

# COVID-19 vaccines explained

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Since it began on 30 December 2020, Singapore's vaccination program has continued to make good progress. More than a million doses of vaccine have been administered, with around 40,000 doses now being administered per day. The vaccines were first given to those working on the frontline in the fight against the pandemic, followed by the elderly.

In March 2021, those age 45 to 59 years old become eligible for vaccination.

Currently, the Pfizer-BioNTech and Moderna vaccines are being administered at vaccination centers around the nation. Singapore has also received approximately 200,000 doses of the Sinovac COVID-19 [vaccine](#) as part of advanced purchases made last year, but these will not be used until the Health Sciences Authority (HSA) has approved it.

In this article, Associate Professor Hsu Li Yang, Vice Dean of Global Health and Leader of the Infectious Diseases Program at the NUS Saw Swee Hock School of Public Health, gives his insights on some common questions related to the vaccination program, and the differences between the vaccines available.

## **Q: What is the difference between the Pfizer-BioNTech and Moderna vaccines?**

A: The two mRNA vaccines are very similar, with tiny doses given twice to achieve optimal priming of the immune response against COVID-19. For the Pfizer-BioNTech vaccine, the doses are 21 days apart while the Moderna vaccine is administered 28 days apart.

The time intervals differ depending on the research done by the companies, but in general, it is not good to have the second dose too early before the stipulated period. A delay of up to six weeks or perhaps longer is thought to be okay, because the immune boost may be blunted if the second dose is given far too early.

## **Q: Are mRNA vaccines the most effective among the vaccine types?**

A: The two mRNA vaccines currently used in Singapore are remarkably effective at protecting against COVID-19. It is not easy to compare vaccine efficacy because the licensing clinical trials were done differently, with different outcomes measured. However, the real-world experience shows that the majority of licensed vaccines are effective at preventing COVID-19, albeit efficacy appears to be reduced against the new variants.

**Q: Why does the Sinovac vaccine have a reported efficacy rate between 50 to 90 percent?**

A: This is because the clinical trials were done in three different countries with different protocols and recruitment numbers. The real-world experience of Sinovac has yielded mixed results, with a markedly lower efficacy of under 60 percent in Brazil and Chile. This could partly be attributed to lower efficacy against new variants, such as the Brazil variant of COVID-19.

**Q: Are there any benefits of importing other types of vaccines, like those manufactured by Astra-Zeneca and Johnson & Johnson?**

A: Boosting supply is the primary benefit in case supply chain issues develop with one or more vaccines (as has occurred even in the European Union and the United States). For those people who may have harmful reactions to one vaccine, they may yet be eligible for other COVID-19 vaccines because they are really fairly different products.

**Q: How do you see the take-up rate for vaccination in Singapore, and are we on track to achieve herd immunity?**

A: The take-up rate for vaccination has been far better than I expected, which is great. I do not think we can consider herd immunity as yet, because a substantial proportion of the population, like children, pregnant women, those who are immunocompromised, etc, are not eligible for COVID-19 vaccination until more evidence of the safety and efficacy emerges. Nonetheless, I understand that we are on target with regards to projected numbers to be vaccinated.

**Q: Why do people experience side effects after taking the vaccination, and why do the side effects tend to be worse after the second jab?**

A: The majority of side effects, especially the common ones like pain, fever and headaches, are reactogenic. This means that they arise because vaccines are specifically engineered to trigger an immune response. These side effects can be worse or manifest with the second dose because the immune system has been primed by the initial dose, resulting in a greater response with the second. There can be allergic reactions, which are much rarer. Individuals can, for reasons that are not well understood, react abnormally and excessively to one or more components of the vaccine, which results in hives, rash, or in extreme cases, life-threatening anaphylaxis.

**Q: Are side effects more common among certain groups of people?**

A: Reactogenic [side effects](#) are more common among younger as opposed to older people, and also among women, because of the stronger immune responses. Those with multiple allergies are probably no more likely to be allergic to the COVID-19 vaccines than the general population unless they are allergic to one of the vaccine components.

**Q: How long does the protection from COVID-19 vaccines last, and are they effective against newer strains?**

A: We are learning about this as we go along. With the other human coronaviruses, immunity post-infection is not lifelong, with reinfections possible after half a year or longer. This is not the case with COVID-19, where reinfections are still very rare for those who have been previously infected, even in countries where there is a widespread transmission of the virus. It is unlikely that vaccination will result in longer immunity compared to natural infection, and it is also likely that existing vaccines will become less and less effective against newer variants of COVID-19.

**Q: Can a vaccinated person still get infected and spread the virus if exposed to COVID-19?**

A: With the mRNA vaccines, we know that efficacy against infection exceeds 90 percent, so perhaps at most one in 10 vaccinated persons will be inadequately protected and can still be infected if exposed. Even in these persons, there will be partial protection and the infection is far less likely to lead to a bad outcome for them. So, these are still significant advantages that accrue with vaccination.

Provided by National University of Singapore

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