

# Myocarditis seven times more likely with COVID-19 than vaccines

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The risk of developing myocarditis—or inflammation of the heart muscle—is seven times higher with a COVID-19 infection than with the COVID-19 vaccine, according to a recent study by Penn State College of Medicine scientists, now published in *Frontiers in Cardiovascular Medicine*. Patients with myocarditis can experience chest pains, shortness of breath or an irregular heartbeat. In severe cases, the inflammation can lead to heart failure and death.

"Our findings show that the risk of myocarditis from being infected by COVID-19 is far greater than from getting the [vaccine](#)," said Dr. Navya Voleti, a [resident physician](#) in the Department of Medicine at Penn State Health Milton S. Hershey Medical Center. "Moving forward, it will be important to monitor the potential long-term effects in those who develop myocarditis."

Myocarditis is one of the complications of SARS-CoV-2 infection. Although vaccines have been shown to reduce severe COVID-19 symptoms, heart complications have been associated with mRNA COVID-19 vaccination—particularly myocarditis in teenage boys. However, the relative risk of myocarditis due to vaccines and infections had not been well characterized in large studies.

The Penn State team conducted the largest study to date on the risk of developing myocarditis as a result of having the coronavirus vs. experiencing inflammation following COVID-19 vaccination. The researchers compared patients with COVID-19—vaccinated and unvaccinated—to those without the virus. They found the risk of myocarditis was 15 times higher in COVID-19 patients, regardless of vaccination status, compared to individuals who did not contract the virus.

Next, the researchers separately compared the rates of myocarditis in those who received the vaccines to those in unvaccinated individuals.

According to the findings, the rates of myocarditis in people who were vaccinated against COVID-19 were only twofold higher than in unvaccinated people.

Based on all the findings, the researchers concluded that the risk of myocarditis due to COVID-19 was seven times higher than the risk related to the vaccines.

Investigators conducted a [systematic review](#) and meta-analysis of 22 studies published worldwide from December 2019 through May 2022. The studies included nearly 58 million patients who reported cardiac complications and belonged to one of two groups: the 55.5 million who were vaccinated against COVID-19 compared to those who were not vaccinated (vaccination group), and the 2.5 million who contracted the virus compared to those who did not contract the virus (COVID-19 group).

In the vaccination group, the researchers separately compared the risk of myocarditis for various COVID-19 vaccines, including mRNA (Pfizer, Moderna), Novavax, AstraZeneca, and Johnson and Johnson. The median age of the study population was 49 years; 49% were men; and the median follow-up time after infection or COVID-19 vaccination was 28 days.

The researchers found that among those diagnosed with myocarditis after receiving the vaccine or having COVID-19, the majority (61%) were men. Of patients diagnosed with myocarditis in both vaccination and COVID-19 groups, 1.07% were hospitalized and 0.015% died.

"COVID-19 infection and the related vaccines both pose a risk for myocarditis. However, the relative risk of heart inflammation induced by COVID-19 infection is substantially greater than the risk posed by the vaccines," said Dr. Paddy Ssentongo, a resident physician in the

Department of Medicine at Penn State Health Milton S. Hershey Medical Center and the lead author of the study. "We hope our findings will help mitigate vaccine hesitancy and increase [vaccine](#) uptake."

**More information:** Navya Voleti et al, Myocarditis in SARS-CoV-2 infection vs. COVID-19 vaccination: A systematic review and meta-analysis, *Frontiers in Cardiovascular Medicine* (2022). [DOI: 10.3389/fcvm.2022.951314](#)

Provided by Pennsylvania State University

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