

# Young people recover quickly from rare myocarditis side effect of COVID-19 vaccine: study

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A medical assistant prepares a dose of a COVID-19 vaccine to be administered to a patient. Credit: Public domain image courtesy of Lisa Ferdinando, U.S. Department of Defense

Most young people under the age of 21 who developed suspected COVID-19 vaccine-related heart muscle inflammation known as

myocarditis had mild symptoms that improved quickly, according to new research published today in the American Heart Association's flagship journal *Circulation*.

Myocarditis is a rare but serious condition that causes inflammation of the [heart](#) muscle. It can weaken the heart and affect the heart's electrical system, which keeps the heart pumping regularly. It is most often the result of an infection and/or inflammation caused by a virus.

"In June of this year, the U.S. Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices reported a likely link between mRNA COVID-19 vaccination and myocarditis, particularly in people younger than 39. However, research continues to find COVID-19 vaccine-related cases of myocarditis uncommon and mostly mild," said Donald M. Lloyd-Jones, M.D., Sc.M., FAHA, president of the American Heart Association, who was not involved in the study. "Overwhelmingly, data continue to indicate that the benefits of COVID-19 vaccination—91% effective at preventing complications of severe COVID-19 infection including hospitalization and death—far exceed the very rare risks of adverse events, including myocarditis."

"The highest rates of myocarditis following COVID-19 vaccination have been reported among adolescent and young adult males. Past research shows this rare side effect to be associated with some other vaccines, most notably the [smallpox vaccine](#)," said the new study's senior author Jane W. Newburger, M.D., M.P.H., FAHA, associate chair of Academic Affairs in the Department of Cardiology at Boston Children's Hospital, the Commonwealth Professor of Pediatrics at Harvard Medical School and a member of the American Heart Association's Council on Lifelong Congenital Heart Disease and Heart Health in the Young. "While current data on symptoms, case severity and short-term outcomes is limited, we set out to examine a large group of suspected cases of this heart

condition as it relates to the COVID-19 vaccine in teens and adults younger than 21 in North America."

Using data from 26 pediatric medical centers across the United States and Canada, researchers reviewed the medical records of patients younger than 21 who showed symptoms, lab results or imaging findings indicating myocarditis within one month of receiving a COVID-19 vaccination, prior to July 4, 2021. Cases of suspected vaccine-associated myocarditis were categorized as "probable" or "confirmed" using CDC definitions.

Of the 139 teens and young adults, ranging from 12 to 20 years of age, researchers identified and evaluated:

- Most patients were white (66.2%), nine out of 10 (90.6%) were male and median age was 15.8 years.
- Nearly every case (97.8%) followed an mRNA vaccine, and 91.4% occurred after the second vaccine dose.
- Onset of symptoms occurred at a median of 2 days following vaccine administration.
- Chest pain was the most common symptom (99.3%); fever and shortness of breath each occurred in 30.9% and 27.3% of patients, respectively.
- About one in five patients (18.7%) was admitted to intensive care, but there were no deaths. Most patients were hospitalized for two or three days.
- More than three-fourths (77.3%) of patients who received a cardiac MRI showed evidence of inflammation of or injury to the heart muscle.
- Nearly 18.7% had at least mildly decreased left ventricular function (squeeze of the heart) at presentation, but heart function had returned to normal in all who returned for follow-up.

"These data suggest that most cases of suspected COVID-19 vaccine-related myocarditis in people younger than 21 are mild and resolve quickly," said the study's first author, Dongngan T. Truong, M.D., an associate professor of pediatrics in the division of cardiology at the University of Utah and a pediatric cardiologist at Intermountain Primary Children's Hospital in Salt Lake City. "We were very happy to see that type of recovery. However, we are awaiting further studies to better understand the long-term outcomes of patients who have had COVID-19 vaccination-related myocarditis. We also need to study the risk factors and mechanisms for this rare complication."

Researchers say future studies should follow patients who have suffered vaccine-associated myocarditis over a longer term, since this study examined only the immediate course of patients and lacks follow-up data. Additionally, there are several important limitations to consider. The study design did not allow scientists to estimate the percentage of those who received the vaccine and who developed this rare complication, nor did it allow for a risk/benefit ratio examination. The patients included in this study were also evaluated at academic medical centers and may have been more seriously ill than other cases found in a community.

"It is important for health care professionals and the public to have information about early signs, symptoms and the time course of recovery of myocarditis, particularly as these vaccines become more widely available to children," Truong said. "Studies to determine long-term outcomes in those who have had myocarditis after COVID-19 vaccination are also planned."

Researchers recommend that [health care professionals](#) consider myocarditis in individuals presenting with chest pain after receiving a COVID-19 vaccine, especially in boys and young men in the first week after the second vaccination.

"This study supports what we have been seeing—people identified and treated early and appropriately for COVID-19 [vaccine](#)-related myocarditis typically experience mild cases and short recovery times," Lloyd-Jones said. "These findings also support the American Heart Association's position that COVID-19 vaccines are safe, highly effective and fundamental to saving lives, protecting our families and communities against COVID-19, and ending the pandemic. Please get your child vaccinated as soon as possible."

**More information:** Clinically Suspected Myocarditis Temporally Related to COVID-19 Vaccination in Adolescents and Young Adults, *Circulation* (2021). [DOI: 10.1161/CIRCULATIONAHA.121.056583](https://doi.org/10.1161/CIRCULATIONAHA.121.056583)

Provided by American Heart Association

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