COVID-19 Vaccines in People with Cancer

COVID-19[1], caused by the SARS-CoV-2 virus, continues to have an impact on many people, including people with cancer, their families, and caregivers. (To learn more about COVID-19 and how it might affect people with cancer and their caregivers, see Questions About COVID-19 and Cancer[2].)

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.

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[3].

Which COVID-19 vaccines are available?

Three COVID-19 vaccines are available in the US.* These vaccines have been approved or have received emergency use authorization (EUA)[4] from the FDA for the ages below:

- The **Pfizer-BioNTech vaccine** is authorized for people 6 months to 11 years of age, and is approved (under the brand name Comirnaty) for people aged 12 or older.
- The **Moderna vaccine** is authorized for people 6 months to 11 years of age, and is approved (under the brand name Spikevax) for people aged 12 or older.
- The **Novavax vaccine** is authorized for people 12 years of age and older.

*A fourth vaccine, made by **Johnson & Johnson (Janssen)**, is no longer available in the US.

To learn more about these vaccines, visit the FDA’s website at https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines[5].

All of these vaccines can lower the risk of being infected with COVID-19, as well as lower 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

recommendations 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 "Recommendations for getting the COVID-19 vaccines" 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 **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.

Updated versions of all 3 of these vaccines are available as of October 2023. These vaccines target the newer omicron variants of the COVID-19 virus. (For more details, see "Should people with cancer get a specific COVID-19 vaccine?")

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)?

When a vaccine is approved by the FDA[6], 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[7], 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[8] 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 CDC and other expert groups generally recommend that all people, including people with cancer and cancer survivors, stay up to date with the most recent COVID-19 vaccines.

Even if you've already had COVID-19, it's still important to be vaccinated. While being infected with COVID-19 offers 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 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)[9], radiation[10], stem cell or bone marrow transplant[11], or immunotherapy[12] can affect the immune system, which might make the vaccine less effective. People with certain types of cancers, like leukemias[13] or lymphomas[14], can also have weakened immune systems, which might make the vaccine less effective.

Because of this, there are different vaccine recommendations for people with weakened immune systems. To learn more, see "Recommendations for getting the COVID-19 vaccines."

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?", a major difference

between these vaccines is that the Pfizer-BioNTech and Moderna vaccines are mRNA vaccines, and the Novavax vaccine is a protein subunit vaccine.

The current versions of all 3 of these vaccines have been updated to help boost the body's immune response against the newer omicron variants, which now account for the vast majority of COVID infections in the US.

The **CDC** recommends that people (regardless of their immune system status) stay up to date with COVID-19 vaccines, which includes getting one of the **updated (2023-2024) vaccines**. The CDC doesn't recommend one vaccine over another. The updated Pfizer-BioNTech and Moderna mRNA vaccines are available for people aged 6 months or older, while the updated Novavax vaccine is available for people 12 and older.

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

Recommendations for getting the COVID-19 vaccines

The CDC has different COVID-19 vaccine recommendations based on if a person has a weakened immune system. 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 set of recommendations below is right for you**.

The CDC recommendations are also based on a person's age, as well as which COVID vaccines they've had in the past (if any).

These recommendations have evolved over time. Part of the reason for this is that most people in the US are now likely to have at least some immunity from COVID-19, either from getting the vaccine or from being infected with COVID-19 in the past (or both). It's also because **updated (2023-2024) versions** of all 3 vaccines – the Pfizer-BioNTech and Moderna mRNA vaccines, and the Novavax protein subunit vaccine – have now replaced the original vaccines (see "Should people with cancer get a specific COVID-19 vaccine?").

The CDC recommends that people stay up to date with COVID-19 vaccines regardless of whether they've been infected with COVID-19 in the past. (See "Should cancer patients and survivors get the COVID-19 vaccine?")

COVID vaccine recommendations for most people

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

For people 6 months to 4 years old

- Those who have not been vaccinated should get 2 or 3 doses of an updated mRNA vaccine, depending on which vaccine they get.
- Those who have received 1 dose of an earlier Pfizer-BioNTech mRNA vaccine should get 2 doses of an updated vaccine.
- Those who have received 1 dose of an earlier Moderna mRNA vaccine should get 1 dose of an updated vaccine.
- Those who have received 2 or more doses of any earlier mRNA vaccine should get 1 dose of an updated vaccine.

For people 5 to 11 years old

- Those who have not been vaccinated should get 1 dose of an updated mRNA vaccine.
- Those who have received 1 or more doses of an earlier mRNA vaccine should get 1 dose of an updated vaccine.

For people 12 years of age or older

- Those who have not been vaccinated should get 1 dose of an updated mRNA vaccine **OR** 2 doses of the updated Novavax vaccine.
- Those who have received 1 or more doses of an earlier mRNA vaccine should get 1 dose of any updated vaccine.
- Those who have received the Novavax or Johnson & Johnson (Janssen) vaccine should get 1 dose of any updated vaccine.
- **People 65 or older** should also get another dose of any updated vaccine, at least 4 months after the prior dose of updated vaccine.

For more on these recommendations, including the timing of the vaccines, visit the CDC website at https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html[15].

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)
- Have blood cancers (such as leukemia, lymphoma, or multiple myeloma), even if they're not getting active cancer treatment
- Received a stem cell transplant (bone marrow transplant) or CAR T-cell therapy within the last 2 years or are still taking medicine to suppress their immune system
- Are getting active treatment with high-dose corticosteroids or other drugs that can 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 the vaccines are still likely to offer some protection.

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

For people 6 months to 4 years old

- Those who have not been vaccinated should get 3 doses of an updated mRNA vaccine.
- Those who have received 1 dose of an earlier mRNA vaccine should get 2 doses of an updated vaccine.
- Those who have received 2 or more doses of an earlier mRNA vaccine should get 1 dose of an updated vaccine.
- **All children in this age group** also have the option to get another dose of an updated vaccine (at least 2 months after the last updated vaccine dose). They may also get additional doses of updated vaccine (each at least 2 months apart) if recommended by their health care provider.

For people 5 to 11 years old

- Those who have not been vaccinated should get 3 doses of an updated mRNA vaccine.
- Those who have received 1 dose of an earlier mRNA vaccine should get 2 doses of an updated vaccine.
- Those who have received 2 or more doses of an earlier mRNA vaccine should get 1 dose of an updated vaccine.
- **All children in this age group** also have the option to get another dose of an

updated vaccine (at least 2 months after the last updated vaccine dose). They may also get additional doses of updated vaccine (each at least 2 months apart) if recommended by their health care provider.

For people 12 years of age or older

- Those who have not been vaccinated should get 3 doses of an updated mRNA vaccine **OR** 2 doses of the updated Novavax vaccine.
- Those who have received 1 dose of an earlier mRNA vaccine should get 2 doses of the updated version of the same vaccine
- Those who have received 2 or more doses of an earlier mRNA vaccine should get 1 dose of the updated version of the same vaccine.
- Those who have received 3 or more doses of an earlier mRNA vaccine should get 1 dose of any of the updated vaccines.
- Those who have received the Novavax or Johnson & Johnson (Janssen) vaccine should get 1 dose of any updated vaccine.
- **People aged 12 to 64** also have the option to get another dose of an updated vaccine (at least 2 months after the last updated vaccine dose). They may also get additional doses of updated vaccine (each at least 2 months apart) if recommended by their health care provider.
- **People 65 or older** *should* also get another dose of an updated vaccine (at least 2 months after the last updated vaccine dose). They may also get additional doses of updated vaccine (each at least 2 months apart) if recommended by their health care provider.

For more on these recommendations, including the timing of the vaccines, visit the CDC website at https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html[16].

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, CT, or PET 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.

Inflammation of the heart

A small proportion of people who have received any of these vaccines have developed **myocarditis** (inflammation of the heart muscle) or **pericarditis** (inflammation of the lining outside of the heart).

Symptoms of these conditions can include chest pain, shortness of breath, or feelings of having a fast-beating, fluttering, or pounding heart. Most often, symptoms start within a week of getting the vaccine, and they have tended to be more common in teens and young adults.

If you have received one of these vaccines and start to have any of these symptoms, the FDA and CDC recommend getting medical attention right away.

For more on these side effects, visit the FDA website at https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines[17].

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 weakened immune systems (which includes many people with cancer), most expert groups still recommend wearing a mask, social distancing, washing your hands, avoiding crowds, and other preventive measures, even if you've been vaccinated. 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[18] and CAR T-cell therapy[19] 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, it’s important to stay up to date with your COVID vaccines. However, your doctor may recommend waiting at least several 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**, your doctor may recommend getting *revaccinated*, at least several 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, most expert groups still recommend 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 you might want to consider having 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/prevent/coadministration.htm[20].

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)[21]
- US Food and Drug Administration (FDA)[22]

To find COVID-19 vaccines and boosters near you, visit https://www.vaccines.gov[23].

Hyperlinks

1. www.cancer.org/cancer/managing-cancer/coronavirus-covid-19-and-cancer.html
2. www.cancer.org/cancer/managing-cancer/coronavirus-covid-19-and-cancer/questions-about-covid-19-and-cancer.html
3. www.cancer.org/cancer/managing-cancer/side-effects/low-blood-counts/infections/vaccination-during-cancer-treatment.html
4. www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization
5. www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines
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7. www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization
8. www.fda.gov/drugs/guidance-compliance-regulatory-information/surveillance
9. www.cancer.org/cancer/managing-cancer/treatment-types/chemotherapy.html
10. www.cancer.org/cancer/managing-cancer/treatment-types/radiation.html
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12. www.cancer.org/cancer/managing-cancer/treatment-types/immunotherapy.html
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14. www.cancer.org/cancer/types/lymphoma.html
15. www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html
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20. www.cdc.gov/flu/prevent/coadministration.htm
21. www.cdc.gov/coronavirus/2019-ncov/vaccines/index.html
22. www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines
23. www.vaccines.gov

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