COVID-19 Vaccines in People with Cancer

On this page

- Is it safe for people with cancer to get the COVID-19 vaccine?
- Which COVID-19 vaccines are available?
- Should cancer patients and survivors get the COVID-19 vaccine?
- Should people with cancer get a specific COVID-19 vaccine?
- Recommended COVID-19 vaccine schedules
- What are the side effects of the COVID-19 vaccines?
- Can COVID-19 vaccines cause cancer or make cancer grow?
- Do I still need to take precautions if I get the COVID-19 vaccine?
- What if I have breast cancer or a history of breast cancer?
- Could the vaccine cause issues if I am getting a mammogram?
- What if a stem cell transplant or CAR T-cell therapy is or was part of my cancer treatment?
- Should cancer caregivers and close contacts get the vaccine?
- Should I get the flu vaccine as well as the COVID-19 vaccine?
- Where can I get more information about COVID-19 vaccines?

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, continues to have a serious impact on many people, including people with cancer, their families, and caregivers. (To learn more about COVID-19 and how it might affect cancer patients and caregivers, see Questions About COVID-19 and Cancer.)

Vaccines (also called immunizations or vaccinations) are available to help protect against COVID-19. Here we'll discuss some of the questions people with cancer (or with a history of cancer) or the people caring for them might have about the COVID-19
vaccines.

The American Cancer Society (ACS) supports the National Comprehensive Cancer Network (NCCN)* recommendation that all people with cancer should be fully vaccinated against COVID-19. Since the situation for every person is different, it is best to discuss the benefits and possible risks of getting the COVID-19 vaccine with your cancer doctor, who can advise you.

(*The NCCN is an alliance of many of the nation’s leading cancer centers that provides detailed guidelines on cancer treatment and cancer care.)

**Is it safe for people with cancer to get the COVID-19 vaccine?**

People with cancer (or with a history of cancer) can get the COVID-19 vaccine safely. However, the vaccine might be less effective in some people with cancer. (See “Should cancer patients and survivors get the vaccine?”)

There are some other types of vaccines that might not be safe for some people with cancer, but this depends on many factors, such as the type of vaccine, the type of cancer a person has (had), if they’re still being treated for cancer, and if their immune system is working properly. Because of this, **it’s best to talk with your doctor before getting any type of vaccine.** To learn more, see Vaccinations and Flu Shots for People with Cancer.

**Which COVID-19 vaccines are available?**

Four COVID-19 vaccines are available in the US.

Two of the vaccines are approved by the US Food and Drug Administration (FDA):

- The Pfizer-BioNTech vaccine (Comirnaty) is approved by the FDA for people 12 years of age or older.
- The Moderna vaccine (Spikevax) is approved by the FDA for people 18 years of age or older.

In addition, some COVID-19 vaccines have received emergency use authorization (EUA) from the FDA for the ages below:

- The Pfizer-BioNTech vaccine is authorized for people 6 months of age or older.
- The Moderna vaccine is authorized for people 6 months of age or older.
The **Novavax vaccine** is authorized for people 12 years of age and older.

The **Johnson & Johnson (Janssen) vaccine** is authorized for people 18 years of age and older who can’t get or don’t want to get one of the other COVID-19 vaccines.


All of these vaccines have been found to lower the risk of being infected with COVID-19. They have also been shown to be very good at lowering the risk of getting very sick, being hospitalized, or dying from COVID-19 if you are infected. But no vaccine is 100% effective, so some people who are fully vaccinated might still become infected with COVID-19 and get sick. This is called a **breakthrough infection**.

The US Centers for Disease Control and Prevention (CDC) has different recommended dosing schedules for the COVID-19 vaccines, based on the type of vaccine, a person’s age, and whether or not they have a weakened immune system. To learn more, see “Recommended COVID-19 vaccine schedules” below.

**How do these vaccines work?**

The **Pfizer-BioNTech and Moderna vaccines** contain messenger RNA (mRNA), which is a type of genetic material. After a person gets the vaccine, the mRNA enters cells in the body and tells them to make copies of the COVID-19 virus’s “spike” protein (the protein that normally helps the virus infect human cells). This doesn’t cause disease, but it does help teach the immune system to recognize and attack the virus if the body is exposed to it in the future.

The **Johnson & Johnson (Janssen) vaccine** contains an adenovirus (a type of virus that is different from the coronavirus that causes COVID-19), which has been changed in the lab so that it contains the gene (piece of DNA) for the COVID-19 virus’s spike protein. Once the adenovirus enters cells in the body, this gene tells the cells to make copies of the spike protein. This triggers the immune system to recognize and attack the COVID-19 virus if the body is exposed to it in the future. The adenovirus in this vaccine is not a live virus because it has been changed so that it can no longer reproduce in the body (nor can it cause disease).

The **Novavax vaccine** is a protein subunit vaccine, which works much like traditional vaccines that have been used for decades. It contains pieces of the COVID-19 virus’s spike protein. Once injected into the body, the pieces of protein are recognized by the
immune system as foreign. This teaches your immune system to attack the COVID-19 virus if it is exposed to it in the future.

**You cannot get COVID-19 from any of these vaccines**, as they do not contain the virus that causes COVID-19.

Some vaccines for other diseases contain changed versions of the live viruses that cause the diseases. These live viruses don’t cause problems in people with normal immune systems. But they might not be safe for people with weakened immune systems, so live virus vaccines typically are not recommended for many people with cancer. However, the COVID-19 vaccines available in the US do not contain these types of live viruses.

For more on these vaccines, see “Should people with cancer get a specific COVID-19 vaccine?”

**What is the difference between FDA approval and emergency use authorization (EUA)?**

If a vaccine is approved by the FDA, it means that the information on the vaccine and its effects has been thoroughly reviewed, and the FDA has determined that the benefits outweigh the known and possible risks for the people it is meant to help.

In an EUA, the FDA allows the use of a vaccine or drug during a time of emergency, such as the COVID-19 pandemic, when the available evidence shows the potential benefits outweigh the potential risks. Drugs and vaccines that have been given an EUA continue to be studied in clinical trials. An EUA is not the same as a full FDA approval, which requires a more thorough review of safety and effectiveness.

Even after a drug or vaccine has been approved, the FDA will continue to monitor it for unexpected side effects or for more information that might be helpful to know.

**Should cancer patients and survivors get the COVID-19 vaccine?**

The ACS supports the NCCN recommendation that all people with cancer should be fully vaccinated as soon as they can with the COVID-19 primary vaccine series, plus additional booster doses.

**Even if you've already had COVID-19**, it’s still important to be vaccinated. While being infected with COVID-19 might offer some immunity, people can still be infected again. What’s more, a person’s immunity to COVID-19 can weaken over time, and it
might not be as helpful against newer variants of the virus that continue to emerge. This is why staying up to date with the latest COVID-19 vaccines and boosters is important.

While the COVID-19 vaccines are safe for people with cancer, they might not be as protective as they are in people without cancer, especially for those with weakened immune systems. Some cancer treatments like chemotherapy (chemo), radiation, stem cell or bone marrow transplant, or immunotherapy can affect the immune system, which might make the vaccine less effective. People with certain types of cancers, like leukemias or lymphomas, can also have weakened immune systems which might make the vaccine less effective.

Because of this, there are different vaccine schedule recommendations for people with weakened immune systems. To learn more, see “Recommended COVID-19 vaccine schedules.”

Since the situation for every person is different, it’s best to discuss the benefits, possible risks, and timing of the COVID-19 vaccines with your cancer doctor.

Should people with cancer get a specific COVID-19 vaccine?

As mentioned in “Which COVID-19 vaccines are available?”, the Pfizer-BioNTech and Moderna vaccines are mRNA vaccines, the Johnson & Johnson (Janssen) vaccine is an adenovirus vaccine, and the Novavax vaccine is a protein subunit vaccine. Another difference between these vaccines is the schedule on which they’re given (see “Recommended COVID-19 vaccine schedules).

All of these vaccines have been shown to lower the risk of getting COVID-19, as well as the risk of getting very sick, being hospitalized, or dying if you are infected.

At this time, the CDC prefers that the Johnson & Johnson (Janssen) vaccine be used only by people aged 18 or older who can’t get or don’t want to get one of the other COVID-19 vaccines. The CDC stresses that getting any COVID-19 vaccine, including the Johnson & Johnson vaccine, is better than being unvaccinated.

As new information about the different COVID-19 vaccines becomes available, it’s possible that the guidance about the different vaccines might change. For this reason, it’s important to talk with your cancer doctor about getting the vaccine.

Recommended COVID-19 vaccine schedules

The CDC has different COVID-19 vaccine recommendations based on if a person has a
weakened immune system. The vaccine schedules include an initial series of shots, often along with booster doses later on, which can help keep the immune system ready to fight off the virus.

The CDC recommends that people get vaccinated and stay up to date with booster doses regardless of whether they’ve been infected with COVID-19 in the past. (See “Should cancer patients and survivors get the COVID-19 vaccine?”)

Some people with cancer (or who have had cancer) might have a weakened immune system, while others might not. Because of this, it's important to talk with your health care provider about which schedule below is right for you.

COVID vaccine schedules for most people

For people who do not have a weakened immune system, the CDC recommends the following vaccine schedules, based on a person’s age:

For people 6 months to 4 years old

- The Moderna vaccine, followed 4-8 weeks later by a second dose, then followed at least 2 months later by a bivalent Moderna booster dose**, OR
- The Pfizer-BioNTech vaccine, followed 3-8 weeks later by a second dose, then followed at least 8 weeks later by a dose of the bivalent Pfizer-BioNTech vaccine**

For people 5 to 11 years old

- The Moderna vaccine, followed 4-8 weeks later by a second dose, then followed at least 2 months later by a bivalent booster dose**, OR
- The Pfizer-BioNTech vaccine, followed 3-8 weeks later by a second dose, then followed at least 2 months later by a bivalent booster dose**

For people 12 years of age or older

- The Moderna, Novavax, or Pfizer-BioNTech vaccine, followed 3-8 weeks later (for Novavax or Pfizer) or 4-8 weeks later (for Moderna) by a second dose, then followed at least 2 months later by a bivalent booster dose**
- For people 18 years of age and older who first received a single shot of the Johnson & Johnson (Janssen) vaccine, a bivalent booster dose** at least 2 months later
**As of late 2022, updated bivalent vaccines are available. These vaccines, which are given mainly as boosters, are made by both Moderna and Pfizer-BioNTech. They target both the original strain of the virus and the newer omicron variants, so they should provide better protection against the omicron variants (which now account for nearly all COVID-19 cases in the US). Many people might have already gotten one or more doses of one of the original (monovalent) boosters. Bivalent booster doses should be given at least 2 months after the last shot a person got (whether it was part of the initial vaccine series or a booster dose).

COVID vaccine schedules for people with a weakened immune system

The COVID-19 vaccines might not be as effective in people with weakened immune systems. This includes, for example, people who:

- Are getting active cancer treatment (either for solid tumors or cancers of the blood) or have received cancer treatment in the past year
- Have blood cancers but are not getting active cancer treatment
- Received a stem cell transplant or CAR T-cell therapy within the last 2 years or are taking medicine to suppress the immune system
- Are getting active treatment with high-dose corticosteroids or other drugs that may suppress the immune response

Vaccines are still recommended for people with weakened immune systems, because these people are at higher risk for getting very sick from COVID-19, and because getting even some protection from the vaccine is better than having none.

For people who have a moderately or severely weakened immune system, the CDC recommends the following vaccine schedules, based on a person’s age:

**For people 6 months to 4 years old**

- The Moderna vaccine, followed 4 weeks later by a second dose, then followed at least 4 weeks later by a third dose, then followed at least 2 months later by a bivalent Moderna booster dose**, OR
- The Pfizer-BioNTech vaccine, followed 3 weeks later by a second dose, then followed at least 8 weeks later by a dose of the bivalent Pfizer-BioNTech vaccine**

**For people 5 to 11 years old**
• The Moderna vaccine, followed 4 weeks later by a second dose, followed at least 4 weeks later by a third dose, then followed at least 2 months later by a bivalent booster dose**, OR
• The Pfizer-BioNTech vaccine, followed 3 weeks later by a second dose, followed at least 4 weeks later by a third dose, then followed at least 2 months later by a bivalent booster dose**

For people 12 years of age or older

• The Moderna or Pfizer-BioNTech vaccine, followed 3-8 weeks later (for Pfizer) or 4 weeks later (for Moderna) by a second dose, followed at least 4 weeks later by a third dose, then followed at least 2 months later by a bivalent booster dose**, OR
• The Novavax vaccine, followed 3 weeks later by a second dose, then followed at least 2 months later by a bivalent booster dose**
• For people 18 years of age and older who first received a single shot of the Johnson & Johnson (Janssen) vaccine, a dose of an mRNA vaccine (Moderna or Pfizer-BioNTech) at least 4 weeks later, followed by a bivalent booster dose** at least 2 months later

**As of late 2022, updated bivalent vaccines are available. These vaccines, which are given mainly as boosters, are made by both Moderna and Pfizer-BioNTech. They target both the original strain of the virus and the newer omicron variants, so they should provide better protection against the omicron variants (which now account for nearly all COVID-19 cases in the US). Many people might have already gotten one or more doses of one of the original (monovalent) boosters. Bivalent booster doses should be given at least 2 months after the last shot a person got (whether it was part of the initial vaccine series or a booster dose).

For more information about the recommended COVID-19 vaccine schedules, visit the CDC website at https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html19.

Other medicines to lower your risk

For people 12 years of age and older with moderately to severely weakened immune systems, a medicine known as Evusheld, which combines the monoclonal antibodies tixagevimab and cilgavimab, can also help lower the risk of COVID-19 infection. (This is known as pre-exposure prevention.) This is not a COVID-19 vaccine, but it might be helpful for certain people. For more on this medicine, see “How can I lower my risk of
getting COVID-19 (or getting very sick from it)?” in Questions About COVID-19 and Cancer \(^\text{20}\).

**Talk to your cancer care team about the best vaccine schedule for you**

COVID-19 vaccines are recommended for people with cancer. But if you’re being treated for cancer, there might be times when it makes sense to postpone getting a dose of vaccine for a while, such as if the treatment will severely weaken your immune system. Some cancer treatments might even wipe out your immune system for a while, which might mean you need to get revaccinated later on.

It’s important to talk to your doctor about your immune status and if it could affect the best time for you to get the vaccine (and booster shots), as well as what else you can do to help lower your risk of COVID-19 infection.

**What are the side effects of the COVID-19 vaccines?**

Common side effects that have been reported after getting the vaccines include:

- Pain, redness, or swelling at the injection site
- Feeling tired
- Headache
- Fever
- Chills
- Muscle and joint pain
- Nausea

The side effects might be a little stronger after the second shot (or later shots) compared to what you might have had after the first injection.

In general, the side effects tend to go away within a few days.

**Swollen/tender lymph nodes**

Some people might have swelling or tenderness of the lymph nodes under the arm in which they got the injection. This is often a normal response by the body’s immune system, which is getting ready to fight a future COVID-19 infection.

A swollen lymph node under the arm might cause concern, since this can also be a sign of breast cancer (as well as some other cancers - see below). The time it takes for the
lymph nodes to shrink back down after the vaccine may be a few days to a few weeks. If you notice swollen or tender lymph nodes that do not go away after a few weeks (or if they continue to get bigger), contact your doctor to discuss the next steps.

**Screening mammograms:** See “Could the vaccine cause issues if I’m getting a mammogram?” for more information about COVID-19 vaccines and mammograms.

For those who have breast cancer or a history of breast cancer: See “What if I have breast cancer or a history of breast cancer?” for more information about which arm to consider getting the injection in.

For those with any type of cancer or a history of cancer: Many types of cancer can spread to nearby lymph nodes (and some types of cancer can start in the lymph nodes). This can cause the nodes to become enlarged. Because the COVID vaccines can also cause lymph nodes to become enlarged, it’s important to talk to your health care team if you are scheduled to get an imaging test (such as an MRI or CT scan) in the weeks after getting a COVID vaccine. In some cases, your doctors might advise that you delay the imaging test if possible, so that any swollen lymph nodes that result from the vaccine aren’t confused for cancer. If you do have a scan done soon after getting the vaccine, it’s important to make sure that your health care team is aware you got the vaccine, so they can take this into account when looking at the scans.

**Serious and long-term side effects of COVID-19 vaccines**

A few uncommon but possibly serious safety concerns have been reported for the vaccines so far.

**Allergic reactions to the vaccine**

In very rare cases, people have had serious allergic reactions after getting one of the vaccines. This seems to be more likely in people who have had serious allergic reactions before.

**Blood clots**

Very rarely, people who have received the Johnson & Johnson (Janssen) vaccine have developed serious blood clots in the brain, lungs, abdomen (belly), legs, or other parts of the body, along with low blood platelet counts. (Platelets are cells that normally help in blood clotting.)

The FDA and the CDC have reviewed the data on these incidents and have determined
that the vaccine’s known and potential benefits outweigh its known and potential risks in people 18 years of age and older. However, because of the increased risk of blood clots, the FDA has limited the authorization of this vaccine to people who can’t get or don’t want to get one of the other COVID vaccines.

The FDA and CDC recommend that you contact your health care provider right away if you have possible symptoms of a blood clot, such as a severe or constant headache, blurred vision, seizures, abdominal (belly) pain, leg pain or swelling, chest pain, or shortness of breath. You should also contact your health care provider if you have symptoms that might be from a low platelet count, such as new or easy bruising, or tiny purple or red spots on the skin that might look like a rash.

**Inflammation of the heart**

A small proportion of people who have received the mRNA vaccines (Pfizer-BioNTech and Moderna) or the Novavax vaccine have developed myocarditis (inflammation of the heart muscle) or pericarditis (inflammation of the lining outside of the heart).

In most cases, the symptoms started a few days after the second vaccine dose and were more likely to happen in adolescents and young adults.

If you have received any of these vaccines and start to have chest pain, shortness of breath, or feelings of having a fast-beating, fluttering, or pounding heart, the FDA and CDC recommend getting medical attention right away.

**Guillain-Barré Syndrome (GBS)**

GBS has occurred in a very small portion of people who have received the Johnson & Johnson (Janssen) vaccine. In this syndrome, the body’s immune system damages parts of the nervous system.

In most people, symptoms of GBS begin within 6 weeks after getting the vaccine. They can include:

- Weakness or tingling, especially in the legs or arms, that gets worse and/or spreads to other parts of the body
- Trouble walking
- Trouble with facial movements, including speaking, chewing, or swallowing
- Double vision or having trouble moving the eyes
- Problems with bladder control or bowel function
The FDA advises you to get medical attention right away if you develop any of these symptoms after getting the Janssen vaccine.


All of these COVID-19 vaccines are still fairly new, so possible long-term side effects are still being studied, and it’s possible that the guidance about the different vaccines might change. If you have concerns about getting one of these COVID-19 vaccines, it’s important to talk with your doctor.

**Can COVID-19 vaccines cause cancer or make cancer grow?**

There is no information that suggests that COVID-19 vaccines cause cancer. There is also no information that suggests these vaccines can make cancer grow or recur (come back).

**Do I still need to take precautions if I get the COVID-19 vaccine?**

The COVID-19 vaccines are still being studied, as there are things we don’t yet know about them. For example, researchers are still trying to determine how long the COVID-19 vaccines will help protect against the virus. And while the vaccines can clearly lower the risk of getting very sick from COVID, it’s not yet clear how well they can prevent the spread of the virus to others.

For people with cancer who are vaccinated, the NCCN still recommends wearing a mask, social distancing, washing your hands, avoiding crowds, and other preventive measures. Close contacts and caregivers should do this as well (see “Should cancer caregivers and close contacts get the vaccine?”).

**What if I have breast cancer or a history of breast cancer?**

Some people who get a COVID-19 vaccine might have swollen lymph nodes under the arm in which the injection was given (see “What are the side effects of the vaccines?” above). Because a swollen lymph node under the arm can also be a sign of breast cancer spread, most doctors recommend that people with breast cancer or a history of breast cancer get the injection in the arm on the opposite side of your breast cancer. For example, if your breast cancer/breast surgery was in the left breast, it is probably best to get the injection in the right arm. If you have had surgery on both breasts, it’s
best to talk with your doctor about the best place on your body to get the injection.

Swollen lymph nodes after a vaccine injection might also affect your mammogram results. (See next question.)

**Could the vaccine cause issues if I am getting a mammogram?**

Getting a COVID-19 vaccine might result in swollen lymph nodes under the arm in which the injection was given. (See “What are the side effects of the vaccines?” above.)

Swollen lymph nodes under the arm might show up on a mammogram done to screen for breast cancer, which could cause concern and might lead to the need for further tests.

If you’re scheduled for a mammogram soon after you get a COVID-19 vaccine, it’s important to tell your doctor when and in which arm you received the injection. Based on your situation, they can discuss with you if you should change your mammogram appointment. **Do not delay your mammogram without speaking to your doctor first.**

**What if a stem cell transplant or CAR T-cell therapy is or was part of my cancer treatment?**

*Stem cell transplants* and *CAR T-cell therapy* are types of cancer treatment that can have major effects on the body’s immune system. This can increase your risk of serious infections (including from COVID-19).

If you’ve **already received one of these cancer treatments** in the past, the NCCN recommends getting the COVID-19 vaccine, including booster doses. NCCN also recommends waiting at least 3 months after these cancer treatments before getting the vaccine, to give your body’s immune system a chance to recover.

If you’ve already gotten the COVID-19 vaccine and **are now getting (or are going to get) one of these cancer treatments**, the NCCN recommends getting *revaccinated*, including booster doses, at least 3 months after treatment. This is because your immune system needs to relearn how to protect your body against COVID-19.

If you’re getting (or have gotten) one of these cancer treatments, it’s important to talk to your doctor about your immune status, when you should get the vaccine, as well as what else you can do to help lower your risk of infection.
Should cancer caregivers and close contacts get the vaccine?

Yes. In fact, getting the vaccine can help lower the risk that the person you’re caring for might get COVID-19.

Some vaccines for other diseases contain changed versions of the live viruses that cause the diseases. These types of live virus vaccines typically are not recommended for cancer caregivers because they might have unwanted effects on cancer patients. However, the COVID-19 vaccines do not contain these types of live viruses, so getting one of these vaccines does not put you at risk for passing COVID-19 on to the person you’re caring for.

For caregivers or close contacts who are vaccinated, the NCCN still recommends wearing a mask, social distancing, washing your hands, avoiding crowds, and other preventive measures.

People getting the vaccine might not feel well for a few days after each shot, so it might make sense to have someone else available to help with caregiving during this time.

Should I get the flu vaccine as well as the COVID-19 vaccine?

COVID-19 and influenza (the flu) are caused by different viruses, so getting a vaccine against one of these diseases will NOT protect against the other. It’s very important for people with cancer to talk to their doctor about the benefits and risks of getting both the COVID-19 vaccine and the flu shot.

The flu and COVID-19 are both caused by viruses that can spread easily and can cause serious illness in older people, those with weakened immune systems, and others with certain medical conditions. These infections share many of the same symptoms, so it can be hard to tell which one you might have without having specific tests.

People who live with or care for someone at high risk of getting the flu should also get the flu vaccine.

For more on getting both the COVID-19 vaccine and the flu vaccine, visit the CDC website at https://www.cdc.gov/flu/season/faq-flu-season-2022-2023.htm.

Where can I get more information about COVID-19 vaccines?

The CDC and FDA have more information about COVID-19 vaccines, including the different types of vaccines and the known possible risks and benefits of each one.
- US Centers for Disease Control and Prevention (CDC)\textsuperscript{25}
- US Food and Drug Administration (FDA)\textsuperscript{26}

To find COVID-19 vaccines and boosters near you, visit https://www.vaccines.gov\textsuperscript{27}.

Hyperlinks

3. [www.nccn.org/covid-19](http://www.nccn.org/covid-19)
8. [www.fda.gov/drugs/development-approval-process-drugs#text=FDA\%20approval\%20of\%20a\%20drug\%20means\%20that\%20data,takes\%20place\%20within\%20a\%20structured\%20framework\%20that\%20includes%3A](http://www.fda.gov/drugs/development-approval-process-drugs#text=FDA%20approval%20of%20a%20drug%20means%20that%20data,takes%20place%20within%20a%20structured%20framework%20that%20includes%3A)
10. [www.fda.gov/drugs/guidance-compliance- regulatory-information/surveillance](http://www.fda.gov/drugs/guidance-compliance-regulatory-information/surveillance)
27. www.vaccines.gov

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