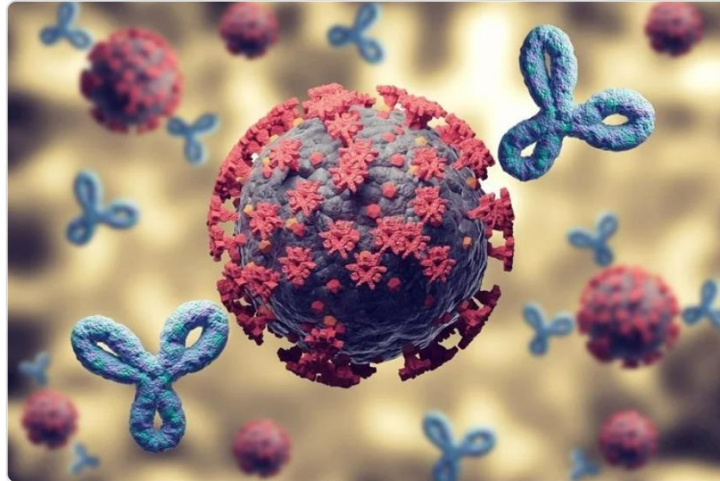


Difference between Waning COVID-19 Immunity between Vaccinated and Infected Individuals

With the onset of the [coronavirus disease 2019](#) (COVID-19) pandemic, millions of deaths and hundreds of millions of non-fatal infections occurred worldwide. Following the rollout of vaccines, the incidence of severe infection and fatalities decreased rapidly once full vaccination rates were achieved for a sizable proportion. The question is, how long does this last before falling below protective levels, and how does it compare to the immunity achieved in recovered individuals?



Introduction

The Pfizer/BioNTech BNT162b2 messenger ribonucleic acid (mRNA) vaccine was the first to receive emergency use authorization, and billions of doses have been distributed so far. Following a two-dose regimen, the fully vaccinated individual has been shown to have significant protection against symptomatic disease with the [severe acute respiratory syndrome coronavirus 2](#) (SARS-CoV-2).

Strong natural immunity also follows natural infection with the virus. [Hybrid immunity](#), achieved in individuals who are vaccinated following recovery from natural infection, is thought to elicit neutralizing antibodies at higher levels and with a broader spectrum of protection and greater effectiveness than either of the earlier two types.

What did the Study Show?

The study involved over 5.7 million individuals confirmed to have SARS-CoV-2 infection during the period August 1 to September 30, 2021. In all cohorts, namely, recovered, vaccinated then recovered, recovered then vaccinated, vaccinated and booster, the researchers found that the [infection](#) rates increased with the time since the immunizing event.

In the unvaccinated recovered cohort, the [infection rate](#) was 10.5 per 100,000 person-days at risk, if previously infected 4-6 months before the study, but this went up three times, to 30, when those infected more than a year before the study were examined.

Similarly, for recovered individuals with a [single vaccine dose](#) taken over six months before the study, the infection incidence was approximately 12, vs. 3.7 per 100,000 person-days for those vaccinated within the preceding two months. For vaccination in uninfected individuals, the rate per 100,000 person-days was 21 for vaccination within the last two months, to almost 90 if vaccinated more than six months before the study.

The recovered cohorts showed similar adjusted rates of confirmed infection compared to hybrid immunity cohorts (recovered then vaccinated vs. vaccinated then recovered), if the time from the last immunization (by [natural infection](#) or vaccination) was standardized. Thus, all cohorts showed clear proof that immunity waned over time.

With single-dose vaccine cohorts, at 4-6 months, the incidence was comparable at between 10 and 13. At 6-8 months, the corresponding rates were between approximately 12 and 17. If both doses had been taken, there were 69 infections per 100,000 at 4-6 months, but 89 at 6-8 months, indicating a steep rise compared to hybrid or [natural immunity](#). Again, a booster dose reduces the rate to 8 over the next two months.

When only severe cases were analyzed, the number among the vaccinated was the highest. The crude rates for those aged 60 years or more were similar at around 0.5 per 100,000 for the recovered as well as the recovered then vaccinated cohorts, a little higher at 1.1 for the vaccinated then recovered, around ten times higher for the vaccinated cohort (at 4.6), falling to 0.4 in the [booster cohort](#).

Conclusion

The researchers found that when recovered and [vaccinated individuals](#), or those with only natural immunity, the protection level was higher than those who were infection-naïve and only received two doses of the mRNA vaccines, agreeing with earlier studies. In addition, for the first time, the study carried out a detailed quantitative assessment of the decline of natural and hybrid immunity over time in the real world.

The adjusted rates of infection were lower in the recovered cohorts than those who had received only two doses of vaccination, at a similar duration from either the last infection or the last vaccination. Protection against infection could be restored in the vaccinated group by a [third dose](#) booster or a single dose of vaccine to a recovered individual.

The results corroborate an earlier Israeli study showing the superiority of hybrid or natural immunity to uninfected vaccine-induced immunity after two doses. Interestingly, though the number of [severe infections](#) was relatively low, it does not seem that protection following double vaccination is higher than natural immunity following infection, at 3-6 months.

The study period overlapped the last days of dominance of the [Alpha variant](#), with earlier strains also in circulation, while the dominant strain was the Delta variant. The lower protection afforded by natural immunity could be partly due to the difference in immunity-inducing strain and newly encountered strain of SARS-CoV-2 and the time elapsed since the infection.

As a result, its protection against newer strains like [Omicron](#) cannot be predicted.

The study helps fill the need to understand how immunity wanes after double vaccination or infection and demonstrates the restoration of a high level of protection with one (or one more) dose of the vaccine in previously infected or [doubly-vaccinated individuals](#) respectively. The best time for this additional dose must be determined.

Overall, however, "[Protection](#) from reinfection decreases with time since previous infection, but is, nevertheless, higher than that conferred by vaccination with two doses at a similar time since the last immunity-conferring event."

Source:

<https://www.news-medical.net/news/20211207/Comparison-of-waning-COVID-19-immunity-between-vaccinated-and-infected-individuals.aspx>