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The pharmacy technician's evolving role in administering injections

by Sarah-Lynn Dunlop, BA, MEd, RPhT



Learning objectives

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

1. Recognize safe storage and handling of vaccines and other medications for injection requiring refrigeration.
2. Identify strategies to help prevent selection and administration errors.
3. Identify patients who may be eligible for administration of injections in community pharmacy practice.
4. Understand the evolving role of pharmacy technicians in administering injections.
5. Recognize standards of practice to ensure safe injection of medications.

Introduction

In 2019, community pharmacists across Canada administered nearly half of all influenza vaccines in the country and it is expected that community pharmacies will continue to be the

“most likely place for vaccination.”⁽¹⁻³⁾ With vaccines for COVID-19 arriving in Canada, community pharmacies have the potential to play a crucial role in administering these vaccinations as well. With approximately 11,000 community

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pharmacies across Canada, “the majority of Canadians live within 5 km of a pharmacy and many pharmacies are located in rural and remote communities, which will be critical to making vaccines accessible and for the administration of multiple doses.”^(4,5) Many community pharmacies also offer hours of operation that are convenient for patients to receive vaccinations and other medications by injection, including long hours of operation (opening early and staying open late), and being open on weekends and holidays. Community pharmacists and pharmacy technicians continue to be among the most easily accessible healthcare professionals and 81% of Canadians “regard the pharmacy as a safe place to get a vaccine.”⁽⁵⁾

Pharmacy technicians already play a crucial role in supporting and engaging in intra-professional collaboration with pharmacists who administer injections by ensuring safe handling and storage of injections, identifying patients who may benefit from a vaccine, and knowing which vaccines and other injectable medications pharmacists in their jurisdiction can administer.

Some provinces are exploring regulatory changes that would allow an expanded scope of practice for technicians, enabling them to administer injections, as delegated by a pharmacist. Pharmacy technicians with proper qualifications in Nova Scotia already have such authorization, as discussed below. In Ontario, legislation regarding the controlled act of administering injections was recently amended to allow pharmacy technicians in a pharmacy (or clinic) that “has an agreement with the Minister of Health related to the administration of the COVID-19 vaccine” to administer the COVID-19 vaccine.⁽⁶⁾ Pharmacy technicians will need to obtain proper qualifications through a training program through “third party providers specifically for technicians who are not currently trained to administer injections.”⁽⁶⁾ Other provinces are expected to follow suit, leading to new opportunities for technicians to be involved in patient care. As the role of pharmacy technicians evolves to allow technicians to administer injections, technicians will need to be familiar with training requirements and other responsibilities associated with administering injections, such as standards of practice in administering injections,

TABLE 1 - Tips on How to Organize & Manage Medication Refrigerators^(12, 13)

Do	Do Not
Place injections in trays or containers that allow for proper airflow.	Place injections on top shelf, floor of fridge, or in door shelves.
Leave 2-3” between trays/containers and fridge walls.	Store food or drink in the same fridge as medications.
Replace crisper bins with water bottles and place water bottles in door shelves, labelled “Do NOT drink,” to help maintain consistent temperature and prevent vaccines from being stored in areas where there may be temperature fluctuations (if not a purpose-built fridge).	Drink from or remove water bottles used to help maintain stable refrigerator temperatures.
Keep vaccines in original boxes with lids closed to prevent exposure to light.	Store sound-alike, look-alike medications together (e.g., Fluzone & Fluzone High-Dose; Havrix, Boostrix & Twinrix; Recombivax & Pneumovax; Twinrix & Twinrix Jr; Imovax Polio & Imovax Rabies; Havrix & Havrix Jr)
Store diluent with vaccine (if both stored in fridge).	
Place medications set to expire first at the front.	
Limit opening of fridge door and ensure door always closes properly.	
Put “Do Not Unplug” sign on fridge and near electrical outlet.	

infection control, and recognizing and managing adverse reactions and emergencies.

Safe Handling and Storage of Vaccines

Pharmacy technicians have the knowledge, skills and abilities to verify the integrity of products and to ensure drug products are stored under the correct conditions to preserve their “quality, safety and integrity.”⁽⁷⁾

The “Cold Chain”

Vaccines must be kept within a given temperature range in order to ensure safety and efficacy. Vaccines requiring refrigeration need to be stored between 2 and 8°C, while other vaccines may be required to be stored at temperatures as cold as -20°C or even -70°C.^(6,7) When vaccines are exposed to temperatures outside of their prescribed ranges, this can negatively affect these products, decreasing their potency and effectiveness, and rendering them unsafe for use.⁽⁸⁻¹⁰⁾ The “cold chain” is a process used to ensure vaccines are kept at the prescribed temperature range as they travel from the manufacturer all the way through to being administered to the

patient. Exposure of a vaccine to environmental conditions outside of those recommended for the specific product constitutes a breach in the cold chain.⁽⁹⁾

Pharmacy technicians in both hospital and community pharmacies play an integral role in ensuring the integrity of vaccines within the pharmacy until administration to the patient. They do this by evaluating drug products upon receipt, transferring products to the fridge or freezer upon receipt, and ensuring that these products are stored in the correct location, at the correct temperature. Pharmacy technicians can help monitor and record fridge temperatures at least twice daily to ensure correct storage of vaccines and other medications requiring refrigeration. In hospital pharmacy settings, technicians who need to deliver vaccines or other refrigerated injectable medications within the hospital, should use a temperature-controlled cooler for transport to maintain the cold chain.⁽¹¹⁾

Staying Organized to Help Prevent Selection & Administration Errors

Pharmacy technicians can also help with

the organization of drug products in the fridge to help ensure patient safety. Vaccines being stored in the fridge, in the community or hospital pharmacy or on a unit in the hospital, should be segregated

from other injectable medications to help prevent an incorrect product from being selected.⁽¹⁰⁾ The Institute for Safe Medication Practices (ISMP) has received numerous reports of administration of incorrect medications by injection. These include instances of accidentally selecting and administering insulin or the pneumococcal vaccine instead of the influenza vaccine, as well as instances where the high-dose influenza vaccine was inadvertently administered to patients who did not qualify for the high-dose vaccine, and vice versa.⁽¹⁰⁾ Pharmacy technicians should ensure that sound-alike, look-alike injections are not stored close together to help prevent the incorrect drug from being selected and administered to the patient.

Pharmacy technicians can also help ensure diluents are correctly stored with the vaccine (if both have similar storage conditions) and that expiry dates of both vaccines and diluents are monitored on a regular basis. This includes ensuring that multi-dose vials are labelled with the date opened and an expiry date of 28 days after opening (unless otherwise indicated by the manufacturer), as well as ensuring that open vials have not exceeded the assigned beyond-use-date.⁽¹¹⁾ Technicians should ensure that products which will expire first are placed at the front to be used first, and that expired products are promptly removed to help prevent patients from receiving expired products.^(9,10) See Table 1 for tips on how to organize and manage medication refrigerators.

Identifying Patients Who May Benefit from Vaccines

As front-line healthcare professionals, pharmacy technicians are in a prime position to help identify patients who may benefit from vaccination, or who otherwise may be able to receive a medication by injection at the pharmacy. In order to effectively identify such patients, technicians must be familiar with which medications pharma-

TABLE 2 - Scope of Practice of Pharmacists Administering Injections Across Canada⁽¹⁴⁾

Injection Authority (IM or SC)	BC	AB	SK	MB	ON	QC	NB	NS	NL	PEI	NWT	YT	NU
Any drug or vaccine	P	✓	✓	✓	✗	✓	✓	✓	✓	✓	✗	✓	✗
Vaccines (within jurisdiction)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗
Influenza Vaccine	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗

P = pending legislation, regulation, or policy for implementation

cists and pharmacy technicians in their jurisdiction can administer by injection, limitations to which patient populations can receive an injection in the pharmacy, as well as vaccine dosing schedules. Doing so allows pharmacy technicians to apply their competencies in supporting public health activities and participating in the delivery of health services in collaboration with the pharmacist.⁽⁷⁾

What Can Pharmacists Administer via Injection and To Whom?

In the majority of provinces and territories across Canada, pharmacists can administer the influenza vaccine as well as some other vaccines and medications, although it is important to check with your regulatory authority as to which additional vaccines and medications may be administered in your jurisdiction. It is also important to check with your regulatory authority to verify under which circumstances these can be administered. For example, in some provinces, drugs can only be administered by injection by a pharmacist for educational purposes or in an emergency situation.⁽¹⁴⁾ Table 2 outlines pharmacists' scope of practice across Canada regarding administration of medications by injection.

In some Canadian provinces and territories, pharmacists are restricted to administering injections to patients who are five years of age and older; however, with the current COVID-19 pandemic, this may change and pharmacy technicians should continue to stay up-to-date with such changes. For example, on December 11, 2020, pharmacists in Ontario received notice that they can now administer the influenza vaccine to children as young as two years of age.⁽¹⁵⁾

Flagging Patients

It is important, now more than ever, to minimize exposure to, and the spread of infec-

tious diseases, such as influenza and pneumonia, in addition to COVID-19—especially to vulnerable individuals, such as older adults, children, pregnant women, and individuals with underlying medical conditions. Pharmacy technicians can help identify patients who fall into these categories and be aware of which vaccines could be beneficial to these patient populations. All patients should receive the influenza vaccine annually (if medically able to do so). Leading up to and during the seasonal influenza vaccine campaign, pharmacy technicians can ask all patients if they have received their vaccine and if they would like to receive their vaccine at the pharmacy. Your pharmacy may be able to accommodate some vaccinations spontaneously and, when not able to do so, pharmacy technicians can help book appointments for patients and ensure that follow-up appointments are made for any vaccines that require multiple doses. Pharmacy technicians completing best possible medication histories in hospital practice can inquire as to whether patients have received their annual influenza vaccine, or other vaccines as they see fit, and remind patients to inquire at their community pharmacy to see if they can receive vaccinations there. Table 3 summarizes some vaccine recommendations for adults.

Patients who are travelling internationally may require additional travel vaccines. Check with your regulatory authority to determine if pharmacists can administer any travel vaccines your pharmacy is dispensing for patients and inform the patient that they may be able to receive their vaccination in the pharmacy when they pick up their prescription.

Some vaccines may require multiple doses to effectively produce immunity. It is important for pharmacy technicians to be familiar with these vaccines to help ensure that patients who are receiving their vacci-

TABLE 3 - Recommended Vaccine Schedules for Adults⁽¹⁶⁻¹⁸⁾

Vaccine	Recommended Administration and Number of Doses for Healthy Adults	Additional Notes on Recommendations for Adults at Risk
Influenza	Every year	Focus on adults: <ul style="list-style-type: none"> • At high risk of influenza-related complications • Capable of transmitting influenza to individuals at high risk • Who provide essential community services
Pneumococcal	65+ years Pneumococcal 13-valent conjugate (PNEU-C-13) followed by pneumococcal 23-valent polysaccharide (PNEU-P-23)	
Diphtheria and tetanus	Primary series if previously unimmunized Booster every 10 years	
Herpes zoster (Shingles)	2 doses RZV (recombinant zoster vaccine) for adults 50 years of age and older	Also consider for adults 50 years of age & older who: <ul style="list-style-type: none"> • Previously received LZV (live zoster vaccine) • Have had previous episode of herpes zoster
	1 dose of LZV (live zoster vaccine)	For adults 50 years of age & older where RZV is contraindicated, unavailable or inaccessible
Pertussis (Tdap)	1 dose as an adult + during each pregnancy	Adults who will be in close contact with young infants should be immunized as early as possible. In pregnancy, should be administered between 27 and 32 weeks of gestation
Human papillomavirus (HPV)	3 doses	HPV2 (bivalent) for females up to and including 45 years of age HPV9 (nonvalent) for females and males up to and including 45 years of age Men 27 years of age and older with ongoing risk of exposure: HPV9
Meningococcal (meningitis)	1 dose at 24 years or younger	Adults up to & including 24 years of age not immunized in adolescence Adults who: <ul style="list-style-type: none"> • Have occupational risk exposure • Travel to an area where meningococcal vaccine is recommended • Are at high risk of meningococcal disease due to medical conditions (i.e., Asplenia or hyposplenism (including sickle cell disease), HIV)
Hepatitis A	2 doses	Recommended for adults who: <ul style="list-style-type: none"> • Travel to or are from hepatitis A endemic areas • Are close contacts of someone from hepatitis A endemic country or with suspected or proven case of hepatitis • Have occupational or lifestyle risk • Have chronic liver disease
Hepatitis B	3 doses	Recommended for adults who: <ul style="list-style-type: none"> • Travel to or are from areas where there is high prevalence of hepatitis B & are known to be susceptible to hepatitis B • Are household or sexual contacts of acute hepatitis B cases & hepatitis B carriers • Have occupational or lifestyle risk for exposure • Have chronic liver disease • Have chronic renal disease • Have congenital immunodeficiencies • Are HIV-infected

nation in the pharmacy have all appointments scheduled to ensure they receive all doses as per the vaccine schedule recommendations. The two earliest COVID-19 vaccines approved in Canada, for example, require two doses, with two doses of the Pfizer-BioNTech COVID-19 vaccine usually

administered 21 days apart and two doses of the Moderna COVID-19 vaccine usually administered 28 days apart.⁽¹⁹⁾

It is also important for pharmacy technicians to remember that, while there may be different types of vaccines available for the same disease (e.g., meningococcal, hepatis

B), that these are not necessarily interchangeable. Pharmacy technicians should refer to reliable resources (e.g., Canadian Immunization Guide) or consult with the pharmacist to ensure correct vaccine selection and administration if they are unsure.

TABLE 4 - Pharmacist and Pharmacy Technician Roles and Responsibilities in Administering Injections^(21,22)

Pharmacist	Pharmacy Technician
Delegating technical activity of administering injection	Accepting delegation of technical activity of administering injection
Providing adequate supervision or direction for pharmacy technician administering injection	Ensuring competence to administer injection
Ensuring patient has been given enough information about benefits, risks and possible adverse reactions, and procedures to make informed decision	Ensuring environment provides patient privacy, allows for aseptic techniques, and contains easy access to necessary supplies for administering injection & managing adverse reactions or emergencies
Ensuring patient has given informed consent	Practising proper hand hygiene and using aseptic techniques when preparing & administering medication
Assessing patient's current state of health	Selecting correct drug and diluent (where applicable)
Determining therapeutic appropriateness, including timing of injection, contraindications, etc.	Checking expiry dates of injections and diluents (where applicable)
Providing pharmacological recommendations on managing pain or other adverse effects associated with injection	Ensuring integrity of medication before preparing for injection (e.g., no particulate matter, damage, irregularities, contamination)
Ensuring follow-up plan is in place	Selecting correct needle & syringe for patient & medication
	Ensuring integrity of needles & syringes before use
	Ensuring post-injection observation takes place
	Documenting details of injection administration
	Following pharmacy policies and procedures to ensure adequate infection control & safety of patient, self and community

TABLE 5 - General Procedures for Reconstitution of Vaccines⁽²²⁾

Follow instructions for reconstitution of each product.
Verify correct drug and diluent.
Check expiry date of both drug and diluent.
Inspect vials for any irregularities.
Wipe rubber stopper with alcohol and let dry prior to use.
When introducing diluent to powder, add down side of vial and not directly into powder to help prevent foaming.
Mix diluent and powder using gentle swirling motion. Do not shake unless medication instructions recommend doing so.
Note (and record) the duration of stability of the reconstituted medication and ensure it is not used beyond that time. Ensure proper storage of diluted product, when needed.

The Evolving Role of Pharmacy Technicians

As the role and scope of practice of Canadian pharmacists continue to expand, pharmacy technicians may see their own role and scope of practice follow suit. Pharmacy technicians taking on additional responsibilities with regards to technical functions can allow pharmacists to focus even more time on providing therapeutic care for patients. The National Association of Pharmacy Regulatory Authorities (NAPRA) Professional Competencies for Canadian Pharmacy Technicians at Entry to Practice include preparing sterile products according to recognized guidelines and standards of practice, contributing to the maintenance of a healthy environment for the public, and accepting referrals from and making referrals to the pharmacist, placing pharmacy technicians in a prime position to expand their scope of practice through the technical administration of injections.⁽⁷⁾

Changes to the Nova Scotia Pharmacy Practice Regulations, effective October 5, 2020, allow pharmacists in Nova Scotia who are authorized to administer injections to delegate the act of administering injections to a pharmacy technician who holds a Drug Administration by Injection Technical Permit.^(20,21)

Required Training for Pharmacy Technicians Administering Medications by Injection

In Nova Scotia, a Drug Administration by Injection Technical Permit allows a pharmacy technician to accept delegation from a pharmacist to “perform the technical activity of administering a drug by injection.”⁽²¹⁾

In order to receive this permit, pharmacy technicians must complete an accredited training program on administering injections and hold current First Aid and cardiopulmonary resuscitation (CPR) certifications.⁽²¹⁾ Injection training programs must include the opportunity “to have land-marked and administered the medication into the site under the guidance of an individual who assesses and confirms their competency.”⁽²¹⁾

Responsibilities in Administering Medications by Injection

When pharmacy technicians accept dele-

TABLE 6 - Recommendations on Needle Length and Gauge⁽²²⁾

Route & Site of Administration	Patient	Needle Length	Gauge (G)
Subcutaneous (SC) Upper triceps area	All patients	5/8"	23–25 G
Intramuscular (IM) Deltoid muscle of arm	Ages 2–18	5/8"	22–25 G
	Adults < 130 lbs (60kg)	5/8–1"	22–25 G
	Males 130-260 lb (60-118kg) & Females 130-200lb (60-90kg)	1"	22–25 G
	Males > 260lbs (118kg) & Females > 200 lbs (90kg)	1.5"	22–25 G

gation of administering an injection from a pharmacist, the pharmacist is responsible for determining therapeutic appropriateness, including the timing of drug administration.⁽²¹⁾ Pharmacy technicians hold multiple responsibilities upon accepting delegation to administer an injection including ensuring that they have the knowledge, skills and abilities to competently administer a given medication by injection.⁽²¹⁾ See Table 4 for pharmacist and pharmacy technician roles and responsibilities.

Preparing for Administration of Injection

Before administering a medication by injection, pharmacy technicians must properly prepare the medication. Table 5 reviews general procedures for reconstitution of vaccines. Pharmacy technicians must also ensure they have all supplies necessary to prepare and administer the medication, treat adverse reactions and emergencies, and ensure that post-immunization observation takes place.⁽²¹⁾ The following supplies should be available when administering injections:⁽²¹⁾

- variety of sizes of needles and syringes
- appropriate personal protective equipment (especially during COVID-19)
- first aid kit
- anaphylaxis kit with epinephrine
- sharps container
- additional supplies as outlined in the pharmacy’s policies and procedures.

Administering Medications by Injection

Pharmacy technicians in Nova Scotia are permitted to administer drugs by injection intramuscularly (IM) and subcutaneously (SC) to patients two years of age and older and must consider patient factors, such as age and weight, when selecting needle size for administration.^(21,22) It is important to

select the correct needle length based on the patient, route of administration, and the medication being injected to ensure the medication reaches the correct tissue site only.^(22,23) When administering IM injections, select a needle that is long enough to reach muscular tissue.⁽²²⁾ Use of a sufficiently long needle is associated with fewer injection site reactions, such as swelling and redness; however, care should be taken not to select too long of a needle for IM injections in order to avoid hitting underlying bone, nerves or blood vessels.⁽²²⁾ See Table 6 for recommendations on needle length and gauge.

IM injections should be administered at a 90° angle, generally in the deltoid muscle, while SC vaccines should be administered at a 45° angle, generally in the triceps area, pinching the skin to help ensure injection reaches subcutaneous tissue.^(22,23) Syringe size will be chosen based on the volume to be administered and typically will be either a 1 mL or 3 mL syringe.^(22,23)

When administering an injection, it is important to withdraw the medication from the vial immediately before administration to help reduce the risk of contamination, administration errors and wastage, and to help preserve the stability of the medication.⁽²²⁾

Infection Prevention and Control

Pharmacy technicians administering injections must adhere to aseptic techniques, including practising proper hand hygiene and disinfecting both the vial stopper and the patient’s skin. Proper hand hygiene can include either washing hands with soap and water or using an alcohol-based hand sanitizer when hands are not visibly soiled, before medication preparation and between each patient. Prior to drawing the

medication into a syringe, pharmacy technicians must wipe the vial stopper with isopropyl alcohol, allowing the stopper to dry before inserting the needle, and must wipe the patient’s skin at the site of administration with isopropyl alcohol, allowing it to dry before injecting the needle to kill any pathogens that may be on the skin.^(22,23) A new needle must be used for each patient and for each injection!^(22,23) Used together, these actions can help prevent the introduction, or spread, of infections.

With the ongoing COVID-19 pandemic, additional measures are required to help reduce the spread of COVID-19 in the pharmacy. This may include, but is not limited to, scheduling appointments for injections in the pharmacy further apart to allow for physical distancing between patients, increased cleaning between patients, additional personal protective equipment with more frequent changing for pharmacy staff, and patient screening for COVID-19 symptoms before injection.⁽²⁴⁾

Preventing Needlestick Injuries

An important strategy to prevent the transmission of potential diseases from a patient to a healthcare professional who is administering injections involves preventing needlestick injuries. To help prevent needlestick injuries, pharmacy technicians should:⁽²⁵⁾

- Use safety-engineered needles and syringes
- Place used needles in an easily accessible, designated puncture-resistant sharps container immediately after use
- Not re-cap a used needle
- Not change a needle between withdrawing medication from vial and administering medication (unless the needle is contaminated or damaged)
- Follow additional policies and procedures as outlined by public health and their place of practice.

Recognizing and Managing Emergencies

Pharmacy technicians administering injections must be prepared to recognize and manage adverse reactions, which can range from anxiety-induced reactions, to minor reactions at the site of injection, to life-threatening anaphylactic reactions. This may involve providing basic first aid, performing CPR, and/or administering emergency medications, such as epinephrine, and calling 911.^(21,26)

TABLE 7 - Comparing Anxiety-Induced Reactions to Anaphylactic Reactions⁽²⁶⁾

	Anxiety-Induced Reactions	Anaphylactic Reactions
Loss of consciousness & other CNS reactions	Vasovagal syncope (reflex fainting) typically occurring during or within minutes of injection Lightheadedness, loss of consciousness that improves with change to supine or head down position	Severe anxiety or distress; Loss of consciousness with no improvement with change to supine or head down position
Skin	Generalized pallor; Cold, clammy skin	Pruritus, urticaria, flushing, angioedema
Respiratory System	Hyperventilation, Breath-holding	Coughing, sneezing, stridor, swelling of lips/tongue, dyspnea, airway obstruction, respiratory distress
Cardiovascular System	Bradycardia	Tachycardia
Additional Symptoms		Nausea, vomiting, diarrhea, abdominal pain; Lethargy, drowsiness

TABLE 8 - Recommended Items for an Emergency Anaphylaxis Kit⁽²⁶⁾

<p>Laminated Documents</p> <ul style="list-style-type: none"> • Clear, concise summary of emergency management protocol • Epinephrine dosages by weight and age
<p>Drugs</p> <ul style="list-style-type: none"> • Epinephrine 3 vials of 1:1000 (1 mg/mL) solution for IM injection
<p>Injection supplies</p> <ul style="list-style-type: none"> • Two 1 cc syringes with attached 25 gauge needle (one 1 “ and one 5/8”) • Three extra 25 gauge needles of varying sizes (5/8”, 1 or 1/25”, 1/5”)
<p>Other</p> <ul style="list-style-type: none"> • Scissors • Alcohol swabs • Tongue depressors • Pocket mask • Wristwatch with second hand (for heart rate) • Ready access to a phone to call emergency services • Flashlight

Pharmacies should have an anaphylactic kit ready, which pharmacy technicians can help prepare and check on a regular basis to ensure adequate, in-date stock. See Table 8 for recommended items to keep in an emergency anaphylaxis kit.

If a patient receiving an injection shows signs and symptoms of anaphylaxis, call 911 or direct someone to call 911, assess the individual's airway, breathing and circulation, and administer epinephrine intramuscularly.⁽²⁶⁾ Epinephrine should be administered at the onset of anaphylaxis in order to help reduce the risk of hospitalization and death as it prevents and relieves upper airway swelling, hypotension, and shock and increases heart rate and bronchodilation.⁽²⁶⁾ It is important to keep in mind that it is better to give epinephrine than to not give epinephrine. There are no contraindications to the use of epinephrine and “failure to administer epinephrine promptly may result in greater risk to the vaccinee with anaphylaxis than using epinephrine improperly”.⁽²⁶⁾

Conclusion

As the role of pharmacists continues to expand and with greater demands being placed on healthcare professionals in the midst of the COVID-19 pandemic, pharmacy technicians may see their own role and scope of practice quickly expand, possibly including the administration of medications by injection as recently seen in Nova Scotia and Ontario. Pharmacy technicians should be aware of the responsibilities of administering medications by injection, whether through managing the cold chain and helping ensure patient safety

While some adverse reactions may occur immediately, not all do, and the post-injection observation period allows healthcare professionals to monitor patients. It is important to note that post-immunization observations may, or may not, look different during the COVID-19 pandemic. For example, the Canadian Immunization Guide recommends that patients receiving vaccines be observed post-vaccination for at least 15 minutes, and up to 30 minutes if there is a concern about an allergy.^(22,27) The National Advisory Committee on Immunization (NACI) is recommending that the usual 15-minute post-vaccination observation period for patients with no known history of immediate reactions or severe allergic reactions be maintained, unless appropriate physical distancing cannot be maintained.⁽²⁷⁾ If physical distancing cannot be maintained, NACI states that a post-vaccination observation

time of five to 15 minutes may be considered.⁽²⁷⁾ Pharmacy technicians administering injections should stay current with NACI and public health recommendations, especially with the ongoing COVID-19 pandemic.

It is important that pharmacy technicians be confident in their ability to recognize different adverse reactions and to collaborate with the pharmacist to manage them. Table 7 compares the symptoms of anxiety-induced reactions and anaphylactic reactions.

“Anaphylaxis is a severe, potentially life-threatening allergic reaction” which can present quickly after administration of an injection.^(26,28) In an anaphylactic reaction the patient’s blood pressure will drop and their airway will become narrow, blocking breathing.⁽²⁶⁾ Pharmacy technicians administering injections should be prepared to recognize and manage anaphylactic reactions with each injection administered.

while pharmacists administer injections, or pursuing injection training and taking on the additional responsibilities that accompany the technical activity of administering injections themselves. Box 1 provides a list of resources pharmacy technicians may use to review information regarding administering injections in Canada, especially during COVID-19. It is crucial that pharmacy technicians stay current with changing information and maintain their knowledge, skills and abilities in order to continue to provide safe and effective patient care.

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BOX 1 - Additional Resources for Pharmacy Techs

- **Canadian Pharmacists Associations**
<https://www.pharmacists.ca/education-practice-resources/patient-care/influenza/influenza-2020-2021-suggested-best-practices-for-pharmacies/>
- **Canadian Immunization Guide**
<https://www.canada.ca/en/public-health/services/canadian-immunization-guide.html>
- **National Advisory Committee on Immunization**
<https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci.html>
- **Guidance for Influenza Vaccine Delivery in the Presence of COVID-19**
<https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/guidance-influenza-vaccine-delivery-covid-19.html>
- **NAPRA Supplemental Competencies on Injection for Canadian Pharmacists**
https://napra.ca/sites/default/files/2017-09/Supplemental_Competerencies_on_Injection_for_Canadian_Pharmacists2012.pdf
- **Provincial and Territorial Vaccine Schedules for Adults**
<https://www.canada.ca/en/public-health/services/provincial-territorial-immunization-information/routine-vaccination-healthy-previously-immunized-adult.html>
- **Provincial and Territorial Vaccine Schedules for Infants and Children**
<https://www.canada.ca/en/public-health/services/provincial-territorial-immunization-information/provincial-territorial-routine-vaccination-programs-infants-children.html>

Learning from Influenza Vaccine Errors to Prepare for COVID-19 Vaccination Campaigns. November 19, 2020. <https://ismp.org/acute-care/medication-safety-alert-november-19-2020/ecri> (accessed December 27, 2020).

11. NAPRA Model Standards for Pharmacy Compounding on Non-Hazardous Sterile Preparations. November, 2016. <https://napra.ca/general-practice-resources/model-standards-pharmacy-compounding-non-hazardous-sterile-preparations> (accessed January 25, 2021).

12. BC Centre for Disease Control. Vaccine Storage and Handling: Quick Guide Reference for those that handle vaccines. December 2019. <http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Immunization/Cold%20Chain/bccdcoldchainresourcescreen.pdf> (accessed January 1, 2021).

13. Centers for Disease Control and Prevention. Storage Best Practices for Refrigerated Vaccines. February 2018. <https://www.cdc.gov/vaccines/hcp/admin/storage/downloads/storage-fridge.pdf> (accessed January 1, 2021).

14. Canadian Pharmacists Association. Pharmacists' Scope of Practice in Canada. June 2020. https://www.pharmacists.ca/cpha-ca/assets/File/pharmacy-in-canada/Scope%20of%20Practice%20in%20Canada_June2020.pdf (accessed January 1, 2021).

15. Ontario College of Pharmacists. Expanded Scope of Practice. <https://www.ocpinfo.com/practice-education/expanded-scope-of-practice/> (accessed January 1, 2021).

16. Government of Canada. Immunizations of Adults: Canadian Immunization Guide. December 24, 2020. <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-3-vaccination-specific-populations/page-2-immunization-of-adults.html#p3c1t1> (accessed January 14, 2021).

17. Government of Canada. NACI immunization recommendations update: Pneumococcal Vaccines. December 1, 2016. <https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2016-42/ccdr-volume-42-12-december-1-2016/ccdr-volume-42-12-december-1-2016-improving-vaccination-rates-4.html> (accessed January 25, 2021).

18. Government of Canada. NACI Update on the recommended use of HPV Vaccine. June 1, 2017. <https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2017-43/ccdr-volume-43-6-june-1-2017/summary-naci-update-recommended-use-human-papillomavirus-vaccine.html> (accessed January 25, 2021).

19. Government of Canada. Recommendations on the use of Covid-19 vaccine. January 12, 2021. <https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-use-covid-19-vaccines.html> (accessed January 14, 2021).

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22. Government of Canada. Vaccine administration practices: Canadian Immunization Guide. December 3, 2020. <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information/page-8-vaccine-administration-practices.html> (accessed January 4, 2021).

23. Centers for Disease Control and Prevention. Vaccine Administration. November 2, 2020. <https://www.cdc.gov/vaccines/pubs/pinkbook/vac-admin.html> (accessed January 5, 2021).

24. Government of Canada. Guidance for influenza vaccine delivery in the presence of COVID-19. August 5, 2020. <https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/guidance-influenza-vaccine-delivery-covid-19.html> (accessed January 5, 2021).

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canadian-immunization-guide-part-2-vaccine-safety/page-4-early-vaccine-reactions-including-anaphylaxis.html#t1 (accessed January 5, 2021).

27. Government of Canada. Recommendations on the Duration of Post-vaccination Observation Period for Influenza Vaccination during the COVID-19

Pandemic. October 14, 2020. <https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-duration-observation-period-post-influenza-vaccination-during-covid-19-pandemic.html> (accessed January 3, 2021).

28. Mayo Clinic. Anaphylaxis. September 14, 2019. <https://www.mayoclinic.org/diseases-conditions/anaphylaxis/symptoms-causes/syc-20351468> (accessed January 6, 2021).

QUESTIONS

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

- Which of the following best describes the cold chain?
 - Set of processes to ensure vaccines are kept at the correct temperature from the manufacturer to the healthcare professional administering the vaccine.
 - Set of processes to ensure vaccines are kept at the correct temperature from the manufacturer to the patient receiving the vaccine.
 - Set of processes to ensure vaccines are kept at the correct temperature from the manufacturer to the pharmacy.
 - All of the above.
- Pharmacy technicians with a Drug Administration by Injection Technical Permit in Nova Scotia should choose which of the following needles for an 18-month-old child
 - 5/8"
 - 1"
 - 1.5"
 - None of the above.
- Which of the following statements is TRUE?
 - Both IM and SC injections should be administered at a 90° angle
 - When administering IM injections in the deltoid muscle of the arm, the skin should be pinched
 - When administering SC injections in the triceps area of the arm, the skin should be pinched.
 - All of the above are true.
- EM, a pharmacy technician in hospital practice, is selecting medications to re-fill the automated dispensing unit (ADU) on the surgical unit when they receive a phone request to bring more Tdap vaccine to the emergency department. EM should do all of the following EXCEPT?
 - Double check expiry dates and choose the box that will expire first.
 - Immediately remove from fridge so as not to forget to bring it to the emergency department and continue selecting medications for the surgical unit.
 - Select Tdap and have a second pharmacy technician double check that the correct product has been selected.
 - Transport unit in a temperature controlled cooler.
- When re-filling the Tdap vaccine in the emergency department's fridge, which of the following should EM NOT do?
 - Ensure Tdap is placed in correct bin.
 - Ensure adequate airflow surrounding bins.
 - Remove Tdap vials from box so nurses have easier and quicker access to product.
 - Ensure vials that expire first are placed in the front of the bin.
- KB, a pharmacy technician, has noticed that the pharmacy fridge seems crowded and that it has been difficult to find products easily. It is a slow day, so KB decides to check the fridge for outdated stock, add labels to the bins to identify medications, and organize the fridge. Which of the following should KB do while organizing the fridge to help protect patient safety?
 - Arrange the bins of medications in alphabetical order.
 - Move any injections from the door of the fridge to a bin on a shelf.
 - Remove water bottles from the fridge.
 - KB should perform all of the above actions.
 - KB should not perform any of the above actions.
- SC, a regular patient at the community pharmacy where CA, a pharmacy technician, works brings in a prescription for heartburn and notifies you that she is 29 weeks pregnant. CA should ask SC if she has recently received which of the following vaccines?
 - Diphtheria and tetanus
 - Herpes zoster
 - Pertussis
 - Pneumococcal
- ES is a pharmacy technician working in a community pharmacy administering the COVID-19 vaccine. Which of the following are reasonable actions for ES to perform?
 - Book an appointment for the second dose of the Pfizer BioNTech COVID-19 vaccine 28 days after the first dose.
 - Ensure pharmacy has adequate PPE for administering vaccines and supplies for additional cleaning.
 - Ensure patients are pre-screened before entering the pharmacy for a vaccination.
 - B & C
 - A B & C
- SM is a pharmacy technician who can accept delegation from a pharmacist to administer an injection. Which of the following is SM's responsibility?
 - Ensuring the injection is being given at the right time.
 - Inspecting the vial for irregularities.
 - Providing advice on managing pain with medications at the injection site.
 - Selecting correct needle length and syringe size.
 - A & B
 - B & D
- AP, a pharmacy technician, is booking appointments for influenza vaccine at her community pharmacy during COVID-19. Which of the following should AP and the pharmacy consider when booking the appointments?
 - Gathering patient information before the appointment (e.g., Has the patient had the influenza vaccine in the past? Has the patient had any reactions to any vaccinations in the past? Does the patient have any known allergies?)
 - Pre-screen patients virtually or via phone before patients arrive for the appointment
 - To ensure physical distancing in the pharmacy, permit patients with no known

history of reactions to the influenza vaccine to leave upon receiving their vaccination.

- d) A & B only
- e) A, B, and C

11. Pharmacy technicians should do which of the following in order to help prevent needlestick injuries?

- a) Prepare several doses at the beginning of the day to avoid handling multiple needles
- b) Re-cap needles after use, before placing in sharps container
- c) Use safety engineered needles and syringe
- d) All of the above

12. Upon receiving an injection, a patient loses consciousness. Which of the following can help TK, the pharmacy technician, determine if this is vasovagal syncope (fainting) due to anxiety rather than due to anaphylaxis?

- a) Cold, clammy skin
- b) Regaining consciousness when moved into head down or supine position
- c) Tachycardia
- d) A & B
- e) A, B & C

13. Which of the following should NOT be done when reconstituting a vial for an injection?

- a) Add diluent slowly down side of vial
- b) Gently shake to form a uniform suspension
- c) Inspect vial and diluent before and after mixing
- d) Note and document duration of stability after reconstituting

14. LM, a pharmacy technician, is gathering information on MZ, a new patient to the community pharmacy. LM enters MZ's date of birth and notes that MZ is 66-years old. Which of the following actions should LM perform?

- a) Add a note asking the pharmacist to determine if MZ is up-to-date on vaccines.
- b) Ask MZ if they have received the herpes zoster and pneumococcal vaccines and if they received the annual influenza vaccine.
- c) Notify MZ that it is important for individuals over 65 years of age to receive the herpes zoster, influenza, and pneumococcal vaccine and book MZ an appointment to receive these in the pharmacy.

d) All of the above are reasonable actions for a pharmacy technician to perform.

15. DD is a pharmacy technician administering vaccines in a busy community pharmacy. The pharmacy has considered appropriate post-immunization observation times as well as physical distancing protocols when booking appointments during DD's shift. To help save time, DD dons a pair of nitrile gloves to wear for the day and prepares all 16 syringes. Which of the following statements is TRUE?

- a) DD should wash their hands between patients instead of wearing nitrile gloves.
- b) DD should use isopropyl alcohol on their gloved hands between each patient.
- c) DD should prepare each syringe to inject at each scheduled appointment.
- d) A & C
- e) B & C

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