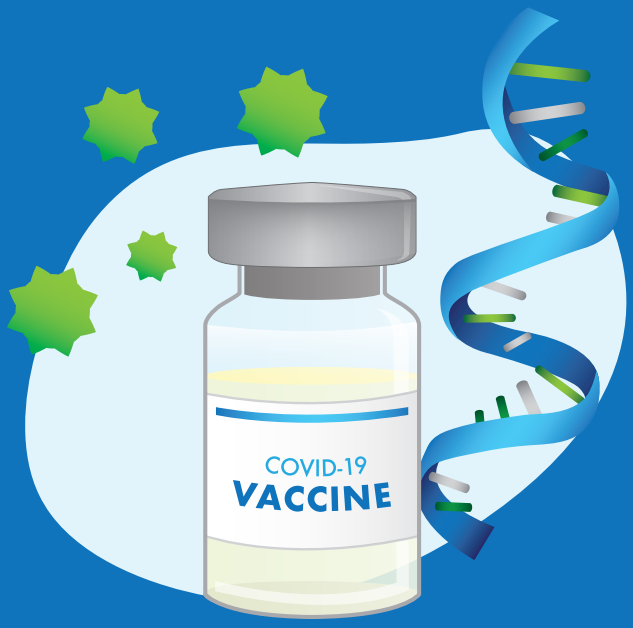
WELLNESS HUB



COVID-19 Vaccine Information Booklet

Version #17 June 29, 2021

ST. MICHAEL'S
UNITY HEALTH TORONTO

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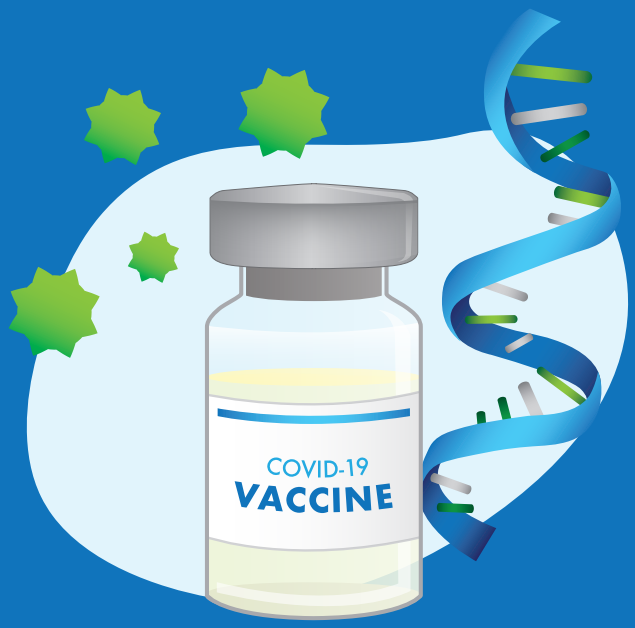
What you need to know about the COVID-19 vaccines

WELLNESS HUB

What is the COVID-19 vaccine?

- A COVID-19 vaccine protects you from COVID-19 infection, especially against serious illnesses and deaths.[1,2]
- Health Canada has approved four COVID-19 vaccines: **Pfizer-BioNTech** and **Moderna** vaccines (messenger RNA [mRNA] vaccines),[3,4] **AstraZeneca** and **Janssen** vaccines (viral vector-based/recombinant vaccines).[5–7]



Where can I find reliable information on COVID-19 vaccines?

- If you want to find the most updated information about the safety and effectiveness of COVID-19 vaccines, we recommend you visit the Health Canada website: https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19/vaccines.html.
- If you need information about how to get COVID-19 vaccine shots in Ontario (e.g. booking appointments), please check the Government of Ontario website here: https://covid-19.ontario.ca/book-vaccine/.
- Additional reliable sources of information:
  - Public Health Ontario: https://www.publichealthontario.ca/en/diseases-and-conditions/infectious-diseases/respiratory-diseases/novel-coronavirus/vaccines
  - National Advisory Committee on Immunization (NACI): https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci.html
  - World Health Organization: https://www.who.int/emergencies/diseases/novel-coronavirus-2019

KNOWLEDGE TRANSLATION PROGRAM

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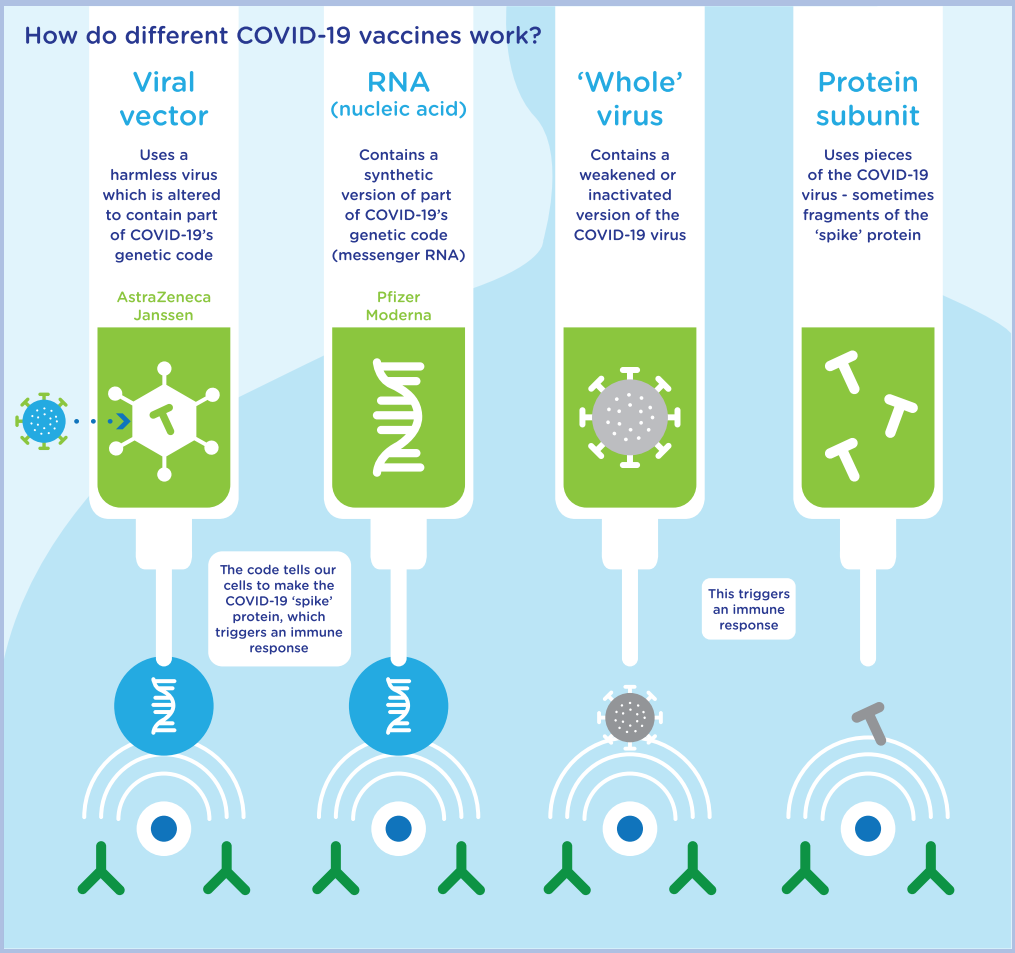
What are the different types of COVID-19 vaccines?



(Image source: Wellcome Trust)[8]

- **Pfizer-BioNTech (shortened to Pfizer) and Moderna vaccines are mRNA vaccines:**
  - They carry the genetic code (mRNA) of the SARS-CoV-2 virus, which is the virus that causes COVID-19, wrapped in lipids.
  - Once inside the human cells, the viral mRNA tells our cells to make spike proteins, which are the proteins found on the outer layer of SARS-CoV-2 virus.
  - Our immune system recognizes the spike protein and starts an immune response.
  - The response produces antibodies, which will recognize and remember the spike proteins if we get infected with the SARS-CoV-2 virus.
  - The antibodies will tell our body to start an immune response to kill the SARS-CoV-2 virus and protect us from getting sick.

- **AstraZeneca and Janssen vaccines are viral vector-based/recombinant vaccines:**
  - They work in a similar way to mRNA vaccines, except they use a type of harmless virus called adenovirus to carry the SARS-CoV-2 viral DNA into the human cells.
  - The carrier adenovirus is modified so that it can enter the human cell but CANNOT replicate to cause common cold in the host.
  - Adenovirus has been used as the delivery system for other vector-based vaccines (e.g. Ebola vaccine) for decades.[6,7,9–11]

Which COVID-19 vaccines are approved for use in Canada?

See the table below for a side by side comparison[5–7,12,13]:

Vaccine	Pfizer-BioNTech	Moderna	AstraZeneca	Janssen
What type of vaccine is it?	mRNA vaccine	mRNA vaccine	Recombinant/ vector-based	Recombinant/ vector-based
When was it approved by Health Canada?	December 9, 2020	December 23, 2020	February 26, 2021	March 5, 2021
How it is given?	Injection into the shoulder muscle	Injection into the shoulder muscle	Injection into the shoulder muscle	Injection into the shoulder muscle
How much is given?	Two doses of 0.3mL	Two doses of 0.5mL	Two doses of 0.5mL	One dose of 0.5mL
When is the second shot given?*	At least 21 days after first shot	At least 28 days after first shot	4-12 weeks after first shot*	Not applicable
How long after my vaccine shot will I be protected from COVID-19?	70-80% protection 14 days after first shot[14] Full protection: 7 days after the second shot	70-80% protection 14 days after first shot[14] Full protection: 14 days after the second shot	76% protection 14 days after first shot for up to 3 months[15] Full protection: 14 days after the second shot	Full protection: 14 days after the single shot[16]
How effective is the vaccine in protecting me from COVID-19 after I receive 2 doses? (full dosage)	95%	94%	62%**	66%**
How effective is the vaccine in protecting me from getting seriously ill from COVID-19?	Current data from real-world studies suggest high effectiveness >7 days after the second dose against severe disease and COVID-19 hospitalization and death[5]	Current data from real-world studies suggest high effectiveness >14 days after the second dose against severe disease and COVID-19 hospitalization and death[5]	87.6% against serious illness[5] 100% against being hospitalized[17] 100% against deaths[5,17]	85% against serious illness[16,18] 100% against being hospitalized[16,18] 100% against deaths[16]
How is it stored?	In freezers between -60°C and -80°C	In freezers at -20°C	In fridges between +2°C and +8°C	In fridges between +2°C and +8°C

Vaccine	Pfizer-BioNTech	Moderna	AstraZeneca	Janssen
Ingredient List	**mRNA** **Lipids** • ((4-hydroxybutyl) azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate) • 2-[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide (PEG) • 1,2-distearoyl-sn-glycero-3-phosphocholine (DSPC) • Cholesterol **Salts** • Dibasic sodium phosphate dihydrate • Monobasic potassium phosphate • Potassium chloride • Sodium chloride **Sucrose**	**mRNA** **Lipids** • 1,2-distearoyl-sn-glycero-3-phosphocholine (DSPC) • SM-102 • Polyethylene glycol (PEG) 2000 DMG • Cholesterol **Acids** • Acetic acid **Acid stabilizers** • Tromethamine • Tromethamine hydrochloride **Salts** • Sodium acetate **Sucrose**	**Adenovirus** **Chelating agent** • disodium edetate dihydrate (EDTA) **Stabilizer** • polysorbate 80 (surfactant commonly used in drug synthesis) **Salts** • sodium chloride • magnesium chloride hexahydrate **Amino acid and derivatives** • L-histidine • L-histidine hydrochloride monohydrate **Alcohol** • ethanol (2mg per dose of 0.5mL) ← very small amount with no noticeable effects[11] **Sucrose**	**Adenovirus** **Stabilizers** • 2-hydroxypropyl-β-cyclodextrin (HBCD) • polysorbate 80 **Salts** • sodium chloride • sodium hydroxide • trisodium citrate dehydrate **Acids** • citric acid monohydrate • hydrochloric acid **Alcohol** • ethanol
Allergen	None of the vaccines contain preservatives, latex, or eggs.[2,9,10,19]			
Animal products	None of the vaccines contain animal products; however, they have been tested on animals as required by vaccine development regulations.[20,21]			

Table 1. Comparison of approved COVID-19 vaccines

***As of June 17, 2021 in Ontario, you may receive your second shot of mRNA (recommended) or AstraZeneca (if you have a known allergy to mRNA ingredients) vaccine 8 weeks after your first shot of AstraZeneca vaccine**: https://covid-19.ontario.ca/covid-19-vaccines-getting-your-second-dose#accelerating-second-doses. (Please note that the vaccination schedule may change; please refer to the provincial government website above for the latest update.)

****Note:** a vaccine that is at least 50% effective against an infectious disease can protect you against that disease, including COVID-19.[22]

What do I need to know about the new variants of concern?

- All viruses develop mutations (changes) over time:
  - When a specific group of mutations occur and make the virus behave differently than the original virus, this mutated virus is called a variant.
  - Variants of the COVID-19 virus are expected to come about.[23] There are many variants of the COVID-19 virus circulating around the world.[23]
- Variants of concern are the variants that spread more easily than other variants and can lead to more serious cases of COVID-19.[24,25] The current variants of concern are:
  - **Alpha variant (formerly B.1.1.7)** → First detected in the United Kingdom in September 2020.
  - **Beta variant (formerly B.1.351)** → First detected in South Africa in October 2020.
  - **Gamma variant (formerly P.1)** → First detected in Brazil in December 2020.
  - **Delta variant (formerly B.1.617.2)** → First detected in India in October 2020.[26]
- We have some data that suggest these variants cause more serious illness and higher risk of deaths.[24]
  - Several UK studies found that the alpha variant may spread more easily and is more likely to cause death than the original circulating variants of COVID-19.[27,28]
- Effectiveness of COVID-19 vaccines against variants of concern:
  - The Pfizer and Moderna vaccines may still offer protection against alpha variant.[29,30]
  - The Moderna vaccine may be slightly less effective against beta variant, but still offers some protection, including lowering risk of serious illness from COVID-19.[30]
  - There is limited data yet on vaccine effectiveness against gamma variant—this variant may be more difficult to protect against. The gamma variant has mutations that make it difficult to be recognized by the body's immune system (i.e. antibodies).[31]
  - The Janssen vaccine may be effective against beta variant and zeta variant (previously P.2).[16]
- Scientists are still gathering data on how effective the current COVID-19 vaccines are against variants of concern and making improvements to the vaccines to better protect us against the new variants of concern.[5,32]

Which vaccine will I receive?

- **You are encouraged to receive the vaccine that is available and offered to you.**
- The vaccine you will receive depends on many things, including how much of each vaccine is available in your area, and how easy it is to store a vaccine in the right conditions at your vaccination site(s).[5]

How safe are the vaccines?

- The vaccines are safe and it is very rare to have serious side effects.[3,4,33,34]

How were the vaccines studied?

- Scientists studied Pfizer, Moderna, AstraZeneca and Janssen vaccines in research studies known as "randomized controlled trials".[35]
  - Randomized controlled trials (RCT): these research studies are the 'gold standard' in health research and produce the best quality evidence for effectiveness of vaccines.
  - The power of RCT lies in the process of randomization, which is like flipping a coin to see who gets to receive the vaccine or placebo (both vaccine and placebo are safe for use in people).
  - Randomization prevents potential bias as scientists do NOT know who has received vaccine or placebo.
  - People in the study are then followed carefully for the outcome of interest (in this case, COVID-19 infection).
- Typical RCT studies of drugs and other interventions require 6,000-8,000 people to take part; here is a summary of the number of people involved in studies of all four vaccines:
  - Pfizer-BioNTech—more than 37,000 people aged 12+ years.[36]
  - Moderna—more than 30,000 people aged 18+ years.[37]
  - AstraZeneca—more than 23,000 people aged 18+ years.[17]
  - Janssen—more than 39,000 people aged 18+ years.[16]
- We summarized all study results in the comparison table on page 5.

What are the possible side effects after receiving the vaccine?

- Side effects can be expected to happen with many vaccines including the flu vaccine and others.
- Common side effects for all vaccines include[5]:
  - Pain, redness or swelling at the injection site
  - Fever
  - Headache
  - Muscle soreness
- For COVID-19 vaccines, some people experienced mild to moderate side effects after the first vaccine shot.[5,16]
- More people experienced mild to moderate side effects after the second vaccine shot (Pfizer, Moderna and AstraZeneca).[5,16,36–38]
- Only 1 in 1000 people (0.1%) experienced more serious side effects that made it difficult to complete their everyday activities.[5,18,36,37]
- Make sure to speak to your employer if you feel concerned about taking time off to deal with possible side effects from getting COVID-19 vaccine.
- As more Canadians receive the vaccine, adverse events are continuously updated and reported here: https://health-infobase.canada.ca/covid-19/vaccine-safety/#summary.

Side effects within 7 days of second vaccine dose	Pfizer-BioNTech[12]	Moderna[13]	AstraZeneca[5,39]	Janssen[16,18]
Local side effects (at the vaccine injection site)—may happen more than 8 days after vaccination[40]				
Pain	73%	88%	54%	50%
Redness	7%	9%	14%	7%
Swelling	7%	12%	10%	5%
Swelling or tenderness in the armpit (in the arm of vaccine shot)	No data	14%	64%	No data
Warmth	No data	No data	18%	No data
Bruising	No data	No data	17%	No data
Systemic side effects (whole body)				
Fever/feverishness	14%	16%	34%	9%
Headache	46%	59%	53%	39%
Fatigue	56%	65%	53%	38%
Muscle pain	34%	58%	44%	33%
Joint pain	21%	43%	26%	No data
Nausea/vomiting	1%	19%	22%	14%
Diarrhea	10%	No data	No data	No data
Chills	30%	44%	32%	No data

Table 2. Common local and systemic side effects from vaccination

Should I get the COVID-19 vaccine?

Can I get the vaccine if I have had serious allergic reactions before?

- If you have had serious allergic reactions to flu shots, it does NOT mean you will necessarily experience a reaction from a COVID-19 vaccine.
- If you have a history of serious allergy to vaccines in general or a known allergy to any of the vaccine ingredients (e.g. PEG or Polysorbate 80), you should talk to your healthcare provider before getting a vaccine.[41] **All four COVID-19 vaccines contain either PEG or polysorbate.**[40–43]
  - A serious allergy (e.g. anaphylaxis) can be deadly. When people experience a serious allergy, they need an injection of epinephrine (e.g. EpiPen).
  - An immediate allergy is a reaction within 4 hours after getting a vaccine shot; you may experience symptoms like hives, swelling or wheezing (respiratory distress).[44]
  - All vaccine clinics have trained staff and volunteers who will help you after you receive the vaccine shot. After you receive the vaccine, you will be asked to stay for 15 minutes to monitor for potential allergy. If you experience an allergic reaction, they will be able to help and assist you.

Can I get the vaccine if I am pregnant or breastfeeding?

- Scientists do NOT have enough data to know how well COVID-19 vaccines work to protect people who are pregnant or breastfeeding. The research studies mentioned above did not include enough people who were pregnant or breastfeeding.
- Scientists and experts believe that the vaccines are NOT harmful to pregnant and breastfeeding people.[45]
- **If you are pregnant**, you may still receive the vaccine:
  - You should speak with your healthcare provider first about your choices and tell them if you have any concern.[46]
  - **Pregnant people are more likely to become seriously ill from COVID-19 than non-pregnant people.**[45,47,48]
  - Pregnant people who have had COVID-19 may be more likely to have negative pregnancy outcomes (e.g. preterm birth) than pregnant people who never had COVID-19.[47,48]
- **If you are breastfeeding**, the vaccine is likely safe for you. You will develop immunity (i.e. body's defense system) to COVID-19 from the vaccine, which will also protect your child.[45–47]
- **If you are trying to become pregnant now or in the future:**
  - You may receive a COVID-19 vaccine when one is available to you.[45,47]
  - Getting vaccinated prior to pregnancy is important to ensure that you and your pregnancy are protected. You should discuss your options with your healthcare provider.

Can children get the COVID-19 vaccine?

- **Pfizer-BioNTech vaccine has been approved by Health Canada for use on children between 12 and 15 years of age as of May 5, 2021.**[3,49,50]
- Currently, Moderna, AstraZeneca and Janssen vaccines have been approved for use in adults 18 years of age or older in Canada[3–7]:
  - Research studies are ongoing to test the effectiveness and safety of use of Pfizer and Moderna COVID-19 vaccines for children between the ages of 6 months and 16 years of age.[51,52]

  - Study results show that the Pfizer vaccine is 100% effective in protecting children against COVID-19 infection and has similar side effects as for people 16-25 years of age.[51]
- Health Canada continues to update recommendations on vaccine use for children based on latest data; please refer to Health Canada website for the latest recommendations: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-use-covid-19-vaccines.html#a7.
- Please consult with your provincial ministry of health websites for province-specific guidelines.
- For the province of Ontario, you can check the provincial vaccination plan and updates here: https://covid-19.ontario.ca/ontarios-covid-19-vaccination-plan.

Can I get the vaccine if I have a weakened immune system?

- You may still receive the vaccine, but you should talk to your healthcare provider first.[53]
- The research studies have included some people who were immunocompromised or with underlying health conditions, but we do not have enough safety data on these groups to make strong recommendations.[5,54,55]
- If you have a weakened immune system, you may not receive as much protection from the vaccine as people with healthy immune systems. However, you will likely still get enough protection from the vaccine.

Should I get the COVID-19 vaccine if I have an underlying health condition(s)?

- If you have an underlying health condition, including high blood pressure; diabetes (type I or II); cerebrovascular disease; chronic obstructive pulmonary diseases (COPD); heart disease; cancer; or kidney or liver diseases, you are more likely to experience serious symptoms if you get infected with COVID-19.[56]
- **The general recommendation is for you to get a COVID-19 vaccine to protect you from getting sick and developing serious illness from COVID-19 infection.**
- It is also safe for you to get a COVID-19 vaccine if you have one or more of the following health conditions[57]:
  - Rheumatologic diseases, including rheumatoid arthritis, systemic lupus erythematosus (SLE), psoriatic arthritis, vasculitis or spondylarthritis
  - Allergies (to allergens other than those ingredients contained in the COVID-19 vaccines)
  - Cancer
  - Diabetes (type I or II) and other endocrine disorders
  - Cardiac conditions (i.e. coronary artery disease/myocardial infarction, heart failure, cardiomyopathy)
  - COPD (e.g. emphysema and chronic bronchitis), pulmonary hypertension
  - Previous medical surgery (e.g. heart bypass surgery)
  - Renal transplant
  - HIV (undetectable viral load; risk is less clear for active HIV infection with detectable viral load)
  - Clotting disorders (suggestion is to apply pressure to the vaccine injection site for 3-5 minutes after injection to reduce bruising)
  - Neuroimmunological disorders (e.g. multiple sclerosis)
  - Fibromyalgia
  - Autoimmune diseases (e.g. inflammatory bowel disease [IBD], Crohn's disease, ulcerative colitis)
  - Sickle-cell anemia
  - Mast cell disorders (a pre-treatment protocol is recommended before the vaccine is given, and it is recommended that you talk to your hematologist or immunologist for further information)

- **If you have an inherited bleeding disorder, you may still receive COVID-19 vaccine**[57]:
  - Please let the person giving you the vaccination know that you have a bleeding disorder prior to the injection.
  - They may use a smaller gauge needle, if possible, and ask you to apply 10 minutes of pressure after the injection.
  - If you are on prophylaxis with factor concentrate, you should time your prophylaxis with the day of your vaccine injection.
  - If you treat on-demand but have a history of severe bleeding, you may need a treatment with factor concentrate before the vaccine injection. Please contact your bleeding disorder team.

Taking the COVID-19 vaccine is a personal choice. If you are concerned about taking the vaccine due to any underlying health conditions or medications that you are currently taking, **talk with your healthcare provider before receiving the COVID-19 vaccine**.

You may also reach out to the Toronto Public Health Hotline or Health Canada COVID-19 Information Line for additional information at:

Toronto Public Health Hotline:
Telephone: 416-338-7600
TTY: 416-392-0658
Email: PublicHealth@toronto.ca

Translation is available in multiple languages.

Health Canada COVID-19 Information Line:
Telephone: 1-833-784- 4397
Email: phac.covid19.aspc@canada.ca

Will I get blood clots from the AstraZeneca vaccine?

- For the province of Ontario, please check the latest provincial vaccination plan and updates here: https://covid-19.ontario.ca/ontarios-covid-19-vaccination-plan.
- A rare type of blood clot that is associated with low platelet counts (thrombocytopenia) and may occur in the brain (such as cerebral venous sinus thrombosis) or elsewhere may be linked to the AstraZeneca COVID-19 vaccine; this side effect is called Vaccine-Induced Immune Thrombotic Thrombocytopenia (VITT).[58]
- Most cases of VITT were among women under 55 years of age, while some cases were reported among men as well.[5,59]
- **The symptoms of VITT generally occur between 4 and 28 days after you have received the AstraZeneca vaccine shot.**[5,58,59]
- The symptoms of VITT are related to where the blood clot may be located and can include the following:
  - Shortness of breath
  - Difficulty speaking
  - Seizure
  - Severe headaches or blurred vision that does not go away
  - Chest pain
  - New serious swelling, pain or colour change in an arm or leg
  - Difficulty moving part of your body
  - Serious abdominal pain that goes on for days
  - Skin bruising (other than at the site of vaccine shot)
- In Ontario, if you have received the first AstraZeneca vaccine shot, you can receive your second vaccine shot 8 weeks after the first. Please refer to the Ontario provincial government website for the latest guidance: https://covid-19.ontario.ca/covid-19-vaccines-getting-your-second-dose#accelerating-second-doses.

- A second dose of mRNA is preferred and recommended; however, you can receive a second dose of AstraZeneca vaccine if you have an known allergy to one of the mRNA vaccines.[60]
- The recommendations on vaccine use are updated based on the latest data; please refer to the Health Canada website for current recommendations: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-use-covid-19-vaccines/summary-statement-june-17-2021.html.
- **Note:** if you have received two doses of AstraZeneca vaccine, you are considered fully protected against COVID-19 infection.
- Please consult with your provincial ministry of health websites for province-specific guidelines.

Getting the vaccine

When and how do I get my vaccine?

- All Canadians can receive COVID-19 vaccines free of cost. When you go for your vaccine appointment, you will need to provide your health (OHIP) card or a government-issued photo ID (provincial health card, status card, driver's license, etc.).[61]
- There is limited supply of vaccines. As a result, people who are most likely to be exposed to COVID-19 and develop serious illnesses from COVID-19 need to get the vaccines first.
- Long-term care home and retirement home residents, essential care partners and staff who lived and worked in congregate settings were among the first to get the vaccine.
- You can check your eligibility and book vaccination appointments through Ontario's online vaccine booking system: https://covid-19.ontario.ca/book-vaccine/.

What happens during the vaccine appointment?

- The nurse/pharmacist/physician will explain the process before your vaccination.
- You will need to agree to getting the COVID-19 vaccine.
- The staff may also collect your sociodemographic data, such as your race and household size: you can choose to provide this information or refuse, you will still be able to get the vaccine either way.
- You may need to wait for your turn to get the vaccine shot.
- You will be asked to wait in the clinic/pharmacy for about 15 minutes after getting the vaccine shot. Staff will make sure that you feel well enough and watch for any serious reactions before letting you leave the clinic/pharmacy safely.

Will I still have to wear a mask and physically distance after I get the vaccine?

- It depends.
- Health Canada has updated its recommendations of mask use and physical distancing based on your vaccination status (i.e. fully vaccinated, partially vaccinated, not vaccinated) and setting/activity (i.e. indoor/outdoor, small group/multiple households/large crowd). Please find the latest recommendations on the Health Canada website: https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/awareness-resources/vaccinated-against-covid-19-public-health-measures.html
- For the latest province-specific guidelines on re-opening, please refer to your provincial government websites.
- If you are returning to/entering Canada from international travels, please refer to the Government of Canada website for the latest testing and quarantine requirements: https://travel.gc.ca/travel-covid.

Will I need to get vaccinated every year?

- We do not have enough data to know how long you will be protected against COVID-19 after receiving the vaccine.
- Scientists will monitor peoples' immune responses after vaccination in the coming years to better understand how long immunity will last.[62]

If I miss the second dose of the vaccine, do I have to start the whole process over again?

- You will not need to begin the whole process over again.[14,44]
- Research shows that the second vaccine shot can be safely delayed for up to four months after the first shot.[14]

What do I do if I get COVID-19 after my first dose of the vaccine?

- That is possible, since the vaccines do not start working until at least 2 weeks after you get your first shot.[15–17,54,55]
- If you get COVID-19 infection after vaccination, you will be able to receive your second vaccine shot after you have recovered from COVID-19 infection. You should talk to your doctor about your situation.[14,44]

Do I need to get tested for COVID-19 before vaccination?

- No, you do not need to get a COVID-19 test before getting the vaccine.
- If you experience symptoms of COVID-19, you should get in touch with your local public health unit or healthcare provider to set up for a COVID-19 test.
- More information can be found here: https://covid-19.ontario.ca/covid-19-test-and-testing-location-information.

Can I get my first dose from one vaccine brand, and my second dose from another brand?[60,63–66]

- If you have received either Pfizer or Moderna mRNA vaccine as your first dose, you can safely receive either Pfizer or Moderna mRNA vaccine as your second dose depending on availability.[67]
- If you received first dose of AstraZeneca vaccine:
  1. If you developed VITT after first dose of AstraZeneca vaccine, you are strongly recommended to receive an mRNA vaccine as the second dose.[67]
  2. If you did NOT develop VITT or experience symptoms of thrombocytopenia:
     - You are recommended to receive a second dose of mRNA vaccine (i.e. Pfizer or Moderna) as data show that a subsequent mRNA vaccine dose offers better immune response and is safe for you.
     - You may choose to receive a second dose of AstraZeneca vaccine, especially if you have known allergy to one of the mRNA vaccine ingredients.
  - **Note:** if you have received two doses of AstraZeneca vaccine, you are considered fully protected against COVID-19 infection.
- Current data on effectiveness and safety of mixing first dose AstraZeneca with a second dose Pfizer vaccine show[63,64,67]:
  - Similar or increased effectiveness against COVID-19.
    - Mixing doses may increase protection against variants of concern.
  - Similar safety profile to two-dose AstraZeneca or Pfizer vaccination.
    - You can expect to experience less, similar or more mild-to-moderate side effects within 48 hours after receiving a second dose mRNA vaccine, as compared to first dose AstraZeneca vaccine.
    - All of the potential side effects are not serious and will go away a few days after you received the second vaccine shot.

- The data on effectiveness and safety of mixing vector-based and mRNA vaccines continue to evolve as ongoing research studies continue. Please refer to the Public Health Agency of Canada website for the latest recommendation: https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-use-covid-19-vaccines/rapid-response-interchangeability.html.
- Please refer to your provincial government website on the latest vaccination plan. For the province of Ontario, please visit: https://covid-19.ontario.ca/covid-19-vaccines-getting-your-second-dose#accelerating-second-doses.
- Bring the receipt from your first vaccine appointment to your second vaccine appointment. This way, your nurse/pharmacist/healthcare provider will know which vaccine you have received before.

I'm experiencing side effects days after receiving the vaccine, what should I do?

- Delayed local reactions (e.g. pain, swelling, tenderness) near where the vaccine is injected may happen more than 8 days after you receive the vaccine.[40]
- These reactions are usually mild and will disappear on their own. You should still get the second COVID-19 vaccine shot, and you will not be more likely to develop serious reactions in the future.
- Most people experienced milder delayed local reactions after receiving the second vaccine shot.[40]
- If you experience serious delayed local reactions, resembling cellulitis (i.e. warm, red, swollen arm), please talk to your healthcare provider right away for support.

What are the implications of vaccine supply shortages in Canada?

- **With increasing vaccine supply in Canada, the dose interval for two-dose vaccines (i.e. Pfizer-BioNTech, Moderna and AstraZeneca) will continue to be adjusted.** For Ontario, please refer to the provincial government website for the latest guidance: https://covid-19.ontario.ca/covid-19-vaccines-getting-your-second-dose#accelerating-second-doses.
- Previously, the National Advisory Committee on Immunization (NACI), an independent advisory board to the federal government, updated its recommendation to prioritize getting first vaccine shots into the arms of as many people as possible.
- Check the National Advisory Committee on Immunization website at https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci.html for the latest recommendations.
- We have data that show COVID-19 vaccines remain effective for at least two months and up to four months after the first shot.[14,68]
  - Like other multi-dose vaccines, the first dose of COVID-19 vaccine provides short-term protection, and the second dose provides long-term protection.
  - As long as the second vaccine is given after the minimum duration, the length of time between doses should not affect the long-term protection.
    - The minimum duration between shots is 21 days for the Pfizer-BioNTech vaccine;
    - 28 days for the Moderna vaccine[5] and
    - 28 days for the AstraZeneca vaccine.[5,17]
- The World Health Organization (WHO) and the U.S. Centers for Disease Control and Prevention (CDC) also support increasing the wait period between vaccine doses when supply is short.[69,70]

Vaccine rumours... Are they true?

WELLNESS HUB

Q: Can the messenger RNA (mRNA) vaccine alter my DNA?

A: mRNA vaccine CANNOT change your DNA for these reasons:

- Location – viral mRNA are never in the same place as the human DNA. The viral mRNA can only stay in the fluid that fills the cell (i.e. cytoplasm), while human DNA is the in center core of the cell (i.e. nucleus) protected by a shield (i.e. nuclear envelope).
- Process – viral mRNA are different from human DNA. Neither the vaccine nor your cell have the tools to make human DNA from viral mRNA.[71,72]
- Stability – viral mRNA is not very stable and can only stay alive in human cells for a few hours.[3,73]

Q: Can viral vector-based vaccine alter my DNA?

A: Viral vector-based vaccine CANNOT change your DNA:

- COVID-19 viral vector-based vaccines are non-replicating. That means the viral DNA is modified so that it cannot be used to make copies of itself and infect other cells.
- The viral DNA in the COVID-19 vaccine can only be used to make spike proteins to trigger an immune response.[71]

Q: I heard that mRNA vaccine technology "has never been tested or approved before." How do we know this vaccine is not dangerous?

A: Scientists have studied mRNA vaccines for many years:

- Scientists have tested mRNA on tens of thousands of people around the world.

- These vaccines received strict and complete reviews for safety by independent scientific advisory boards and drug regulatory departments in many countries before allowing for widespread use.
- Even though Pfizer and Moderna COVID-19 vaccines are the first mRNA vaccines to be approved by Health Canada, we know this technology has been in use in humans for the last several years.[44]

Q: There are claims that the COVID-19 pandemic is a cover for a plan to implant trackable microchips or that a magnet would stick to the vaccine injection site. Are these true?

A: No. There is no vaccine "microchip" nor any metallic component to the vaccine. The vaccine has no ability to track people or gather any personal information nor can it attract a magnet.[74]

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Q: Can I get COVID-19 from receiving the vaccine?

A: NO. COVID-19 vaccines do NOT contain the SARS-CoV-2 virus (the virus that causes COVID-19). Therefore, you cannot get COVID-19 infection from any of the vaccines.[5]

Q: Can the vaccine impact fertility, pregnancy and breastfeeding?

A: Current scientific data show COVID-19 vaccines are NOT linked to negative effects on fertility, pregnancy or breastfeeding.[45,48,75]

- However, scientists have NOT done enough testing of COVID-19 vaccines on pregnant or breastfeeding individuals, so we need to wait for more data to know the effects of COVID-19 vaccines on this group of people:
  - In Canada, pregnant and breastfeeding individuals can still receive the vaccine if they choose.
  - If you are pregnant, breastfeeding or planning to get pregnant, you are eligible for the vaccine. You should talk to your healthcare provider first to discuss your options.

Q: Can the vaccine cause erectile dysfunction in men?

A: NO, COVID-19 vaccines are not known to cause erectile dysfunction (ED) in men.

- However, some data show that COVID-19 infection may be linked to ED.[76]

Q: Will the COVID-19 vaccine cause long-term autoimmune issues?

A: Scientific data show that mRNA and vector-based vaccines are NOT linked to new autoimmune disease nor do they worsen existing autoimmune diseases.

- If you have an autoimmune disease, we encourage you to talk to your healthcare provider to decide if the vaccine is right for you or not.[77]

Q: Will the COVID-19 vaccine cause neurological issues, for example, facial weakness or paralysis (also known as Bell's Palsy)?

A: In the Pfizer-BioNTech vaccine trial, four out of 43,449 people in the study (less than 0.01%) had a temporary weakness or paralysis of facial muscles.

- The rate is similar to what can be expected in the general population without vaccination.[78]

Q: Is the vaccine permitted and recommended for those practicing different religions?

A: Many North American faith-based communities recommend or permit vaccination. Among these are:

  - The Canadian Muslim COVID-19 Task Force (CMCTF),
  - The Orthodox Union and Rabbinical Council of America,
  - The United States Conference of Catholic Bishops, and
  - The Hindu American Foundation.[79–82]

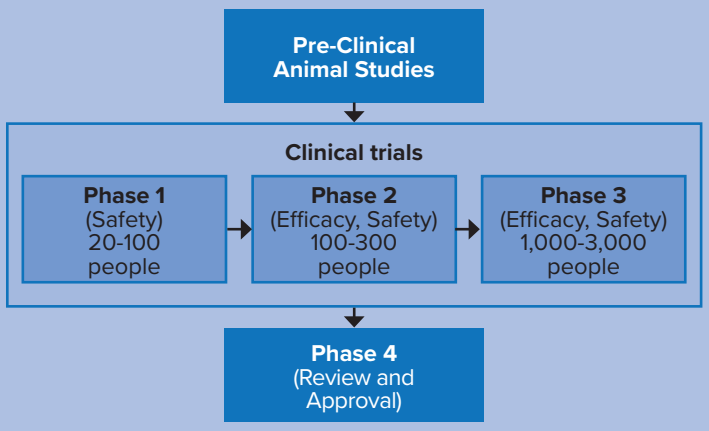
- Taking the COVID-19 vaccine is a personal choice. If you are concerned about your faith-based or cultural group's guidance on vaccination, talk to your religious leaders within your community or seek additional information before making a decision.

Q: These vaccines underwent a "Fast Track" Process for approval in Canada – what does that mean for the safety of the vaccine?

A: The government has made changes to speed up the review process for vaccines while ensuring safety of vaccine use on Canadians.

- On September 16, 2020, Canada's Minister of Health signed the *Interim Order Respecting the Importation, Sale and Advertising of Drugs for Use in Relation to COVID-19*.

- This order allows for a faster authorization process for "**importing, selling and advertising** COVID-19-related drugs **without compromising patient safety**".[83]
- All COVID-19 vaccines still went through completed clinical trials to make sure they are effective and safe for use.
- All COVID-19 vaccines successfully underwent **all phases** of clinical trials.



- Health Canada and the Minister of Health sped up the review process in the following ways:
  1. **Rolling review** of data – health regulators studied vaccine data as they became available (i.e. rolling basis), rather than waiting for all data to come in before reviewing.
  2. **Foreign approval** – health regulators took into account if vaccines have already been approved for use in other countries.
  3. **Pre-positioning** – health regulators allowed for the import of COVID-19 vaccines that are likely to be approved, and stored the vaccines in Canadian facilities before their formal authorization for use in Canada.
- This has not led to "cutting corners" in the creation of these vaccines, but rather an extreme focus and added attention to detail in these processes.[83]

Q: If I already had COVID-19 and recovered, should I still get the vaccine?

A: Yes. COVID-19 vaccines can protect you better and for longer than the immunity you developed from COVID-19 infection.[84]

- We recommend that you get COVID-19 vaccine when it becomes available to you, even if you have already had COVID-19 infection.
- Recovering from COVID-19 does not replace vaccination.
- There have been many reported cases of COVID-19 re-infection.[85]

Q: Am I immune to COVID-19 if I have type O blood?

A: Blood type O does NOT protect against COVID-19 infection.

- Some data suggest that people with type O blood may experience less serious symptoms from COVID-19 infection, but we don't know for sure yet.[86,87]
- You should take all measures to protect yourself from COVID-19 and take the COVID-19 vaccine once it becomes available to you.

Q: Do COVID-19 vaccines contain fetal tissue?

A: NO. None of the COVID-19 vaccines contain fetal tissue.

- Although early research studies on the mRNA vaccine technology used fetal cell cultures, fetal tissues were NOT used in the design, development or production of the COVID-19 vaccines.[88]

Q: Is the COVID-19 vaccine like the flu shot in that it will not guarantee that we will not get the disease?

A: COVID-19 vaccines are more effective in preventing COVID-19 infection than the flu vaccine is in preventing influenza.

- The Pfizer and Moderna COVID-19 vaccines are over 94% effective.
- AstraZeneca and Janssen vector-based COVID-19 vaccines are 62%-66% effective.
- The flu shot is about 50% effective in preventing the flu.[89]

In addition, **a vaccine that is at least 50% effective in preventing a disease can offer you protection against that disease, including COVID-19**.[22]

If you have any concerns about taking the COVID-19 vaccine, discuss these with your healthcare provider. You may also reach out to the Toronto Public Health Hotline for additional information at:

Telephone: 416-338-7600
TTY: 416-392-0658
Email: PublicHealth@toronto.ca

Translation is available in multiple languages.

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