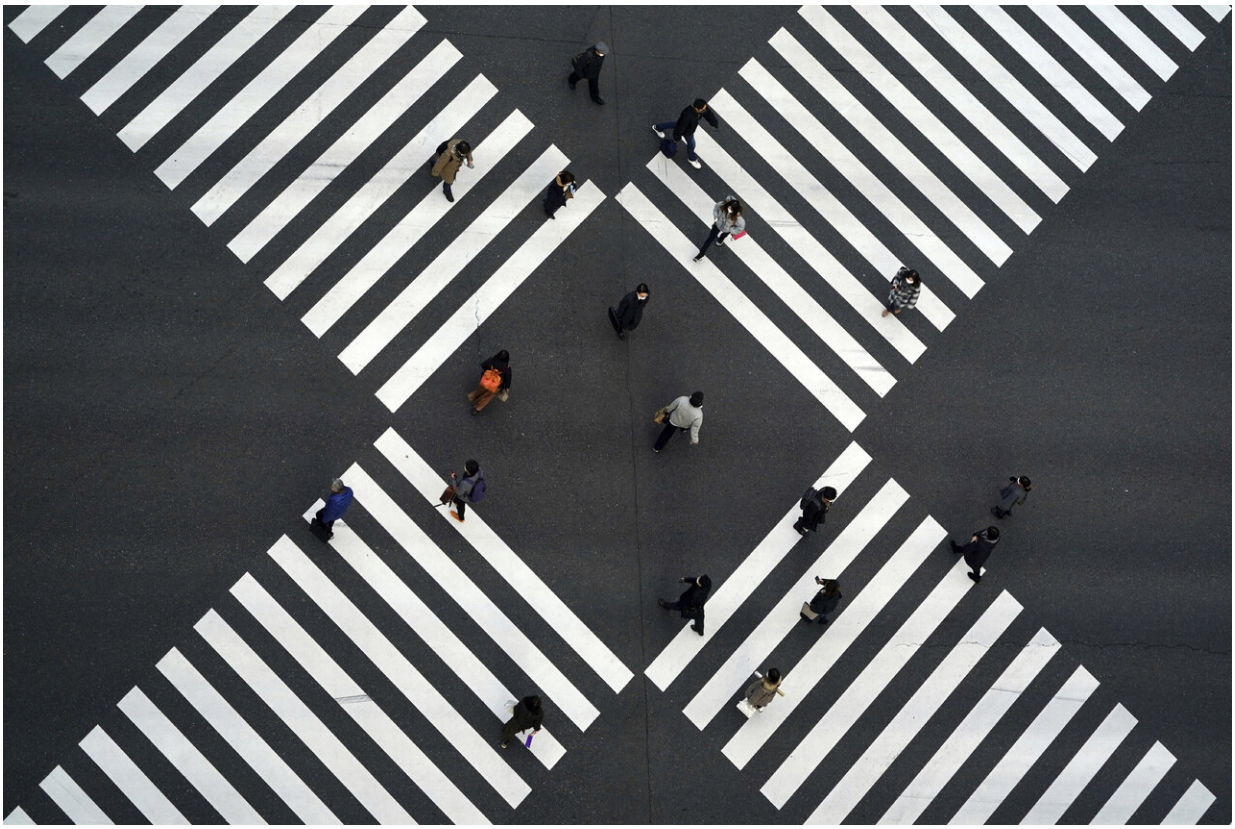
Here's what's known about the virus and herd immunity.

HOW IS THE HERD IMMUNITY THRESHOLD CALCUATED?

It's a formula based on how contagious a virus is—or how many people catch the virus from one infected person, on average.

But the calculation offers only a broad target for when there might be a big drop off in spread. The figure could also vary by region.

"It's not 64.9 is terrible and 70.1 is fantastic," said Dr. Walter Orenstein, an infectious disease expert at Emory University.



In this Friday, Jan. 8, 2021 file photo, people wearing protective masks to help curb the spread of the coronavirus walk along pedestrian crossings in the Ginza shipping area of Tokyo. Health officials around the world are racing to vaccinate enough people to stop the spread of COVID-19—but what qualifies as "enough" is still an open question. (AP Photo/Eugene Hoshiko)

Orenstein notes vaccination levels and other factors that affect spread could differ even within a city.

HOW DO WE KNOW WE'VE REACHED HERD IMMUNITY?

Proof that we're nearing herd immunity would be a "disruption in the chain of transmission," said Ashley St. John, who studies immune systems at Duke-NUS Medical School at Singapore.

But don't wait for any big declaration that we've reached that milestone.

To determine whether to relax restrictions, health officials will be watching infection and hospitalization trends as vaccinations roll out. And those decisions are likely to begin long before the ideal herd immunity threshold is reached, though they will be gradual and vary by region.

In India, for instance, scientists believe that more people will need to be protected in densely populated cities, where the virus spreads faster, than in its vast countryside.

India plans to look for antibodies in people nationally to figure out what percentage of its nearly 1.4 billion people have already been infected, said Dr. Jayaprakash Muliyil, who is advising the government on virus surveillance.

Vaccine effectiveness also plays a role. Fewer people need to be vaccinated to achieve herd immunity if the shots have higher efficacy.

HOW DO CORONAVIRUS VARIANTS AFFECT HERD IMMUNITY?

In this Friday, Jan. 8, 2021 file photo, volunteers wait to participate in a trial run for the COVID-19 vaccine delivery system in Ahmedabad, India. Health officials around the world are racing to vaccinate enough people to stop the spread of the coronavirus—but what qualifies as "enough" is still an open question. (AP Photo/Ajit Solanki)

It depends on the protection that past infection or vaccination gives you from the variant.

If vaccines were to prove notably less effective against a variant, it would require vaccinating an even greater portion of the population or updating existing vaccines to make them more effective, Orenstein said.

So far, it appears the shots provide at least some protection from the

most worrisome variants. But scientists are still studying the situation, and worry about further mutations.

The variants have underscored the importance of vaccinating people as quickly as possible. Slowing transmission is critical since viruses can mutate when they infect people.

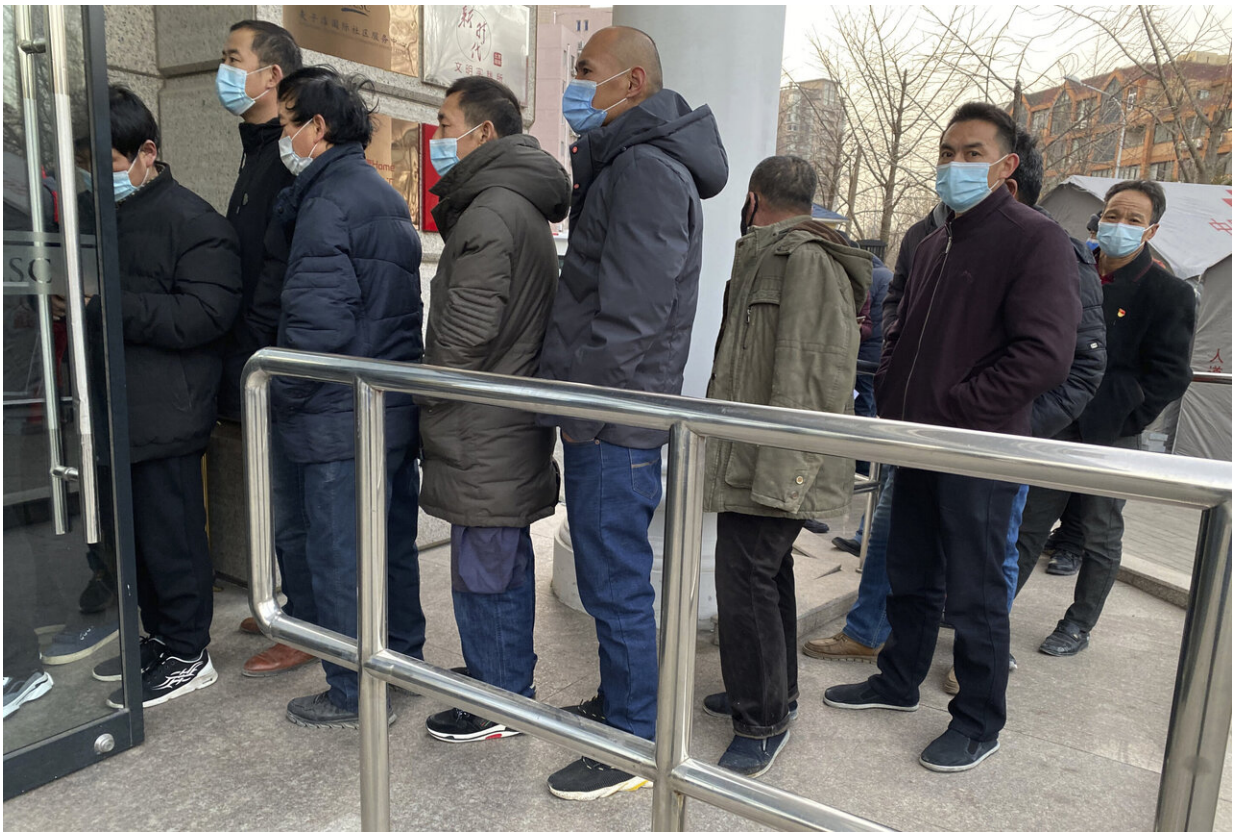
DOES HERD IMMUNITY HAVE TO BE GLOBAL?

Global herd immunity is ideal but unlikely.

Rich nations have reserved most vaccines that will be manufactured this year. In the U.S., for example, officials have said enough people could be vaccinated by fall to start to return to normal.

But many poorer countries will likely have to wait longer. This is why the World Health Organization has warned that global herd immunity is unlikely to be achieved this year.

Differences in vaccination levels among countries are also why many experts believe the virus will never be completely stamped out.



In this Tuesday, Jan. 12, 2021 file photo, people line up for COVID-19 vaccinations in Beijing. Health officials around the world are racing to vaccinate enough people to stop the spread of the coronavirus—but what qualifies as "enough" is still an open question. (AP Photo/Ng Han Guan)

CAN HERD IMMUNITY WEAR OFF?

It's not known how long immunity lasts, either after vaccination or from an infection, though experts believe it should be at least several months.

Still, booster shots could be necessary down the road. And though the current COVID-19 vaccines are expected to work on the variants identified in the United Kingdom and elsewhere, it's possible the virus could mutate enough over time that the shots would need to be updated.

Mutations in influenza viruses, for example, are why we get flu shots every year. But experts note coronaviruses generally do not mutate as easily.

WHAT IF THE COVID-19 VACCINES DON'T PREVENT INFECTION?

The COVID-19 vaccines rolling out now appear very effective at preventing people from getting sick. We don't know yet how good they are at stopping transmission, but experts say they should help greatly reduce the spread of the virus.

Even if you get infected after vaccination, your body should shed less virus and for a shorter time, said Deborah Fuller, a vaccine expert at the University of Washington.

Dr. Anthony Fauci, the top U.S. infectious disease expert, on Wednesday noted the public health benefit of getting vaccinated, given the potential for reduced spread.

"It's not only good for you and your family and your community, it will have a very important impact on the dynamics of the outbreak in our country," he said.