# How much less likely are you to spread Covid-19 if you're vaccinated?

By Michael Le Page, *New Scientist*, Oct 23, 2021

People who are fully vaccinated against Covid-19 are far less likely to infect others, despite the arrival of the delta variant, several studies show. The findings refute the idea, which has become common in some circles, that vaccines no longer do much to prevent the spread of the coronavirus.

"They absolutely do reduce transmission," says Christopher Byron Brooke at the University of Illinois at Urbana-Champaign. "Vaccinated people do transmit the virus in some cases, but the data are super crystal-clear that the risk of transmission for a vaccinated individual is much, much lower than for an unvaccinated individual."

A recent study found that vaccinated people infected with the delta variant are 63 per cent less likely to infect people who are unvaccinated.

This is only slightly lower than with the alpha variant, says Brechje de Gier at the National Institute for Public Health and the Environment in the Netherlands, who led the study. Her team had previously found that vaccinated people infected with alpha were 73 per cent less likely to infect unvaccinated people.

What is important to realise, de Gier says, is that the full effect of vaccines on reducing transmission is even higher than 63 per cent, because most vaccinated people don't become infected in the first place.

De Gier and her team used data from the Netherlands' contact tracing system to work out the so-called secondary attack rate – the proportion of contacts infected by positive cases. They then worked out how much this was reduced by vaccination, adjusting for factors such as age.

De Gier says they cannot calculate the full reduction in transmission due to vaccination, because they don't know exactly how much vaccination reduces the risk of infection. But even assuming vaccination only halves the risk of infection, this would still imply that vaccines reduce transmission by more than 80 per cent overall.

Others have worked out the full effect. Earlier this year, Ottavia Prunas at Yale University applied two different models to data from Israel, where the Pfizer vaccine was used. Her team's conclusion was that the overall vaccine effectiveness against transmission was 89 per cent.

However, the data used only went up to 24 March, before delta became dominant. The team is now using more recent data to work out the impact of delta, says Prunas.

The idea that vaccines are no longer that effective against transmission may derive from news reports in July claiming that vaccinated people who become infected "can carry as much virus as others". Even if this were true, however, vaccines would still greatly reduce transmission by reducing infections in the first place.

In fact, the study that sparked the news reports didn't measure the number of viruses in someone directly but relied on so-called Ct scores, a measure of viral RNA. However, this RNA can derive from viruses destroyed by the immune system. "You can measure the RNA but it's rendered useless," says Timothy Peto at the University of Oxford.

There are now several lines of evidence that Ct scores aren't a good measure of the amount of virus someone has. Firstly, the fact that infected vaccinated people are much less likely to infect others. Peto has done a similar study to de Gier using contact tracing data from England and gotten similar results.

Secondly, Peto's team specifically showed that there is little connection between Ct scores and infectiousness. "It appeared people who were positive after vaccination had the same viral load as the unvaccinated. We thought they were just as infectious. But it turns out you are less infectious," says Peto. "That's quite important. People were over-pessimistic."

Yet another line of evidence comes from a study by Brooke. His team took samples from 23 people every day after they first tested positive until the infection cleared and performed tests, including trying to infect cells in a dish with the samples.

With five out of the six fully vaccinated people, none of the samples were infectious, unlike most from unvaccinated people. The study shows that vaccinated people shed fewer viruses and also stop shedding sooner than unvaccinated people, says Brooke.

The one bit of bad news is that Peto's study shows that the protection a vaccine provides against an infected person infecting others does wane over time, by around a quarter over the three months after a second vaccine dose. "This has made me a believer in boosters," he says. "They ought to get on with it, given that we are in the middle of a major outbreak [in the UK]."