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INSTRUCTIONS

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Pharmacy Technician's Role in Supporting Immunizations in a Pharmacy

by Jason Kmet, BSP, Certificate in Travel Health



Learning objectives

After completing this lesson, the pharmacy technician participant will be able to:

1. Understand the basic principles of immunization and the two main categories of vaccines.
2. Identify the key roles of pharmacy technicians in supporting the immunization program provided by a pharmacy.
3. Understand the technician's role in proper vaccine storage and handling (cold chain issues).
4. Recognize and assist with managing adverse events following immunizations.

Introduction

Immunization is one of the most significant preventive healthcare measures ever discovered. Over the past 50 years, some common infectious diseases have been eliminated or contained across Canada through immunization

programs. Before vaccines became available, many Canadian children were hospitalized or died from diseases such as diphtheria, pertussis, measles and polio. With the implementation of vaccination programs, these diseases are now rarely seen in Canada.⁽¹⁾

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Pharmacies and Immunization

Community pharmacies are a very convenient access point for health care. This makes them ideal locations to develop and promote in-house immunization programs.

Historically, pharmacies mostly were involved in dispensing vaccines to a patient according to a physician’s prescription, and then the vaccine would be taken to and administered by another healthcare provider, such as a physician or nurse.

However, in the last decade, pharmacists have been granted the ability to prescribe and/or administer certain vaccines. As a result, pharmacies are among the leading locations where certain vaccines are administered. For example, in Alberta during the 2018-19 influenza season, pharmacists administered more than 720,000 flu shots, which was more than 55% of all doses of influenza vaccine administered in Alberta.⁽²⁾

What is a vaccine?

A vaccine is a biologic product that contains a small amount of antigen(s) that triggers a protective immune response against a specific disease(s) within a person, effectively and safely. Some vaccines protect against only one disease (e.g., hepatitis A vaccine), while others contain multiple antigens (e.g., measles/mumps/rubella) to protect against more than one disease.

There are many ways of categorizing vaccines, but they are most often placed into two groups - live attenuated vaccines and inactivated vaccines.

1) Live attenuated vaccines contain whole, weakened bacteria or viruses. These vaccines have the potential to cause severe or fatal reactions as a result of uncontrolled growth of the vaccine virus in certain situations.⁽³⁾ Patient groups at risk include those who are:

- Immunodeficient (from chemotherapy or treatment with certain other drugs, or patients with organ transplants or human immunodeficiency virus [HIV] infection)
- Pregnant or breastfeeding (due to theoretical risk of infection to the fetus or infant).
- If more than one live vaccine needs to be given, it should be administered concurrently or be separated by at least four weeks.⁽⁴⁾

TABLE 1 - Live vs Inactivated Vaccines

Live vaccines⁽⁵⁾	Bacille Calmette-Guérin (BCG) vaccine
	Herpes zoster (shingles) vaccine – Zostavax II brand
	Influenza vaccine – intranasal
	Measles, mumps and rubella (MMR) vaccine
	Measles, mumps, rubella and varicella (MMRV) vaccine
	Rotavirus vaccine
	Typhoid vaccine - oral
	Varicella (chickenpox) vaccine
	Yellow fever vaccine
Inactivated vaccines⁽⁵⁾	Cholera and enterotoxigenic Escherichia coli travellers’ diarrhea vaccine - oral
	Diphtheria toxoid-containing vaccines
	Haemophilus influenzae Type B vaccine
	Hepatitis A vaccines
	Hepatitis B vaccines
	Herpes zoster (shingles) vaccine – Shingrix brand
	Human papillomavirus (HPV) vaccines
	Influenza vaccines - injectable
	Japanese encephalitis vaccine
	Meningococcal vaccines
	Pertussis-containing vaccines
	Pneumococcal vaccines
	Poliomyelitis-containing vaccines
	Rabies vaccines
	Tetanus toxoid-containing vaccines
Typhoid vaccine - injectable	

Note: not all of these vaccines may be allowed to be administered in pharmacies due to regulatory and age restrictions. Pharmacists typically cannot administer vaccines to patients under 5 years of age.

2) Inactivated vaccines contain whole or parts of inactivated (killed) bacteria or viruses; products secreted by bacteria that are modified to remove their pathogenic effects (toxoids); or parts of a bacteria or virus obtained through recombinant technology. Inactivated vaccines cannot cause the disease they are designed to prevent.⁽³⁾

Role of the pharmacy technician

Pharmacy technicians can be a key member of a pharmacy-based immunization program. Possible roles can include:

- 1)** Identification of potential vaccine recipients
Pharmacy technicians often have multi-

ple opportunities to interact with patients. Therefore, they are in an excellent position to identify patients who may benefit from the pharmacy’s immunization program. Pay particular attention to the following:

- Immunocompromised – live vaccines often contraindicated
- Chronic medical conditions -at higher risk of illness
- Elderly – some vaccines are only indicated for older adults
- Travellers – destination-specific recommendations
- Students – may have required vaccines for school

- Healthcare workers – at higher risk of exposure

In consultation with other pharmacy staff members, a method should be developed to screen patients to see if they are eligible for any vaccines and incorporate it into the existing workflow.

- Document immunizations when updating a patient's profile or taking a medication history. This will help the pharmacist determine any needed vaccines. This includes keeping vaccines active in the patient profile.
- Check with every patient to determine whether they've received a flu shot when the flu vaccines become available every fall.
- Check patient's age to see if they're eligible for shingles or pneumococcal vaccines for example.

2) Supporting the pharmacist

- Offer to schedule vaccine appointments, including booster doses if requested. Keep in mind when are the more appropriate times to schedule, such as when there are extra pharmacists available.
- Pre-vaccination screening and documentation – gather demographic information, medical history, allergies, vaccine history, name of family physician, insurance information, help fill out consent forms.
- Drawing up the required dose in a syringe for the pharmacist, making it easier for the pharmacist to administer, especially when doing mass immunizations.
- Post-vaccination patient monitoring – Help pharmacist observe patients post-injection to identify any possible adverse reactions.
- Post-vaccination information and documentation - Ensure patients have received a record of vaccination and appropriate patient information regarding post-vaccination care
- Keeping patient profiles/medication lists current. This will help pharmacists when checking for possible vaccine contraindications or vaccine-drug or vaccine-disease interactions (e.g., live vaccines should not be given while patients are receiving biological drugs)

- ## 3) Developing and sharing policies and procedures with topics such as:

- ordering and inventory control of vaccines
- storage of vaccines
- temperature monitoring plan
- maintaining anaphylaxis kits
- break in cold chain procedures
- disposal of sharps
- how to handle an emergency (e.g., power supply is interrupted, assist with dealing with needlestick injury)

4) Ordering and managing vaccines and supplies, including syringes, needles, gloves, alcohol swabs, sharps container, and bandages. Ensure adequate supplies of vaccines (and other supplies) are always available in the pharmacy.

5) Assisting in the documentation of vaccines administered and ensuring that the immunizer has recorded data such as:

- Name of patient
- Date and time administered
- Product and manufacturer
- Lot number and expiry date
- Site administered
- Name of immunizer

Send documentation to family physician for patient continuity of care and maintain records for continuity of care.

6) Billing insurance plans.

7) Providing patient reminders for remaining doses of vaccines that require more than one dose (e.g., HPV vaccines) and/or booster doses. This may include placing reminders in the chart, phone calls or electronic reminders.

Pharmacy staff members need to be aware of provincial/territorial legislation, policies and procedures for providing vaccinations. This will ensure optimal results and increase patient safety.

8) Referring patients to the pharmacist

Some patients may require additional information and should be referred to the pharmacist. Examples could include:

- Patients with vaccine hesitancy
- Questions about drug-vaccine, disease-vaccine or vaccine-vaccine interactions
- Questions about vaccine safety in patients with allergies
- Questions about vaccine adverse effects

- Patients with a history of adverse reactions to vaccines

In addition to basic information on the technician's role listed above, more detail is provided on three key issues:

1. Proper vaccine transport, storage and handling (cold chain issues)
2. Interchangeability of vaccines
3. Vaccine safety and adverse reaction management

1. Proper vaccine transport, storage and handling

What Is the Cold Chain?

The "cold chain" refers to the process used to maintain optimal conditions during the transport, storage and handling of vaccines, starting at the manufacturer and ending with the administration of the vaccine to the client. Proper storage temperatures must be maintained at every link in the chain (transport, storage, handling) or the vaccine may be damaged and unsuitable for administration (exposure to excessive heat or cold can damage vaccines).⁽⁶⁾

Cold Chain Policies and Procedures

All pharmacies that provide immunizations should develop detailed written protocols for vaccine storage and handling, and for cold chain breaks. All personnel should receive appropriate cold chain training. This would include:

- Monitoring and recording the operation of the refrigerator/freezer twice daily.
- Ensuring that protocols and training are in place for the appropriate handling of vaccines during a disaster, power outage or equipment failure.

Instructions for Cold Chain Breaks

In the event of a cold chain failure, immediate action must be taken. A cold chain break protocol should be posted in an accessible location on or near the refrigerator. The following are key steps:

- Notify the vaccine coordinator (someone assigned to handle vaccine-related events, such as the pharmacy manager)
- Isolate and label vaccines with "Quarantine" and the date of cold chain break. Do not assume that exposure to suboptimal storage conditions has rendered the vaccines unusable. Do not dis-

card vaccines unless instructed to do so by your vaccine coordinator.

- Store the vaccine at appropriate temperatures and monitor the storage unit conditions.
- Transfer vaccine to an alternative storage unit if storage unit has failed (breakdown, power outage, human error, etc.)
- Identify the source of the failure (breakdown, power outage, human error, etc.)
- Complete appropriate cold chain break forms. A sample form from Health Canada is available at <https://www.canada.ca/en/public-health/services/publications/healthy-living/national-vaccine-storage-handling-guidelines-immunization-providers-2015.html#appf>
- Contact manufacturers and/or public health office for further guidance. ⁽⁷⁾

Organizing Your Refrigerator

The organization of a refrigerator should take into account vaccine requirements, convenience for staff, and the technical features of the refrigerators and freezers.

2. Interchangeability of vaccines

Similar vaccines from different manufacturers are routinely authorized for use in Canada. Circumstances such as vaccine shortages may necessitate giving vaccines from different manufacturers to the same individual over time. Because immunization schedules and specific products used vary across provinces and territories and among countries, questions about vaccine interchangeability may arise when evaluating the immunization status of persons new to Canada or people who have moved between jurisdictions. ⁽⁹⁾

- In general, the same manufacturer’s product should be used for all doses in a vaccine series. However, routine immunization should not be deferred because of the lack of availability of a specific product.
- To be considered interchangeable, the vaccines should:
 - be authorized with the same indications and with equally acceptable schedules,
 - be authorized for the same population, and
 - contain comparable type and quantity of antigen, and
 - be similar in terms of safety, reactogenicity, immunogenicity and efficacy.⁽⁹⁾

TABLE 2 - Vaccine Refrigerator Tips

Do	Place vaccine in breathable plastic mesh baskets and clearly label baskets by type of vaccine.
	Place vaccines in the middle of the compartment away from the coils, walls, floor and cold-air vent.
	Keep baskets 5–8 cm from walls and other baskets.
	Keep vaccines in their original boxes until you are ready to use them.
	Keep vaccines with shorter expiration dates to the front of the shelf/basket.
	Keep temperature between 2–8 degrees C (aim for 5 degrees C).
	Check and log temperature twice a day.
	Store full water bottles on empty shelves and on the door. Water bottles help maintain an even temperature in the compartments when doors are opened and closed. They will also help keep the temperatures stable longer in the event of a power failure.
	Place thermometer in the middle of the refrigeration unit.
	Always refer to vaccine product monographs for the most up-to-date information on storage information.
Do Not	Vaccine products that have similar packaging or similar sounding names should be stored in different locations to avoid confusion and medication errors. ⁽⁸⁾
	Store food or drink in the vaccine refrigerator – only vaccines in vaccine storage unit.
	Place vaccines in solid plastic trays or containers.
	Store vials out of their original individual packaging.
	Place vaccines in vegetable bins, doors, drawers or on floor of refrigerator.
Open door more than necessary. ⁽⁸⁾	

- Be aware that there are different versions of pneumococcal (Prevnar™ and Pneumovax 23™ for example) and meningococcal (Bexsero™, Trumenba™ and Menactra™ for example) vaccines that cover different strains of disease and are not interchangeable.
- In general, vaccine diluents are not interchangeable.
 - A pharmacist should be consulted regarding any interchangeability issues, as clinical decision-making may be required.

3. Vaccine Safety and Adverse Reaction Management

Adverse reactions after vaccination

Most instances of anaphylaxis to a vaccine begin within 30 minutes after administration of vaccine. Therefore, vaccine recipients should be kept under observation for at least 15 minutes after immunization; 30 minutes is a safer interval when there is a specific concern about possible vaccine allergy.

Pharmacy technicians should be aware of any patients that have been given an immunization and are waiting near the dispensary in case they feel unwell. Some possible symptoms include:

Fainting

During fainting, the individual suddenly becomes pale, loses consciousness and collapses to the ground. Fainting is sometimes accompanied by brief clonic seizure activity (i.e., rhythmic jerking of the limbs) which generally requires no specific treatment. If a patient is feeling faint, a pharmacist should be made aware and they should be put in a recumbent position. A technician can help assist the pharmacist by pulling out a reclining chair or a cot or mat for patient to lie on to avoid injury. Fainting is managed by placing the patient in a recumbent (lying down) position. Recovery of consciousness generally occurs within a minute or two, but the person may remain pale, diaphoretic

(sweating) and mildly hypotensive for several minutes.⁽¹⁰⁾ Patients should be advised rise slowly, first sitting then to standing when feeling better. They should also have someone else drive them home.

Anxiety

People experiencing anxiety may appear fearful, pale and diaphoretic and complain of light-headedness, dizziness and numbness, as well as tingling of the face and extremities. Hyperventilation is usually evident. Treatment consists of reassurance.⁽¹⁰⁾

Swelling and urticarial rash at the injection site

Swelling and urticarial rash (i.e., hives) at the injection site can occur but are not always caused by an allergic reaction. Patients with swelling or hives should be observed for at least 30 minutes in order to ensure that the reaction remains localized, and if so, the patient may leave after this observation period. Ice can be applied to the injection site for comfort. If the hives or swelling disappears, there is no evidence of any progression to other parts of the body, and no other symptoms develop within the 30-minute observation period, further observation is not necessary. However, if any other symptoms arise or if there is evidence of any progression of the hives or swelling to other parts of the body during the observation period, epinephrine should be given by the pharmacist.⁽¹⁰⁾

A mild local reaction resolving by itself within a few minutes is not indicative of an allergic reaction and does not require special observation or specialized assessment prior to subsequent vaccination.⁽¹⁰⁾

Anaphylaxis

Anaphylaxis is a serious, potentially life-threatening allergic reaction that can occur after the administration of a vaccine. Anaphylaxis is rare, with an estimated range of occurrence of one to 10 episodes per million doses of vaccine administered

Signs and symptoms of anaphylaxis

In anaphylaxis, signs and symptoms develop over several minutes and involve at least two body systems. Symptoms can include:⁽¹⁰⁾

- Itchy rash

- progressive, painless swelling of the face and mouth, which may be preceded by itchiness, tearing, nasal congestion or facial flushing
- respiratory symptoms, including sneezing, coughing, wheezing, laboured breathing and upper airway swelling (indicated by hoarseness and/or difficulty swallowing) possibly causing airway obstruction
- gastrointestinal symptoms, including abdominal pain and vomiting
- cardiovascular system symptoms, such as reduced blood pressure, chest pain, palpitations or tachycardia
- central nervous system symptoms, including altered mental status, dizziness or confusion.

Features of severe anaphylaxis include obstructive swelling of the upper airway, marked bronchospasm and hypotension. Hypotension can progress to cause shock and collapse. Unconsciousness is rarely the only manifestation of anaphylaxis; it usually occurs as a late event in severe cases.⁽¹⁰⁾

The rate of progression or the severity of the anaphylactic episode can be difficult to predict at the start of anaphylaxis. Symptoms are variable and only a few symptoms may be present. Death can occur within minutes.⁽¹⁰⁾

Anaphylaxis is often preventable and should be treatable in every case. If there is uncertainty whether it is truly anaphylaxis, it is appropriate for the pharmacist to administer epinephrine. The risk of anaphylaxis is greater than potential side effects from epinephrine. You should anticipate that any patient receiving a vaccine could develop anaphylaxis; therefore, protocols and supplies for initial management of anaphylaxis must be immediately available.⁽¹⁰⁾

Anaphylaxis management kits

Appropriate preparation is important for a good outcome in anaphylaxis. The first step in any anaphylaxis reaction is to call 911. Anaphylaxis management kits should be readily available wherever vaccines are administered. Epinephrine in an autoinjector or in a vial should be used to treat anaphylaxis. Prompt administration of epinephrine is a priority. Epinephrine solutions for injection (vials or autoinjectors) have a short shelf-life so all emergency supplies should

be checked on a regular basis and replaced when outdated.⁽¹⁰⁾

List of recommended items in an anaphylaxis management kit⁽¹⁰⁾:

- anaphylaxis emergency management protocol
- table of dosage recommendations for epinephrine and diphenhydramine hydrochloride (e.g., Benadryl) by weight and by age
- Two vials of aqueous epinephrine 1:1000
- Autoinjectors of epinephrine labelled by age and weight
- One vial of injectable diphenhydramine hydrochloride (may be given to relieve itching, flushing, urticaria, and nasal and eye symptoms).
- One bottle of oral liquid diphenhydramine hydrochloride and oral syringe
- Two - 1 mL syringes with attached needles (1 - 25-gauge, 1 inch needle; 1 - 25 gauge, 5/8 inch needle)
- One - 25-gauge, 5/8 inch needle
- Two- 25-gauge, 1 inch and 1.5 inch needles (extra for larger adults)
- Alcohol swabs

Reporting Adverse Events Following Immunizations

Healthcare providers should report events that are possibly associated with a vaccine and which cannot be clearly attributed to other causes. A causal relationship does not need to be proven and submitting a report does not imply causality.⁽¹⁴⁾

If a patient experiences an adverse event following immunization, the Adverse Events Following Immunization (AEFI) form (<https://www.canada.ca/content/dam/phac-aspc/documents/services/immunization/adverse-events-following-immunization-reporting-declaration-manifestations-cliniques-inhabituelles-suite-immunisation-eng.pdf>) should be completed and sent to your local Health Unit in your province/territory.

Summary

Pharmacy technicians are in an excellent position to facilitate and enable a pharmacy to implement an immunization program. Their roles include identifying patients that may be vaccination candidates, supporting the pharmacist, and operational/procedural tasks.



Resources

The Canadian Immunization Guide is a resource managed by Health Canada. To access the main page, go to <https://www.canada.ca/en/public-health/services/canadian-immunization-guide.html>

Direct links to two frequently accessed areas:

Details of currently available vaccines in Canada: <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines.html>

Cold Chain Guidelines from Health Canada: <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information/page-9-storage-handling-immunizing-agents.html>

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QUESTIONS

Please select the best answer for each question and answer online at eCortex.ca for instant results.

1. Which of the following patient groups may be identified as being possible candidates for immunizations:
 - a) Elderly
 - b) International travellers
 - c) Healthcare providers
 - d) All of the above
2. A pharmacy should have the following in their immunization policies and procedures:
 - a) Cold chain break procedures
 - b) Fridge temperature monitoring procedures
 - c) List of countries which requires yellow fever vaccination
 - d) A and B only
3. Which items do NOT need to be included when documenting a vaccination?
 - a) Name of patient
 - b) Administration site
 - c) Size of needle
 - d) Date and time administered
4. Which of the following immunization related tasks can NOT be done by a pharmacy technician?
 - a) Billing the patient's insurance plan
 - b) Assessing vaccine interchangeability
 - c) Booking booster appointments
 - d) Monitoring fridge temperatures
5. An adverse event related to a vaccine in Canada should be reported to:
 - a) Food and Drug Administration (FDA)
 - b) Health Canada
 - c) your local Health Unit in your province/territory
 - d) None of the above
6. Vaccine refrigerators should have their temperature monitored:
 - a) once a day
 - b) twice a day
 - c) once every two days
 - d) every 2 hours

7. The following items should NOT be stored in a vaccine refrigerator

- a) Water bottles
- b) Vaccines
- c) Staff lunches
- d) None of the above

8. Which are symptoms of anaphylaxis?

- a) itchy rash
- b) swelling near face or mouth
- c) laboured breathing
- d) any of the above

9. If there is a cold chain break:

- a) Promptly dispose of all affected vaccines
- b) Quarantine vaccines in a separate area of fridge and mark "Do Not Use"
- c) Do nothing until the manager arrives at the store
- d) None of the above

10. Which of the following statements are true?

- a) Anaphylaxis kits should be stored in the back of the dispensary
- b) Vomiting is not a sign of anaphylaxis

c) Measles/Mumps/Rubella vaccine is a live vaccine

d) Live vaccines must be given at least 7 days apart

11. Inactivated vaccines

- a) Cannot be given to patients with organ transplants
- b) Can cause the illness they are helping protect against
- c) Can be given to patients on immunosuppressive therapy
- d) None of the above statements are true

12. An anaphylaxis kit should contain

- a) Diphenhydramine vials
- b) Epinephrine auto injector
- c) Table of dosing recommendations
- d) All of the above

13. Which of the following statements are true?

- a) Hyperventilation is a common symptom of anxiety
- b) Patients who faint usually regain consciousness in 5-10 minutes

c) Hives are always caused by an allergic reaction

d) Patients should stay in the pharmacy for at least 30 minutes after their injection

14. Which of the following statements are true?

- a) Generally, vaccine diluents are not interchangeable
- b) Ideally, the same manufacturer's product should be used for all doses in a vaccine series
- c) All pneumonia vaccines are interchangeable
- d) A and B

15. When placing the thermometer inside the vaccine fridge

- a) It should be placed in the middle of the unit
- b) It should be placed on the floor of the unit
- c) It should be placed in the fridge door
- d) It does not matter where it is, as long as it's inside the fridge

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Pharmacy Technician's Role in Supporting Immunizations in a Pharmacy

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