Internews

Understanding herd immunity and reporting on it

Herd immunity is also known as indirect protection, community immunity, or community protection. It happens when a virus cannot spread anymore because it keeps coming into contact with people who are protected against infection.

Once a sufficient proportion of the population is no longer susceptible, any new outbreak peters out. This can happen in two ways:

- Many people contract the disease and in time build up an immune response to it (natural immunity).
- Many people are vaccinated against the disease to achieve immunity.

For some diseases, herd immunity occurs when 40 percent of the people in a population become immune to the disease, such as through vaccination. But in most cases, 80 to 95 percent of the population must be immune to the disease to stop its spread.

An infection-based herd immunity approach, in the absence of a vaccine, has been proposed by certain governments to slow the spread of COVID-19. The suggestion has been to allow low-risk groups to become infected with the SARS-CoV-2 virus that causes COVID-19 while isolating susceptible groups like the aged. However, many scientists have warned that such a strategy is fraught with risks.

What do you need to know?

Question 1
Has Herd immunity worked before?

Herd immunity has been used as a vaccine strategy for diseases such as measles, mumps and rubella, smallpox and polio. It these cases it meant vaccinating the bulk of the population, preventing the ongoing transmission of these diseases, and protecting the vulnerable (e.g. immuno-compromised) who cannot have the vaccine.

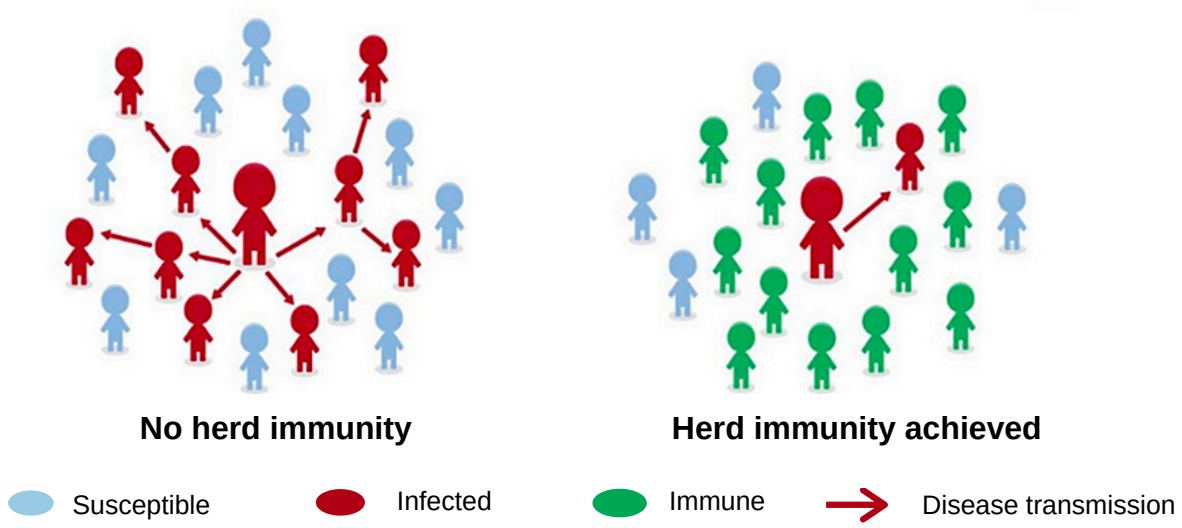
The more contagious a disease is, then the more people need to be vaccinated for herd immunity to work. Not every illness that has a vaccine can be stopped by herd immunity. For example, you can contract tetanus from bacteria in your environment. So anyone who is not vaccinated could become infected, and getting the vaccine is the only protection.

Question 2
Is any country close to reaching COVID-19 herd immunity?

The definitive answer is no. The Swedish government chose to pursue herd immunity in mid-March when COVID-19 overwhelmed many European nations, favoring voluntary control measures over strict lockdown procedures. But 25 Swedish infectious diseases experts denounced the policy, writing, “In Sweden, the strategy has led to death, grief, and suffering, and on top of that there are no indications that the Swedish economy has fared better than in many other countries. At the moment, we have set an example for the rest of the world on how not to deal with a deadly infectious disease.”

The United Kingdom also flirted with a herd immunity strategy in March, but it soon backtracked as the death toll rose and Prime Minister Boris Johnson was hospitalized with COVID-19. Netherlands, too, briefly used the herd immunity strategy but ended up abandoning it because of pressure from health officials and the public.

"Never in the history of public health has herd immunity been used as a strategy for responding to an outbreak, let alone a pandemic. It is scientifically and ethically problematic," WHO Director-General Tedros Adhanom Ghebreyesus said in a recent media briefing. "Herd immunity is achieved by protecting people from a virus, not by exposing them to it."



Graphic explaining herd immunity where immunity to a disease in a population, whether through natural infection or widespread vaccination, reaches a high enough percentage to stem the spread of an outbreak. ***Credit: National Institutes of Health***

Question 3
What are the chances COVID-19 suddenly fades away like the Spanish flu did?

The 1918 Spanish flu (H1N1) pandemic lasted for seven years, originating in southern China in the winter of 1915–1916. It came to Europe with Chinese laborers imported to dig trenches in the First World War.

Analysis of excess deaths shows that it went around the world in three waves resulting in round 50 million deaths globally. In the case of H1N1, the pandemic died out in two years when 40% of the population who lived in countries where the virus was spreading had been naturally infected. But H1N1 did not "fade away". It comes back each year as the susceptible population, through new births, grows beyond the herd immunity threshold.

There have been H1N1 epidemics or pandemics in 1941, 1977, 2009, 2012, 2015, 2017 and 2019. Without a vaccine, COVID-19 will NOT fade away on its own. It will stay with us just as H1N1 has stayed with us.

Question 4
So why is herd immunity without a COVID-19 vaccine so risky?

- **Young people can keep infecting and can die from severe COVID-19**

The basic idea behind this proposal is to let low-risk young people socialize and naturally become infected with the coronavirus, while vulnerable people like the elderly would maintain social distancing and continue to shelter in place. Proponents of this strategy claim so-called "natural herd immunity" will emerge and minimize harm from SARS-CoV-2 while protecting the economy.

The strategy involves dropping social distancing and mask wearing, reopening restaurants and schools and allowing large gatherings of young adults while vulnerable and elderly people are forced to stay at home or aged-care settings for an indefinite amount of time.

But scientists warn that it is misleading to assume young adults are less likely to develop severe infections. Younger people with diseases like asthma, obesity, immune disorders, diabetes, liver or heart conditions are at greater risk of severe COVID. And while most infections in young people are mild, many seemingly healthy young people have also developed severe infections and have died from the disease already.

New findings published in September further reveal how severely COVID-19 can affect young adults. A research paper published in JAMA Internal Medicine found that among more than 3,200 adults ages 18 to 34 in the US who were hospitalized with the disease, 21% required intensive care, 10% required mechanical ventilation and nearly 3% — 88 patients — died. Of those who survived, 3 percent — 99 patients — had to be discharged to another health care facility to continue their recoveries.

The World Health Organization warned that young people are becoming the primary drivers of the spread of the novel coronavirus in many countries. More than half of confirmed infections in Australia and the Philippines recently have been in people younger than 40, a stark contrast to predominantly older patients from the previous months. In Japan, 65% of recent infections occurred in people below age 40.

Because symptoms are often milder in the young, many are unaware they are infected. They could live with people in the high-risk group, like their aged parents or relatives. This increases the risk of spillovers to the most vulnerable: the elderly, the sick, people in long-term care, people who live in densely populated urban areas and underserved rural areas.

- **Having the virus once does not guarantee immunity for life**

Because SARS-CoV-2 is a new virus, scientists still can't say how long a person will be protected after they've recovered from an infection. Recent cases of reinfections hint that immunity could only last for a matter of months in some people, with implications not just for the risks facing recovered patients, but also for how long future vaccines might protect people.

A new study, which has not been peer-reviewed, suggests immunity to the SARS-CoV-2 virus that causes COVID-19 can last for at least six months -- and possibly much longer, perhaps even years.

The study included 185 adults, ages 19 to 81, in the United States who had recovered from COVID-19. Most of the adults had mild disease. The study comes with limitations, including that more research is needed to determine whether similar findings would emerge among a larger group of people, people who had a more severe infection or across various periods of time after recovery.

Some diseases will create what is called a 'sterilizing immunity'. Sterilizing immunity means that the first time you get infected, the possibility of getting reinfected again is very slim. For example, if you are infected with Chicken Pox (varicella) as a child, you build a strong immunity and very few people are infected a second time.

In general terms, measles also fits into this category, although there are rare reports of people contracting measles more than once. The bad news is that viruses that infect via the mucus membranes of the nose and throat, like SARS-CoV-2 (the virus that causes COVID-19), typically don't induce sterilizing immunity. Results from a study on rhesus macaque monkeys suggest experimental vaccines protect the lungs from severe disease but don't block replication of the virus in the upper airways. This means that people can still be infected with SARS-CoV-2.

Question 5
Can first-generation COVID-19 vaccines bring herd immunity?

Once there is a vaccine for COVID-19, the immunity threshold should be within reach. In final results, Pfizer and Germany's BioNTech announced on 18 November that their COVID-19 vaccine has 95% efficacy, even better than the 90% found in its initial analysis, and they will apply for emergency use authorization (EUA) from the US Food and Drug Administration (FDA). Two days earlier, Moderna announced that their COVID-19 has 94.5% efficacy based on Phase 3 clinical trials. AstraZeneca, which partnered with the University of Oxford, announced on 23 November that its coronavirus vaccine reduced the risk of contracting COVID-19 by an average of 70.4%, according to an interim analysis of large Phase 3 trials conducted in the UK and Brazil.

The EUA process is faster than standard FDA approval, which can take six to 10 months. However, data proving safety and effectiveness are still required for authorization, and the FDA and an advisory committee of experts use this data to weigh the risks and benefits of the product in question.

The term vaccine **efficacy** is used to measure how well a vaccine works to prevent a particular disease (in this case COVID-19) in controlled, research environments. Vaccine **effectiveness** studies examine how well a vaccine prevents a particular disease in the "real world" where people are doing things like going to the grocery store, work, and school. If a vaccine has 95% efficacy, using an example of 100 trial participants in a given trial of a vaccine, 95 patients would not contract the disease and 10 would contract COVID-19.

If both vaccines receive FDA approval and is distributed to large populations around the world, scientists will then be able to calculate vaccine effectiveness in real-world settings. Real world vaccine effectiveness is a much more reliable and accurate term for telling us how helpful a vaccine is at preventing disease in daily life – not just in a controlled, research setting.

According to a recent study in the American Journal of Preventive Medicine a vaccine has to have an efficacy (i.e., probability of preventing infection) of at least 70% when vaccination covers at least 75% of the population to effectively prevent the spread of COVID-19.

While vaccines are celebrated as one of the most successful public health measures, an increasing number of people believe vaccines are either unsafe or unnecessary. It is considered a growing threat to the success of vaccination programmes as vaccine coverage rates are decreasing globally.

Policy makers must be vigilant of the possible impact of vaccine hesitancy. In the COVID-19 response, the activities of some politicians have been incompatible with science and risk further eroding vaccine confidence among the general public. The potential disruption of a proportion of people declining to be vaccinated could be substantial. Provision of consistent and scientifically accurate information can mediate some vaccine hesitancy, but vaccine confidence may not improve unless efforts are made to increase public trust in vaccine effectiveness and safety, in public health response, and in health systems and government more broadly.

When the vast majority of a population are vaccinated, herd immunity will lower the overall amount of virus able to spread in the whole population. As a result, not every single person needs to be vaccinated to be protected, which helps ensure vulnerable groups who cannot get vaccinated are kept safe. Nonetheless, scientists warn that respiratory infections in particular can be hard to block completely with vaccines – although the shots will go some way to reducing the amount of circulating virus.

Question 6
What is the threshold to reach herd immunity?

The proportion of the population required for herd immunity depends on how infectious a virus is. To set a threshold, epidemiologists — experts in infectious disease transmission —use a value called “basic reproduction number”, often referred to as R0 (pronounced R naught).

R0 measures how many people a single contagious person would infect in a susceptible population. For SARS-CoV-2, R0 is between 2 and 3.2. In other words, one person with the disease is expected to infect, on average, between 2 to 3 others.

For SARS-CoV-2 that means somewhere between 60% to 80% of the population needs immunity to COVID-19 to reach herd immunity. An R0 below 1 suggests that not every infected person will pass the disease to another person and hence the number of cases is shrinking, possibly allowing societies to open back up. An R0 above 1 indicates that the number of cases is growing, perhaps necessitating renewed lockdowns or other measures. Different viruses have different R0s. The measles virus, for instance, is extremely contagious, with an R0 of 12 to 18, so it requires a high percentage of the population to be immunized by vaccination to prevent transmission.

Herd immunity against measles requires about 95% of the population to be vaccinated, according to WHO. The remaining 5% will be protected by the fact that measles will not spread among those who are vaccinated. For polio, the threshold is between 80% to 85% percent.

Question 7
Does an R0 below 1 mean the virus is defeated?

No. It means, assuming the numbers are correct, that the virus's spread has been paused. Where R0 drops below 1, this means that every, say, 100 sick people will infect fewer than 100 others.

Each successive generation of infections will be smaller than the last. But people can still get sick, and people can still die. It can take a long time for countries to see the virus fully disappear, especially if the initial outbreak was bad.

Seeing an R0 of less than 1 is no reason to relax or to expect an easy road ahead. There will be further flare-ups, easily large enough to overwhelm local resources.

There's no easy fix, but there is a fix: remaining patient and confident that a vaccine would work, washing hands and wearing masks, and, most of all, pushing for vastly ramped-up testing and contact tracing so we can identify and respond to local outbreaks where and when they emerge.

How can I report on this issue?

1. Remind your audience that even with a vaccine, prevention efforts are still needed

The results announced by Pfizer-BioNTech and Moderna in mid-November have raised hopes that COVID-19 vaccines will start to become available in early 2021, and also, perhaps, that other vaccines against the disease will also prove effective.

The prospect of preventing illness and death, and avoiding the harm and misery of extended lockdowns, is a cause for optimism. But although it is right to be hopeful and encouraged, we are far from ending COVID-19 as a public health issue. Your audience may be wondering if a new coronavirus vaccine will mean that soon they will not have to social distance or wear a mask.

The answer is NO. They will still need to, even if they get vaccinated. There are a few reasons:

- The first vaccines that will be available are likely to be two-dose vaccines, meaning it will be at least a month after you get the drug before you build your immunity enough to be confident that the virus won't make you sick.

- In the best-case scenario, it will be late July or early September 2021 before most of the public is vaccinated. That is if people do not hesitate to get vaccinated, if the vaccines get approval soon, if state and local governments can organize distribution, if the vaccines work as they are supposed to and if the drug companies can manufacture the vaccines at the speed everybody hopes they can.

The WHO's guidance on how to wear face masks safely include:

- Avoid touching the mask when it's on your face
- Cleaning your hands before removing the mask
- Removing the mask by the straps behind the ears or head
- Storing the mask in a clean, resealable bag if it is not wet or dirty and you plan to reuse it
- Clean your hands after removing the mask

Regardless, there will be risks and in the interests of public service journalism you have a responsibility to ensure the safety of your readers and viewers as they relax their guard as though the threat of COVID-19 infection has decreased. Your audience must be reminded of the following:

- **Keep listening to national advice and guidance**

Advice from your national Ministry of Health and the WHO will give you the latest information about COVID-19, including what the symptoms are, what to do if you think you have it and how to reduce your chances of getting it.

- **Do not be complacent about hand hygiene**

Your readers and viewers might be tired of hearing it, but the fact remains: touching surfaces, then your face, is likely to get you sick, and handwashing (or using hand sanitizer) is key to reducing spread of the virus. Scientists have found that the coronavirus could stay up to four hours on copper, up to 24 hours on cardboard, and up to two to three days on plastic and stainless steel.

The US Centers for Disease Control and Prevention (CDC) has the following 5 steps to wash hands the right way:

- Wet your hands with clean, running water (warm or cold), turn off the tap, and apply soap.
- Lather your hands by rubbing them together with the soap. Lather the backs of your hands, between your fingers, and under your nails.
- Scrub your hands for at least 20 seconds. Need a timer? Hum the "Happy Birthday" song from beginning to end twice.
- Rinse your hands well under clean, running water.
- Dry your hands using a clean towel or air dry them.

- **Do not get complacent about physical distancing**

While it is important to support local businesses struggling to get on their feet after the lockdowns, it is also important to make smart choices to limit person-to-person contact, which is the way the virus spreads. Social distancing, also called "physical distancing," means keeping a safe space between yourself and other people who are not from your household. To practice social or physical distancing, stay at least 6 feet (about 2 arms' length) from other people who are not from your household in both indoor and outdoor spaces.

2. Ask the right questions acknowledging the following challenges:

- **Limited data on immunity**

Currently, there are a number of unknown factors, such as whether a COVID-19 infection leads to immunity and how long immunity might last. It may be necessary for more time to pass to monitor individuals who have been infected and recovered and thus determine how long they show disease immunity. This information is needed to determine the herd immunity threshold.

- **Inconsistent immunity**

Even if herd immunity is eventually achieved, outbreaks may still occur because immunity may not be uniform across the general population.

- **Striking a balance**

If the path to COVID-19 herd immunity is uncertain, what steps might be needed to help strike a balance between public health and enabling the economy and society to function smoothly?

3. Engage young adults on COVID-19 so that they take it more seriously

Many experts are concerned that rising case numbers even amongst younger adults will lead to higher hospitalizations and eventually deaths as the virus continues to spread in the population. Young adults can easily spread the virus to older adults and those with underlying health issues — who are at higher risk for serious complications from the virus Through your reporting you can make clear the following:

- The more closely they interact with others and the longer that interaction, the higher the risk of COVID-19 spread.
- Masks help reduce the spread of COVID-19.
- Indoor spaces are more risky than outdoor spaces since it can be more difficult to keep people apart and there's less ventilation inside.
- Even if they've heard it already, remind your young adult audience to wear a mask in public, when around new people, and when social distancing measures aren't possible. They should wash their hands frequently, stay 6 feet away from anyone outside the household, and quarantine if they don't feel well.
- Remind them that by not wearing a mask and following precautions, they could expose a vulnerable person (including someone they love) to the virus.

The US Centers for Disease Control and Prevention (CDC) has prepared a toolkit for people 15 to 21 and it is accessible at https://www.cdc.gov/coronavirus/2019-ncov/communication/toolkits/young-people-15-to-21.html