

# Which COVID vaccine you get could affect your myocarditis risk

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Incidence of myocarditis, pericarditis or myopericarditis is two- to threefold higher after a second dose of the Moderna Spikevax COVID-19 vaccine when compared to the Pfizer BioNTech COVID-19

vaccine; however, overall cases of heart inflammation with either vaccine are very rare, according to a study in the *Journal of the American College of Cardiology*. The study showed males younger than 40 years old who received the Moderna vaccine were shown to have the highest rates of myocarditis, which according to the authors, may have implications for choosing specific vaccines for certain populations.

Two mRNA COVID-19 vaccines have been approved for use: Pfizer BioNTech (BNT162b2) and Moderna Spikevax (mRNA-1273). As of March 20, 2022, more than 52 million doses of Pfizer and 22 million doses of Moderna have been administered in Canada, where this study was conducted. Clinical trials have demonstrated the vaccines are safe and monitoring of vaccinated people has shown side effects are mild and go away on their own. However, some rare but serious side effects have been observed after both vaccines, mainly myocarditis (inflammation of the heart).

While there have been many studies on either [vaccine](#), few studies have been conducted to directly compare the safety of the two mRNA vaccines. Researchers in this study sought to compare the risk of myocarditis, pericarditis and myopericarditis between the Pfizer and Moderna COVID-19 vaccines.

People in the study were 18 years old or older and had received two primary doses of either Pfizer or Moderna vaccine in British Columbia, Canada, with the second dose between Jan. 1, 2021 and Sept. 9, 2021. Individuals whose first or second shots were administered outside of British Columbia or had a history of myocarditis or pericarditis within one year prior to their second dose were excluded.

In all, more than 2.2 million second Pfizer doses and more than 870,000 Moderna doses were given. Within 21 days of the second dose, there was a total of 52 myocarditis cases (21 Pfizer and 31 Moderna) and 41

pericarditis cases (21 Pfizer and 20 Moderna). Researchers also looked at rates per million doses and the rate was 35.6 cases per million for Moderna and 12.6 per million for Pfizer—an almost threefold increase after Moderna shots vs. Pfizer. Comparatively, rates of myocarditis in the general population in 2018 were 2.01 per million in people under age 40 and 2.2 per million in people over age 40.

Rates of myocarditis and pericarditis were higher with the Moderna vaccine in both males and females between ages 18 and 39, with the highest per million rates in males ages 18-29 after a second dose of Moderna.

According to the authors, the findings support recommending certain populations receive certain vaccines to maximize benefits and minimize adverse events.

"Few population-based analyses have been conducted to directly compare the safety of the two mRNA COVID-19 vaccines, which differ in important ways that could impact safety," said Naveed Janjua, MBBS, DrPH, lead author of the study and an epidemiologist and the executive director of Data and Analytic Services at the British Columbia Centre for Disease Control. "Our findings have implications for strategizing the rollout of mRNA vaccines, which should also consider the self-limiting and mild nature of most myocarditis events, benefits provided by vaccination, higher effectiveness of the Moderna vaccine against infection and hospitalization [found in prior studies], and the apparent higher risk of myocarditis following COVID-19 infection than with mRNA vaccination."

Limitations of the study include that it was observational, which limits the ability to determine causality between vaccination and myocarditis or pericarditis. However, temporality was ensured in the study design to limit the time studied between vaccine dose and myocarditis/pericarditis

diagnosis. Also, the study relied on hospital and emergency department visit data and may have missed some less severe cases.

In a related editorial comment, Guy Witberg, MD, MPH, a cardiologist at Rabin Medical Center in Petah-Tikva, Israel, wrote that the study is reassuring for vaccine safety since it provides further data that [myocarditis](#) is a very rare adverse event after both vaccines, and it is an important step toward a personalized approach to administering COVID-19 vaccines.

"[The study] should help put to rest 'vaccine hesitancy' due to concerns over cardiac adverse events," Witberg said. "This is one of only a few direct comparisons of the two widely adopted mRNA vaccines, and its results have practical policy implications: for a substantial segment of the population suffering from [cardiovascular disease](#)...these data give a strong argument to preferentially use the BNT162b2 [Pfizer] vaccine over mRNA-1273 [Moderna]."

**More information:** Zaeema Naveed et al, Comparative Risk of Myocarditis/Pericarditis Following Second Doses of BNT162b2 and mRNA-1273 Coronavirus Vaccines, *Journal of the American College of Cardiology* (2022). [DOI: 10.1016/j.jacc.2022.08.799](https://doi.org/10.1016/j.jacc.2022.08.799).  
[www.jacc.org/doi/10.1016/j.jacc.2022.08.799](https://www.jacc.org/doi/10.1016/j.jacc.2022.08.799)

Guy Witberg et al, A Tale of 2 mRNA Vaccines: The Spring of Hope, The Winter of Despair *Journal of the American College of Cardiology* (2022). [DOI: 10.1016/j.jacc.2022.09.010](https://doi.org/10.1016/j.jacc.2022.09.010).  
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