

Myocarditis & Pericarditis after mRNA vaccination for Covid-19

what it is and what we know

What is myocarditis and pericarditis?

Myocarditis: Inflammation of the heart muscle.

Pericarditis: Inflammation of the lining around the heart.

Myopericarditis: Both of the above occurring at same time.

What are the typical causes?

- Infections are the primary cause:
 - Viral, bacterial, fungal and parasitic
- Immunological syndromes
- Medications or certain drug exposures.

What is the baseline incidence of myocarditis and pericarditis?

- In children overall: 0.8/100,000 (8/million)
- In children 15–18: 1.8/100,000 (18/million)
- 66% of cases occur in males.

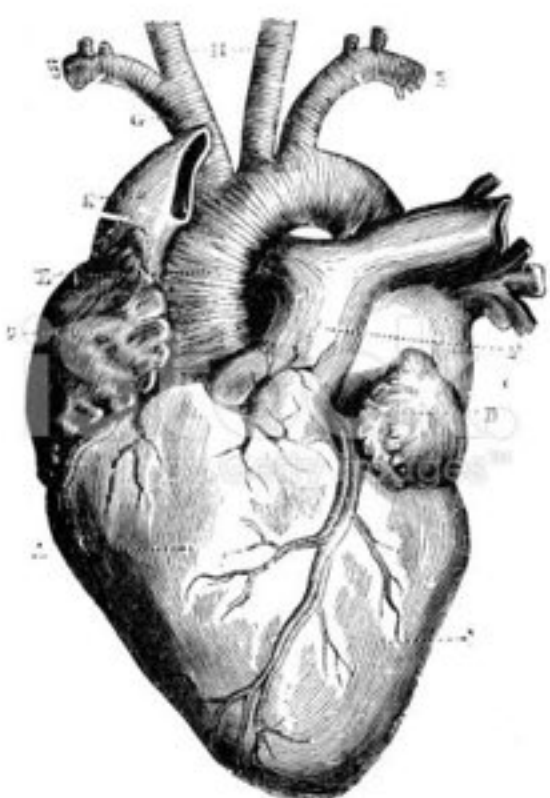
incidence of myocarditis post COVID-19

Based on one study with college athletes it occurred in 0.31% to 2.3% of those studied (~1/320 – 1/43)

<https://jamanetwork.com/journals/jamacardiology/fullarticle/2780548>

How is it treated?

- Supportive care (depending on the cause)
- Anti-inflammatory medications
- Rest
- If severe, you may need medications to reduce the burden on your heart or rarely mechanical support



What have we seen so far with the Covid-19 vaccines?

- 484 cases of myocarditis following vaccination among people ≤29 years old in the United States
- Symptom onset typically within 5 days
- Predominance of males
- Median age is younger after Dose 2 vs Dose 1
- Overall more cases after Dose 2
- Available outcome data indicate that most generally recover from symptoms and do well

Symptoms to watch out for:

If you have these symptoms or are concerned, talk to your medical provider or seek emergency medical care.

Chest pain

- can be worse lying down and better sitting up and leaning forward,
- generally persistent

Shortness of breath

- often starting with exertion
- can occur at rest

Feelings of having a fast-beating, fluttering, skipping or pounding heart

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What is the incidence post second dose of an mRNA vaccine

Vaccine (dose)	Doses administered	Rate per million doses
Any mRNA both doses	3.42M	8
Any mRNA Dose 1	1.88M	4.4
Any mRNA Dose 2	1.54M	12.6

Males

12-17: 66.7/million
 18-24: 56.3/million
 25-29: 20.4/million
 30-39: 10/million

Females

12-17: 9.1/million
 18-24: 5.5/million
 25-29: 2.6/million
 30-39: 1.8/million

For chart confirmed cases the rate for 12-39 is: 12.6/million second doses

Rates above are per million second doses based on reported (not confirmed) cases. So these could be overestimated. Despite this, these higher estimates reflect rare occurrence.

What are the outcomes of these cases that were reported post vaccine?

CDC ACIP has stated that myocarditis with the mRNA vaccines seem to be less severe than what is seen with traditional myocarditis. The clinical course seems shorter, milder and requiring minimal treatment for most.

Per the CDC report:

323 cases. 14 not hospitalized. 309 hospitalized, 295 discharged from hospital, 218 had recovered from all symptoms, 9 remained hospitalized at time of report with 2 in ICU.

This data seems consistent with what was reported by Israel's Ministry of Health:

148 cases, 95% of cases were mild, most discharged by four days.

Risk of Covid-19 to consider

When weighing whether or not to vaccinate one should also factor in these risks of COVID-19. The delta variant is becoming the dominant strain worldwide. It is more contagious and will lead to more cases in those unvaccinated, including within these age groups. This will increase all of the below risks.

- 2,767 deaths have been reported from COVID-19 for those 12-29
- Long COVID:
 - Estimated to affect 1.8%-52% of kids who get COVID-19, persisting symptoms include fatigue, insomnia, rhinorrhea, muscle pain, headache, lack of concentration, exercise intolerance, dyspnea, chest pain
- MIS-C
 - Risk is estimated to be 1/3,200 cases of COVID-19 in age 21 and under, 36% of these cases are in those 12-20
 - 1-2% die



Bottom line: The benefits of COVID-19 vaccines outweigh their risks

Given the increasing prevalence of Delta, cases of COVID-19 and subsequent complications will likely be increasing. This makes the benefits of COVID-19 vaccination even greater than represented here.

The benefits of being vaccinated far outweigh the risks of myocarditis and pericarditis.

Rate is per 1 million second doses, given current COVID-19 exposure rates