COVID-19 Vaccines

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Archived information is provided for reference and research purposes. Please refer to **Respiratory Infectious Diseases: Health and Safety Resources** for the latest guidance.

Introduction

Since the start of the COVID-19 pandemic researchers have focused on developing vaccines against the SARS-CoV-2 virus. COVID-19 vaccines can protect people from severe disease outcomes including death. This resource answers some commonly asked questions about COVID-19 vaccines.

What vaccines are currently authorized in Canada?

As of November 2022, several vaccines are authorized for use in Canada. They are:

- Pfizer-BioNTech Comirnaty (mRNA)
- Moderna Spikevax (mRNA)
- AstraZeneca Vaxzevria (viral vector-based) – authorized but no longer available
- Janssen (Johnson & Johnson) Jcovden (viral vector-based)
- Medicago Covifenz (plant-based)
- Novavax Nuvaxovid (protein subunit)

Additional COVID-19 vaccines are currently under review by Health Canada and may be approved in the future.

What are the types of Vaccines?

Currently there are 4 types of COVID-19 vaccines:

mRNA (messenger ribonucleic acid): These vaccines contain mRNA that instruct cells on how to make SARS-CoV-2 spike proteins. The mRNA enters human cells and the cell's machinery use the mRNA to produce the spike protein which triggers an immune response

Viral vector-based: These vaccines contain a harmless virus (e.g., adenovirus) that is modified in the laboratory and contains instructions on how to make SARS-CoV-2 spike proteins. After vaccination, the modified virus enters cells and the cell's machinery uses the instructions to produce spike proteins which triggers an immune response.

Protein subunit: SARS-CoV-2 spike proteins are produced at a large scale in a manufacturing facility. The proteins are extracted and purified and mixed with other ingredients (including adjuvants which help to make the vaccine more effective). Once in the body, the spike proteins trigger an immune response.

Plant-based virus-like particles: The virus' genetic code is introduced into plant leaves. The plant's natural processes produce a non-infectious virus-like particle which displays the SARS-CoV-2 spike protein. These virus-like particles are extracted from the plants and purified. When mixed with an adjuvant these viral like particles trigger an immune response to the spike protein once in the body.

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How do the vaccines work against COVID-19?

Vaccines work by exposing a person's immune system to SARS-CoV-2 spike proteins, which are found on the surface of the virus. This can be done in two ways: 1) injecting the genetic material coding for the spike protein (e.g., mRNA or viral vector) into the body, which then produces the spike protein or 2) injecting the spike protein made in a manufacturing facility (e.g., protein subunit and plant-based virus-like particle vaccines) into the body. The immune system has millions of unique antibody-producing cells. After vaccination, antibody-producing cells specific to the spike protein are activated and begin to divide and release antibodies into the bloodstream and surrounding tissues. These antibodies will bind to the spike protein. Antibodies bound to the spike proteins of SARS-CoV-2 viruses prevent them from entering cells and signal other immune cells to act. It can take up to two weeks after vaccination for the antibody response to develop.

Once the vaccine spike proteins are gone, the antibody-producing cells stop making antibodies and eventually their numbers slowly decrease over time. Some of the cells will remain as memory cells which will activate very quickly if a future exposure occurs (i.e., infection with the SARS-CoV-2 virus or receipt of another dose of vaccine).

Vaccines also stimulate another part of the immune system called the cellular immune response. This response helps to prevent serious infection from developing in those who are vaccinated.

Can these vaccines cause COVID-19?

No. It is impossible to get sick with COVID-19 from any of the vaccines authorized for use in Canada. They do not contain live SARS-CoV-2 virus.

What are the possible side effects from the vaccines?

Mild to moderate side effects are very common and last no more than a few days. Common side effects include pain at the injection site, tiredness, headache, muscle and joint pain, chills, and fever.

A serious allergic reaction following immunization (anaphylaxis) is rare **but treatable**. People who experience the following symptoms after vaccination, should seek medical attention immediately:

- Hives
- Swelling of the face, tongue, or throat
- Difficulty breathing

Other more serious adverse effects are rare and include:

For mRNA vaccines

- Myocarditis and pericarditis (inflammation of the heart or the lining of the heart)
- Bell's palsy (weakness or inability to move the muscles of the face)

For viral-vector vaccines

- Vaccine-induced immune thrombotic thrombocytopenia syndrome (blood clots and low platelets)
- Guillain-Barré syndrome (numbness and weakness in the arms, legs, face, chest or other muscles, causing paralysis in severe cases)
- Capillary leak syndrome (leakage of fluids from small blood vessels)
- Immune thrombocytopenia (low platelets)
- Venous thromboembolism (blood clots in veins)

Ask your health care provider if you are concerned about any potential side effects.

Do the mRNA vaccines contain animal products or latex?

No. There are no animal or human materials in the mRNA vaccines. They also do not contain any latex.

Get more information on vaccines available in Canada by visiting the Vaccines for COVID-19 PHAC website.

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Which COVID-19 vaccines contain allergens?

- Both the Pfizer-BioNTech Comirnaty and Moderna Spikevax vaccines contain polyethylene glycol (PEG) which is a potential allergen. Trace amounts of PEG are also found in Medicago Covifenz. PEG is also used in other products such as bowel preparation for colonoscopies, laxatives, cough syrup, cosmetics, contact lens solutions and skin care products. PEG can also be found in foods or drinks, but has not been reported to cause allergic reactions from foods or drinks.
- Tromethamine (trometamol or Tris), which is found in Moderna Spikevax and some Pfizer-BioNTech Comirnaty vaccines, can also very rarely cause allergic reactions. Tromethamine can also be found in other products including in some medications injected to do tests (contrast media) as well as other medications taken by mouth or injection, and some creams and lotions.
- The AstraZeneca Vaxzevria, Janseen Jcovden, Medicago Covifenz and Novavax Nuvaxovid vaccines contain a potential allergen called polysorbate 80. It is also found in cosmetics and medical preparations (e.g., vitamin oils, tablets).

Consult with your health care provider or allergist if you have concerns about allergens in COVID-19 vaccines.

Can I still receive a COVID-19 vaccine if I have allergies?

If you have a severe allergy to a previous COVID-19 vaccine dose, a COVID-19 vaccine ingredient, or materials found in the vaccine's packaging, make sure your vaccination provider knows about them before getting vaccinated.

Your health care provider will take this information into account when choosing the best vaccine for you. You may be asked to stay in the waiting area for additional time after the vaccination so that you can be monitored for an allergic reaction.

Food and environmental allergies are not a cause for concern when receiving COVID-19 vaccines.

Are there medical conditions to consider when receiving a COVID-19 vaccine?

Inform vaccine providers, before receiving a vaccine dose, if you suffer from any of the conditions below:

- Have a problem with your immune system (as the number of doses required may change)
- Had a severe reaction to a previous dose of a COVID-19 vaccine (so the appropriate decisions can be made about re-vaccination)
- Are allergic to a COVID-19 vaccine, or to one of their ingredients (so the appropriate product can be chosen for the COVID-19 vaccination)
- Are prone to fainting after medical procedures (so the health care provider can help to prevent fainting and injury during the vaccinations)
- Have a bleeding disorder or taking any medications that could affect blood clotting (so the site where the needle was given can be held to prevent bleeding)

Refer to publications by the National Advisory Committee on Immunization (NACI) for more information:

- COVID-19 vaccine: Canadian Immunization Guide
- Updated guidance on COVID-19 vaccine booster doses in Canada

How many doses of COVID-19 vaccines do I need?

The Public Health Agency of Canada is recommending that people with no pre-existing medical conditions complete a primary series of vaccinations (usually two doses), followed 6 months later by a booster dose.

NACI recommends at least 8 weeks between primary series vaccine doses that require a two-dose schedule. In Canada, the only exception is Janssen's Jcovden which is a one dose vaccine.

Refer to NACI's vaccination of specific populations recommendations if you:

- Are pregnant
- Are breastfeeding

- Were previously infected with SARS-CoV-2
- Have an autoimmune condition
- Are immunocompromised

Additional booster doses may be recommended in the future in response to pandemic conditions. Booster doses restore the protection gained by the primary series which may have decreased over time.

More details can be found on the PHAC Vaccines for COVID-19: How to get vaccinated webpage.

What are bivalent COVID-19 vaccines?

A bivalent vaccine target two coronavirus strains. Bivalent vaccines contain mRNA that codes for two different spike proteins (e.g., the original virus strain and a variant strain such as omicron BA.1). People who receive a bivalent vaccine dose have a broader immune response and improved duration and strength of protection against the variant.

Refer to the COVID-19 mRNA vaccines PHAC webpage for additional information about bivalent vaccines.

How can I get vaccinated?

Vaccines are available right now. Visit the Vaccines for COVID-19: How to get vaccinated website for instructions on how to book a COVID-19 vaccine or booster in your area.

How long will I be protected for once I receive the COVID-19 vaccine?

Protection from vaccination against infection and symptomatic disease decreases over time. Protection against severe disease outcomes also decreases over time, but to a lesser extent. Many factors determine an individual person's protection level including:

- The number and type of vaccine doses received (including booster doses)
- The time between vaccine doses
- The time since the last vaccine dose
- The status of the persons immune system (influenced by how old they are, whether they have underlying medical conditions, or are taking medications)
- Which strain of SARS-CoV-2 virus is circulating (future coronavirus variants may be better able to evade the immune response from vaccination and previous infections than current variants)

Detailed information about the effectiveness of several COVID-19 vaccines can be found on the COVID-19 vaccine: Canadian Immunization Guide website (PHAC).

Can my employer make COVID-19 vaccination mandatory?

Canadian workplaces can determine if they require a vaccine policy that requires its employees to be vaccinated against COVID-19.

Canada is offering the COVID-19 vaccine and boosters on a voluntary basis to anyone in Canada who is eligible and would like to receive them. Some workplaces may have employees who are unvaccinated or who received some or all recommended vaccine doses, including booster doses. Your employer should work with your health and safety committee or representative to assess the risk factors for COVID-19 transmission in the workplace when determining if a COVID-19 vaccine mandate is appropriate.

Speak with your employer, committee or representative, or your union (if available), to discuss any concerns you might have about COVID-19 prevention in your workplace, including any need for accommodation.

I had COVID-19. Do I still need to get vaccinated?

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SARS-CoV-2 infection alone provides some protection against future COVID-19 infections and severe disease, but this protection can decrease over time. Getting vaccinated after having COVID-19 will provide better protection against future infections through hybrid immunity. The National Advisory Committee on Immunization (NACI) has published recommended waiting periods following infection to receive a primary series or booster dose of COVID-19 vaccine. Visit Canadian Immunization Guide – Canada.ca for details.

I've been vaccinated. Do I still need to wear a mask?

Follow your local public health authority's guidance on mask wearing.

You may choose to wear a mask even if it is not mandatory. If you do, wear the one that offers the highest protection such as a respirator or medical mask. The mask should also be comfortable, well-fitting, well-constructed, and cover the nose, mouth, and chin. For additional protection, use multiple personal preventative practices to reduce your chance of exposure.

Should I get the yearly influenza vaccine?

Influenza (or simply the flu) is an infection caused by the influenza virus. Influenza can cause the sudden onset of fever, cough, tiredness, headache, and complications such as pneumonia and worsening of underlying medical conditions. Influenza generally circulates from November to April. The period between November 2020 to April 2022 had very little influenza activity as measures put in place to limit COVID-19 spread were very effective at also limiting the spread of influenza.

Prior to the COVID-19 pandemic, influenza had been in the top 10 leading causes of deaths in Canada for over a decade (estimates from prior to the pandemic were that there were approximately 3,500 annual influenza deaths in Canada and hundreds of thousands of deaths worldwide).

With the relaxing of COVID-19 public health measures, it is possible that upcoming respiratory virus seasons will return to normal levels for influenza but will now also include SARS-CoV-2 infections. Therefore, local public health authorities advise that individuals receive both the COVID-19 and yearly influenza vaccines, to help prevent severe complications from having both illnesses at the same time and also help alleviate strain on our health care system.

Public health authorities in Canada recommend that everyone 6 months and older get a flu shot annually, since the influenza vaccine often changes from year to year to better match the influenza virus strains expected to circulate in the upcoming season. Additionally, the protection from the previous years' vaccine can decrease over time. Not only does the annual influenza vaccine help to protect people from becoming seriously sick, but it also reduces the likelihood of spreading the virus to others. More information about the influenza vaccine can be obtained from Health Canada.

Refer to your local public health authority or health care provider for information on how to receive the influenza and COVID-19 vaccines. For everyone 5 years of age and over, these vaccines can be given at the same visit.

If you or someone you know is in crisis, please contact your local hospital, call 911 immediately, or contact a Crisis Centre in your area.

It is important that mental health resources and support are provided to all workers, including access to an employee assistance program, if available.

For further information on COVID-19, refer to the Public Health Agency of Canada.
Note that this guidance is just some of the adjustments organizations can make during a pandemic. Adapt this list by adding your own good practices and policies to meet your organization's specific needs.
For further information on respiratory infectious diseases, including COVID-19, refer to the Public Health Agency of Canada .

Disclaimer: As public and occupational health and safety information may continue to change, local public health authorities should be consulted for specific, regional guidance. This information is not intended to replace medical advice or legislated health and safety obligations. Although every effort is made to ensure the accuracy, currency, and completeness of the information, CCOHS does not guarantee, warrant, represent or undertake that the information provided is correct, accurate or current. CCOHS is not liable for any loss, claim, or demand arising directly or indirectly from any use or reliance upon the information.