



COVID-19


Selected Adverse Events Reported after COVID-19 Vaccination

Updated Sept. 19, 2022

Safety of COVID-19 Vaccines

Some people have no side effects. Many people have reported side effects, such as headache, fatigue, and soreness at the injection site, that are generally mild to moderate and go away within a few days.

What You Need to Know

- COVID-19 vaccines are **safe and effective and severe reactions after vaccination are rare.**
- CDC recommends COVID-19 vaccines for everyone ages 6 months and older, and boosters for everyone 5 years and older, if eligible.
- Millions of people in the United States have received COVID-19 vaccines under the most intense safety monitoring program in U.S. history.
- CDC, the U.S. Food and Drug Administration (FDA), and other federal agencies continue to monitor the safety of all vaccines, including COVID-19 vaccines, by reviewing data reported to the Vaccine Adverse Event Reporting System (VAERS)  and the Vaccine Safety Datalink (VSD).

The benefits of COVID-19 vaccination continue to outweigh any potential risks.

CDC is providing timely updates on the following adverse events of interest:

- **Anaphylaxis after COVID-19 vaccination is rare** and has occurred at a rate of approximately 5 cases per one million vaccine doses administered. Anaphylaxis, a severe type of allergic reaction, can occur after any kind of vaccination. If it happens, healthcare providers can effectively and immediately treat the reaction. Learn more about COVID-19 vaccines and allergic reactions, including anaphylaxis.

CDC scientists have conducted detailed reviews of cases of anaphylaxis and made the information available to healthcare providers and the public:

- Allergic Reactions Including Anaphylaxis After Receipt of the First Dose of Pfizer-BioNTech COVID-19 Vaccine [↗](#)
- Reports of Anaphylaxis After Receipt of mRNA COVID-19 Vaccines in the US—December 14, 2020-January 18, 2021 [↗](#)
- Allergic Reactions Including Anaphylaxis After Receipt of the First Dose of Moderna COVID-19 Vaccine— United States, December 21, 2020-January 10, 2021
- Allergic Reactions Including Anaphylaxis After Receipt of the First Dose of Pfizer-BioNTech COVID-19 Vaccine — United States, December 14-23, 2020

- **Thrombosis with thrombocytopenia syndrome (TTS) after J&J/Janssen COVID-19 vaccination is rare** and has occurred in approximately 4 cases per one million doses administered. TTS is a rare but serious adverse event that causes blood clots in large blood vessels and low platelets (blood cells that help form clots).

A review of reports indicates a causal relationship between the J&J/Janssen COVID-19 vaccine and TTS. CDC scientists have conducted detailed reviews of TTS cases and made the information available to healthcare providers and the public:

- US Case Reports of Cerebral Venous Sinus Thrombosis With Thrombocytopenia After Ad26.COV2.S Vaccination, March 2 to April 21, 2021 [↗](#)
- [Case Series of Thrombosis with Thrombocytopenia Syndrome following COVID-19 vaccination—United States, December 2020–August 2021](#) [↗](#)
- Updates on Thrombosis with Thrombocytopenia Syndrome (TTS) [📄](#)
[1.3 MB, 39 Pages]

- **Guillain-Barré Syndrome (GBS) in people who have received the J&J/Janssen COVID-19 vaccine is rare.** GBS is a rare disorder where the body's immune system damages nerve cells, causing muscle weakness and sometimes paralysis. GBS has largely been reported in men ages 50 years and older.

Based on a recent analysis of data from the Vaccine Safety Datalink, the rate of GBS within the first 21 days following J&J/Janssen COVID-19 vaccination was found to be 21 times higher than after Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). After the first 42 days, the rate of GBS was 11 times higher following J&J/Janssen COVID-19 vaccination. The analysis found no increased risk of GBS after Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). CDC and FDA will continue to monitor for and evaluate reports of GBS occurring after COVID-19 vaccination and will share more information as it becomes available.

- **Myocarditis and pericarditis after COVID-19 vaccination are rare.** Myocarditis is inflammation of the heart muscle, and pericarditis is inflammation of the outer lining of the heart. Most patients with myocarditis or pericarditis after COVID-19 vaccination responded well to medicine and rest and felt better quickly. Most cases have been reported after receiving Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines), particularly in male adolescents and young adults.

A review of vaccine safety data [↗](#) in VAERS from December 2020–August 2021 found a small but increased risk of myocarditis after mRNA COVID-19 vaccines. Over 350 million mRNA vaccines were given during the study period and CDC scientists found that rates of myocarditis were highest following the second dose of an mRNA

vaccine among males in the following age groups:

- 12–15 years (70.7 cases per one million doses of Pfizer-BioNTech)
- 16–17 years (105.9 cases per one million doses of Pfizer-BioNTech)
- 18–24 years (52.4 cases and 56.3 cases per million doses of Pfizer-BioNTech and Moderna, respectively)

Multiple studies and reviews of data from vaccine safety monitoring systems continue to show that vaccines are safe. As a result, the agency will refocus enhanced surveillance and safety monitoring efforts toward children and adolescents.

As of September 15, 2022, there have been 1,026 preliminary reports in VAERS among people younger than age 18 years under review for potential cases of myocarditis and pericarditis. Of these, 261 remain under review. Through confirmation of symptoms and diagnostics by provider interview or review of medical records, 674 reports have been verified to meet CDC's working case definition for myocarditis. See below for counts of verified reports of myocarditis by age group.

5-11 years: 22 verified reports of myocarditis after 21,288,828 doses administered

12-15 years: 350 verified reports of myocarditis after 24,409,126 doses administered

16-17 years: 302 verified reports of myocarditis after 13,377,606 doses administered

As the COVID-19 vaccines are authorized for younger children, CDC and FDA will continue to monitor for and evaluate reports of myocarditis and pericarditis after COVID-19 vaccination and will share more information as it becomes available. Learn more about myocarditis and pericarditis, including clinical considerations, after mRNA COVID-19 vaccination.

- **Reports of death after COVID-19 vaccination are rare.** FDA requires healthcare providers to report any death after COVID-19 vaccination to VAERS, even if it's unclear whether the vaccine was the cause. **Reports of adverse events to VAERS following vaccination, including deaths, do not necessarily mean that a vaccine caused a health problem.** More than 612 million doses of COVID-19 vaccines were administered in the United States from December 14, 2020, through September 14, 2022. During this time, VAERS received 16,516 preliminary reports of death (0.0027%) among people who received a COVID-19 vaccine. CDC and FDA clinicians review reports of death to VAERS including death certificates, autopsy, and medical records.

Continued monitoring has identified nine deaths causally associated with J&J/Janssen COVID-19 vaccination. CDC and FDA continue to review reports of death following COVID-19 vaccination and update information as it becomes available.

Related Pages

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- › [Vaccine Adverse Event Reporting System \(VAERS\): What Reports Mean and How VAERS Works](#)
- › [COVID-19 Vaccine Safety Publications](#)

Last Updated Sept. 19, 2022

Content source: National Center for Immunization
and Respiratory Diseases (NCIRD), Division of Viral
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Based on a recent analysis of data from the Vaccine Safety Datalink, the rate of GBS within the first 21 days following J&J/Janssen COVID-19 vaccination was found to be 21 times higher than after Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). After the first 42 days, the rate of GBS was 11 times higher following J&J/Janssen COVID-19 vaccination. The analysis found no increased risk of GBS after Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). CDC and FDA will continue to monitor for and evaluate reports of GBS occurring after COVID-19 vaccination and will share more information as it becomes available.

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vaccine among males in the following age groups:

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Multiple studies and reviews of data from vaccine safety monitoring systems continue to show that vaccines are safe. As a result, the agency will refocus enhanced surveillance and safety monitoring efforts toward children and adolescents.

As of September 22, 2022, there have been 1,028 preliminary reports in VAERS among people younger than age 18 years under review for potential cases of myocarditis and pericarditis. Of these, 257 remain under review. Through confirmation of symptoms and diagnostics by provider interview or review of medical records, 679 reports have been verified to meet CDC's working case definition for myocarditis. See below for counts of verified reports of myocarditis by age group.

5-11 years: 22 verified reports of myocarditis after 21,380,593 doses administered

12-15 years: 352 verified reports of myocarditis after 24,420,543 doses administered

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- **Reports of death after COVID-19 vaccination are rare.** FDA requires healthcare providers to report any death after COVID-19 vaccination to VAERS, even if it's unclear whether the vaccine was the cause. **Reports of adverse events to VAERS following vaccination, including deaths, do not necessarily mean that a vaccine caused a health problem.** More than 616 million doses of COVID-19 vaccines were administered in the United States from December 14, 2020, through September 21, 2022. During this time, VAERS received 16,595 preliminary reports of death (0.0027%) among people who received a COVID-19 vaccine. CDC and FDA clinicians review reports of death to VAERS including death certificates, autopsy, and medical records.

Continued monitoring has identified nine deaths causally associated with J&J/Janssen COVID-19 vaccination. CDC and FDA continue to review reports of death following COVID-19 vaccination and update information as it becomes available.

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Updated Oct. 3, 2022

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about COVID-19 vaccines and allergic reactions, including anaphylaxis.

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- **Thrombosis with thrombocytopenia syndrome (TTS) after J&J/Janssen**

COVID-19 vaccination is rare and has occurred in approximately 4 cases per one million doses administered. TTS is a rare but serious adverse event that causes blood clots in large blood vessels and low platelets (blood cells that help form clots).

A review of reports indicates a causal relationship between the J&J/Janssen COVID-19 vaccine and TTS. CDC scientists have conducted detailed reviews of TTS cases and made the information available to healthcare providers and the public:

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[1.3 MB, 39 Pages]

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A review of vaccine safety data [↗](#) in VAERS from December 2020–August 2021 found a small but increased risk of myocarditis after mRNA COVID-19 vaccines. Over 350 million mRNA vaccines were given during the study period and CDC scientists found that rates of myocarditis were highest following the second dose of an mRNA

vaccine among males in the following age groups:

- 12-15 years (70.7 cases per one million doses of Pfizer-BioNTech)
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Multiple studies and reviews of data from vaccine safety monitoring systems continue to show that vaccines are safe. As a result, the agency will refocus enhanced surveillance and safety monitoring efforts toward children and adolescents.

As of September 29, 2022, there have been 1,033 preliminary reports in VAERS among people younger than age 18 years under review for potential cases of myocarditis and pericarditis. Of these, 259 remain under review. Through confirmation of symptoms and diagnostics by provider interview or review of medical records, 682 reports have been verified to meet CDC's working case definition for myocarditis. See below for counts of verified reports of myocarditis by age group.

5-11 years: 22 verified reports of myocarditis after 21,449,601 doses administered

12-15 years: 354 verified reports of myocarditis after 24,428,076 doses administered

16-17 years: 306 verified reports of myocarditis after 13,392,341 doses administered

As the COVID-19 vaccines are authorized for younger children, CDC and FDA will continue to monitor for and evaluate reports of myocarditis and pericarditis after COVID-19 vaccination and will share more information as it becomes available. Learn more about myocarditis and pericarditis, including clinical considerations, after mRNA COVID-19 vaccination.

- **Reports of death after COVID-19 vaccination are rare.** FDA requires healthcare providers to report any death after COVID-19 vaccination to VAERS, even if it's unclear whether the vaccine was the cause. **Reports of adverse events to VAERS following vaccination, including deaths, do not necessarily mean that a vaccine caused a health problem.** More than 619 million doses of COVID-19 vaccines were administered in the United States from December 14, 2020, through September 28, 2022. During this time, VAERS received 16,727 preliminary reports of death (0.0027%) among people who received a COVID-19 vaccine. CDC and FDA clinicians review reports of death to VAERS including death certificates, autopsy, and medical records.

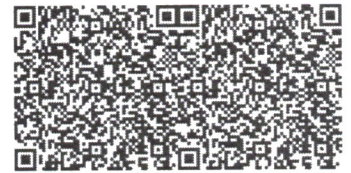
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Last Updated Oct. 3, 2022

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Updated Oct. 12, 2022

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- Updates on Thrombosis with Thrombocytopenia Syndrome (TTS) [📎](#)
[1.3 MB, 39 Pages]

- **Guillain-Barré Syndrome (GBS) in people who have received the J&J/Janssen**

COVID-19 vaccine is rare. GBS is a rare disorder where the body's immune system damages nerve cells, causing muscle weakness and sometimes paralysis. GBS has largely been reported in men ages 50 years and older.

Based on a recent analysis of data from the Vaccine Safety Datalink, the rate of GBS within the first 21 days following J&J/Janssen COVID-19 vaccination was found to be 21 times higher than after Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). After the first 42 days, the rate of GBS was 11 times higher following J&J/Janssen COVID-19 vaccination. The analysis found no increased risk of GBS after Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). CDC and FDA will continue to monitor for and evaluate reports of GBS occurring after COVID-19 vaccination and will share more information as it becomes available.

- **Myocarditis and pericarditis after COVID-19 vaccination are rare.**

Myocarditis is inflammation of the heart muscle, and pericarditis is inflammation of the outer lining of the heart. Most patients with myocarditis or pericarditis after COVID-19 vaccination responded well to medicine and rest and felt better quickly. Most cases have been reported after receiving Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines), particularly in male adolescents and young adults.

A review of vaccine safety data [↗](#) in VAERS from December 2020–August 2021 found a small but increased risk of myocarditis after mRNA COVID-19 vaccines. Over 350 million mRNA vaccines were given during the study period and CDC scientists found that rates of myocarditis were highest following the second dose of an mRNA

vaccine among males in the following age groups:

- 12–15 years (70.7 cases per one million doses of Pfizer-BioNTech)
- 16–17 years (105.9 cases per one million doses of Pfizer-BioNTech)
- 18–24 years (52.4 cases and 56.3 cases per million doses of Pfizer-BioNTech and Moderna, respectively)

Multiple studies and reviews of data from vaccine safety monitoring systems continue to show that vaccines are safe. As a result, the agency will refocus enhanced surveillance and safety monitoring efforts toward children and adolescents.

As of October 13, 2022, there have been 1,033 preliminary reports in VAERS among people younger than age 18 years under review for potential cases of myocarditis and pericarditis. Of these, 255 remain under review. Through confirmation of symptoms and diagnostics by provider interview or review of medical records, 685 reports have been verified to meet CDC’s working case definition for myocarditis. See below for counts of verified reports of myocarditis by age group.

5-11 years: 22 verified reports of myocarditis after 21,576,826 doses administered

12-15 years: 355 verified reports of myocarditis after 24,463,521 doses administered

16-17 years: 308 verified reports of myocarditis after 13,418,594 doses administered

As the COVID-19 vaccines are authorized for younger children, CDC and FDA will continue to monitor for and evaluate reports of myocarditis and pericarditis after COVID-19 vaccination and will share more information as it becomes available. Learn more about myocarditis and pericarditis, including clinical considerations, after mRNA COVID-19 vaccination.

- **Reports of death after COVID-19 vaccination are rare.** FDA requires healthcare providers to report any death after COVID-19 vaccination to VAERS, even if it’s unclear whether the vaccine was the cause. **Reports of adverse events to VAERS following vaccination, including deaths, do not necessarily mean that a vaccine caused a health problem.** More than 627 million doses of COVID-19 vaccines were administered in the United States from December 14, 2020, through October 12, 2022. During this time, VAERS received 16,888 preliminary reports of death (0.0027%) among people who received a COVID-19 vaccine. CDC and FDA clinicians review reports of death to VAERS including death certificates, autopsy, and medical records.

Related Pages

- › Safety of COVID-19 Vaccines
- › Vaccine Adverse Event Reporting System (VAERS): What Reports Mean and How VAERS Works
- › COVID-19 Vaccine Safety Publications

Last Updated Oct. 17, 2022

Source: National Center for Immunization and Respiratory Diseases
(NCIRD), Division of Viral Diseases



COVID-19

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Selected Adverse Events Reported after COVID-19 Vaccination

Updated Oct. 24, 2022

Safety of COVID-19 Vaccines

Some people have no side effects. Many people have reported side effects, such as headache, fatigue, and soreness at the injection site, that are generally mild to moderate and go away within a few days.

What You Need to Know

- COVID-19 vaccines are **safe and effective and severe reactions after vaccination are rare.**
- CDC recommends everyone ages 5 years and older get vaccinated as soon as possible to protect against COVID-19 and its potentially severe complications.
- Although mRNA vaccines (Pfizer-BioNTech or Moderna COVID-19 vaccines) are preferred, Johnson & Johnson's Janssen COVID-19 vaccine may be considered in some situations.
- Millions of people in the United States have received COVID-19 vaccines under the most intense safety monitoring program in U.S. history.
- CDC, the U.S. Food and Drug Administration (FDA), and other federal agencies continue to monitor the safety of COVID-19 vaccines.
- Adverse events described on this page have been reported to the Vaccine Adverse Event Reporting System (VAERS) [↗](#).
- VAERS accepts reports of any adverse event following vaccination.

The benefits of COVID-19 vaccination continue to outweigh any potential risks.

CDC is providing timely updates on the following adverse events of interest:

- **Anaphylaxis after COVID-19 vaccination is rare** and has occurred at a rate of approximately 5 cases per one million vaccine doses administered. Anaphylaxis, a severe type of allergic reaction, can occur after any kind of vaccination. If it happens, healthcare providers can effectively and immediately treat the reaction. Learn more about COVID-19 vaccines and allergic reactions, including anaphylaxis.

CDC scientists have conducted detailed reviews of cases of anaphylaxis and made the information available to healthcare providers and the public:

- Allergic Reactions Including Anaphylaxis After Receipt of the First Dose of Pfizer-BioNTech COVID-19 Vaccine [↗](#)
- Reports of Anaphylaxis After Receipt of mRNA COVID-19 Vaccines in the US —December 14, 2020-January 18, 2021 [↗](#)
- Allergic Reactions Including Anaphylaxis After Receipt of the First Dose of Moderna COVID-19 Vaccine— United States, December 21, 2020-January 10, 2021
- Allergic Reactions Including Anaphylaxis After Receipt of the First Dose of Pfizer-BioNTech COVID-19 Vaccine — United States, December 14-23, 2020

- **Thrombosis with thrombocytopenia syndrome (TTS) after J&J/Janssen COVID-19 vaccination is rare** and has occurred in approximately 4 cases per one million doses administered. TTS is a rare but serious adverse event that causes blood clots in large blood vessels and low platelets (blood cells that help form clots).

A review of reports indicates a causal relationship between the J&J/Janssen COVID-19 vaccine and TTS. CDC scientists have conducted detailed reviews of TTS cases and made the information available to healthcare providers and the public:

- US Case Reports of Cerebral Venous Sinus Thrombosis With Thrombocytopenia After Ad26.COV2.S Vaccination, March 2 to April 21, 2021 [↗](#)
- [Case Series of Thrombosis with Thrombocytopenia Syndrome following COVID-19 vaccination—United States, December 2020–August 2021](#) [↗](#)
- Updates on Thrombosis with Thrombocytopenia Syndrome (TTS) [📄](#)
[1.3 MB, 39 Pages]

- **Guillain-Barré Syndrome (GBS) in people who have received the J&J/Janssen COVID-19 vaccine is rare.** GBS is a rare disorder where the body's immune system damages nerve cells, causing muscle weakness and sometimes paralysis. GBS has largely been reported in men ages 50 years and older.

Based on a recent analysis of data from the Vaccine Safety Datalink, the rate of GBS within the first 21 days following J&J/Janssen COVID-19 vaccination was found to be 21 times higher than after Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). After the first 42 days, the rate of GBS was 11 times higher following J&J/Janssen COVID-19 vaccination. The analysis found no increased risk of GBS after Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). CDC and FDA will continue to monitor for and evaluate reports of GBS occurring after COVID-19 vaccination and will share more information as it becomes available.

- **Myocarditis and pericarditis after COVID-19 vaccination are rare.**

Myocarditis is inflammation of the heart muscle, and pericarditis is inflammation of the outer lining of the heart. Most patients with myocarditis or pericarditis after COVID-19 vaccination responded well to medicine and rest and felt better quickly. Most cases have been reported after receiving Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines), particularly in male adolescents and young adults.

A review of vaccine safety data [in VAERS](#) from December 2020–August 2021 found a small but increased risk of myocarditis after mRNA COVID-19 vaccines. Over 350 million mRNA vaccines were given during the study period and CDC scientists found that rates of myocarditis were highest following the second dose of an mRNA vaccine among males in the following age groups:

- 12–15 years (70.7 cases per one million doses of Pfizer-BioNTech)
- 16–17 years (105.9 cases per one million doses of Pfizer-BioNTech)
- 18–24 years (52.4 cases and 56.3 cases per million doses of Pfizer-BioNTech and Moderna, respectively)

Multiple studies and reviews of data from vaccine safety monitoring systems continue to show that vaccines are safe. As a result, the agency will refocus enhanced surveillance and safety monitoring efforts toward children and adolescents.

As of October 20, 2022, there have been 1,036 preliminary reports in VAERS among people younger than age 18 years under review for potential cases of myocarditis and pericarditis. Of these, 253 remain under review. Through confirmation of symptoms and diagnostics by provider interview or review of medical records, 687 reports have been verified to meet CDC’s working case definition for myocarditis. See below for counts of verified reports of myocarditis by age group.

5-11 years: 22 verified reports of myocarditis after 21,638,046 doses administered

12-15 years: 357 verified reports of myocarditis after 24,480,644 doses administered

16-17 years: 308 verified reports of myocarditis after 13,429,039 doses administered

As the COVID-19 vaccines are authorized for younger children, CDC and FDA will continue to monitor for and evaluate reports of myocarditis and pericarditis after COVID-19 vaccination and will share more information as it becomes available. Learn more about myocarditis and pericarditis, including clinical considerations, after mRNA COVID-19 vaccination.

- **Reports of death after COVID-19 vaccination are rare.** FDA requires healthcare providers to report any death after COVID-19 vaccination to VAERS, even if it’s unclear whether the vaccine was the cause. **Reports of adverse events to VAERS following vaccination, including deaths, do not necessarily mean that a vaccine caused a health problem.** More than 632 million doses of COVID-19 vaccines were administered in the United States from December 14, 2020, through October 19, 2022. During this time, VAERS received 16,990 preliminary reports of death (0.0027%) among people who received a COVID-19 vaccine. CDC and FDA clinicians review reports of death to VAERS

including death certificates, autopsy, and medical records. Continued monitoring has identified nine deaths causally associated with J&J/Janssen COVID-19 vaccination. CDC and FDA continue to review reports of death following COVID-19 vaccination and update information as it becomes available.

Related Pages

- › [Safety of COVID-19 Vaccines](#)
- › [Vaccine Adverse Event Reporting System \(VAERS\): What Reports Mean and How VAERS Works](#)
- › [COVID-19 Vaccine Safety Publications](#)

Last Updated Oct. 24, 2022

Source: National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases