

Vaccines remain highly effective against Covid-19 virus variants

Within less than a year of the outbreak of the Covid-19 pandemic, several research teams rose to the challenge and have developed effective vaccines. This year 3.2 billion vaccine doses have already been administered globally, and 37.3 million are now administered each day. Indeed, 24% of the world population has now received at least one dose of a Covid-19 vaccine. This is already an impressive achievement, but effort is still needed to provide comfort to reduce vaccine hesitancy and ensure that vaccines are available to people in less wealthy countries.

Viruses mutate all the time, including the SARS-CoV-2 coronavirus that causes Covid-19. Genetic mutation of a virus is a random process. According to Darwin’s theory of “survival of the fittest” evolution naturally selects virus mutants that infect human cells more easily. Many new variants of the virus have emerged since the outbreak, each with a constellation of mutations. So far, the World Health Organization (WHO) has identified four “variants of concern” (VOC), to which it assigns Greek letters for identification: alpha, beta, gamma and delta.

WHO variants of concern

WHO label	VOC	Country of discovery
alpha	B.1.1.7	England
beta	B.1.351	South Africa
gamma	P.1	Brazil/Japan
delta	B.1.617.2	India

Sources: Bloomberg and QNB analysis

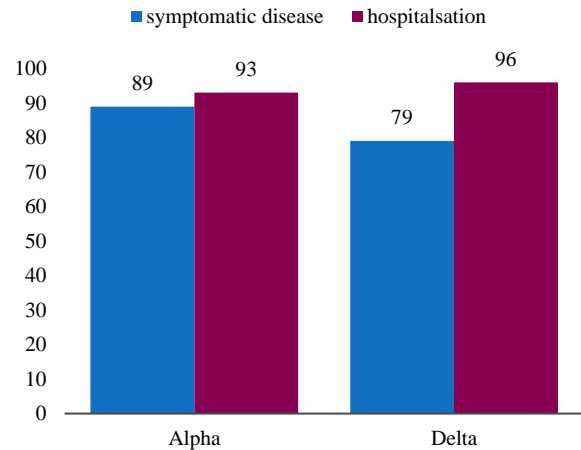
This week we consider the implications of VOC by considering three questions: Do vaccines protect against VOC? Do some vaccines offer better protection against VOC than others? Can protection against VOC be improved?

Do vaccines protect against VOC?

UK data, focusing on the alpha and delta VOCs shows that vaccines still offer a high level of protection against symptomatic infections caused by VOC (Chart 1). In particular, vaccine protection against severe cases of Covid-19 remains very high. The research also shows that getting a second dose is

particularly helpful for boosting protection against the delta variant. So, vaccines do still protect against VOCs, particularly against hospitalisation.

Chart 1: Vaccine effectiveness at protecting against different outcomes after two doses, by VOC



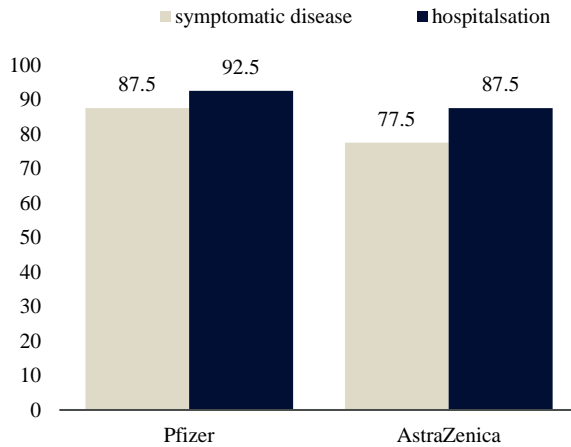
Sources: Public Health England (PHE) and QNB analysis

Do some vaccines offer better protection against VOC than others?

Two main types of vaccines have been developed to protect against Covid-19. [Vaccines that use messenger ribonucleic acid \(mRNA\) technology](#) work by telling our cells to temporarily produce a small-inactive piece of the virus (the spike protein), which triggers an immune response inside our bodies. Examples of mRNA vaccines include the vaccines developed by Pfizer and Moderna. [Vaccines that use viral vector technology](#) work in much the same way, but use a de-activated adenovirus to tell our cells to produce the spike protein. The AstraZeneca vaccine is an example of a vaccine which uses viral vector technology.

Our immune systems respond to the presence of the spike protein by activating multiple defence mechanisms, including both antibodies and so-called T-cells. Researchers at the La Jolla Institute for Immunology have shown that T-cells from people who have received mRNA vaccines are still able to recognize VOC. This is one reason why the Pfizer vaccine has been shown to be more effective than the AstraZeneca vaccine (Chart 2).

Chart 2: Vaccine effectiveness at protecting against different outcomes after two doses, by vaccine type



Sources: PHE and QNB analysis

Can protection against VOC be improved?

Yes. Different vaccines can be used in combination. Germany’s vaccine authority has recommended mRNA vaccines as the second dose for people who were vaccinated with a first dose of the AstraZeneca vaccine. Indeed, a number of studies suggests that a second dose of a [different type](#) of Covid vaccine are [more protective](#) than two doses of the same vaccine. Further studies are investigating the optimal [mix of](#)

[vaccines](#) and [delay between doses](#). Looking further forward, drug companies are also working on “booster shots” as already happens annually with vaccines against flu.

Virus mutations and VOC will remain a serious problem as long as the number of active Covid-19 infections remains at a high level. Fortunately, existing vaccines and particularly mRNA vaccines, offer a high level of protection against severe cases of Covid-19. In addition, optimising the timing of doses, mix of vaccines and providing booster shots can increase the effectiveness of vaccine protection.

Given the already high level of vaccinations in a number of wealthy countries, getting more vaccine doses to less wealthy countries and encouraging those that are still hesitant to get vaccinated, will become increasingly important to maintain a high rate of vaccination globally. The sooner we are able to vaccinate the remaining global population, the less opportunity the virus has to mutate into new VOC and the more effective vaccination becomes at preventing infection. Therefore, the faster the vaccination rate, the sooner and more comprehensive the reopening of the global economy can be.

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