

## **What is herd immunity anyway? Here's how many people South Africa should vaccinate**

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Herd immunity means that enough people are protected from a disease, such as COVID-19, so that it can no longer spread within a population.

People can gain immunity in two ways.

They can get infected with the virus and build up natural immunity, or they can get immunity by being vaccinated.

The government estimates that 67% of South Africa would need to have immunity to stop COVID from spreading.

Some scientists, however, believe the threshold needed is much higher.

The idea is to have enough people within a population with immunity, so that those without immunity are also protected because there aren't enough people with the disease around to infect them.

Waiting for enough people to develop immunity naturally would take a long time.

It would also come at a great cost as many people would die as a result of the disease.

With COVID, at least two-thirds of a population needs to get infected to stop the virus from spreading.

Vaccines can speed up the process. But this comes with a catch.

Each COVID jab offers a different level of protection.

So the number of people you need to vaccinate to reach herd immunity depends on the shot you use.

Working out how many people need to get vaccinated therefore needs to take into account the efficacy of the vaccine.

Scientists estimate that if a country uses a jab with an efficacy below 80% they would need to vaccinate the entire population to reach herd immunity.

Here's how it works:

South Africa is currently using the Johnson & Johnson COVID vaccine, which showed 64% efficacy in a local trial.

We are planning to vaccinate 67% of the population.

By multiplying these two numbers we can work out what level of immunity we would get within the population:

$$64 \times 67 = 4\,288$$

$$4\,288 \div 100 = 43\%$$

In this example, South Africa's roll-out would give us a population immunity level of 43%.

This is 24% lower than the herd immunity threshold of 67% needed for COVID-19.

The Pfizer jab, which has an efficacy of 95% for the original form of the virus, would give us a population immunity level of 64%.

The Pfizer jab hasn't been tested in South Africa, but lab tests suggest that it is less effective against the dominant variant, 501Y.V2.

The population immunity level of 64%, when 67% of South Africa is vaccinated, is therefore likely to be lower.

The emergence of new variants makes it even harder to stop the pandemic.

For instance, the 501Y.V2 variant in South Africa is able to spread faster and infect more people than the original virus.

Even if someone was previously sick from COVID, they could still get re-infected with this new changed version of the virus.

We also don't yet know how long immunity against COVID lasts.

All these factors make it impractical to rely on vaccines alone to end the pandemic.

That's why we need to continue to wear masks, wash our hands and social distance.