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INSTRUCTIONS

1. After carefully reading this lesson, study each question and select the one answer you believe to be correct. For immediate results answer online at www.Canadian HealthcareNetwork.ca.

2. To pass this lesson, a grade of at least 70% (11 out of 15) is required. If you pass, your CEU(s) will be recorded with the relevant provincial authority(ies). (Note: some provinces require individual technicians to notify them.)

CE FACULTY

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pharmacy practice

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Beyond the flu:
factors in immunization

by Jennifer Chan, R.Ph., B.Sc.(Pharm)., CDE, CPT

Learning objectives

After successful completion of this lesson, pharmacy technicians will be able to do the following:

1. Describe the various types of vaccines that an injection-certified pharmacist can provide and to answer common questions asked by patients regarding vaccines.
2. Identify a technician's role in collaborating with the pharmacist to facilitate and implement vaccine services into everyday workflow.
3. Identify the important contraindications to various vaccines and to help screen patients for vaccine eligibility.

Introduction

Community pharmacies are increasingly being viewed by the public as the destination of choice when it comes to receiving vaccinations. Many injection-certified pharmacists have received advanced training to offer the public convenient, accessible and expanded vaccination services. Most vaccines being requested by the general public fall into two main categories (see Table 1).

The indications for routine and travel vaccinations are age-specific and disease-specific, and the timing of routine vaccine administrations follow vaccination schedules set out by individual provincial guidelines.[1,9] However, many routine vaccinations may also

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be required during outbreak situations or changes in a vaccine schedule/legislation might require "catch-up vaccinations." Some examples of special situations for vaccination include the pertussis outbreak in BC and Alberta in 2012, the measles outbreak in many parts of North America during 2014-2015, and a government-issued human papillomavirus (HPV) vaccine "catch-up program" for women aged < 26 years old in June 2013.[3]

However, it is important to keep in mind that all vaccine schedules are guidelines only, and that vaccines from either category can be required for various reasons (patient request, supplement to school-based programs, outbreak control, post-exposure, and case-by-case). For those special situations that might deviate from vaccination guidelines, the pharmacy technician can always refer a patient to an injection-certified pharmacist to assess and confirm the patient's eligibility and need. The technician holds a very pivotal role in conjunction with the pharmacist's expanded scope of administering injections, acting as a front-line contact in support of the public's vaccination needs.

With the surge in vaccination-related inquiries at the pharmacy counter, strong collaboration and communication among all pharmacy staff will help ensure the safe implementation and delivery of vaccination services and information for the patient.

TABLE 1

Routine Immunizations[2]:	Travel Immunizations[2]:
Influenza (seasonal) vaccine Pneumococcal vaccine Varicella zoster (chickenpox) vaccine Hepatitis B vaccine Mumps, measles, rubella (MMR) vaccine Tetanus-diphtheria-pertussis vaccine Herpes zoster (shingles) vaccine Polio vaccine Meningococcal vaccine Human papillomavirus vaccine	Hepatitis A vaccine Hepatitis B vaccine Cholera/E. coli vaccine (oral) Typhoid vaccine Meningococcal vaccine Rabies vaccine Yellow fever vaccine Japanese encephalitis vaccine

Important factors for pharmacy-operated vaccination programs

In order to facilitate smooth and timely public access to vaccination services, a technician should gain an overall understanding of the factors that are of key importance for pharmacy-operated vaccination programs and be able to provide accurate information to patients regarding vaccines.

Maintaining the Cold Chain

The cold chain is an uninterrupted series of distribution and storage activities performed in a completely temperature-controlled supply chain.[4] In order for a vaccine to remain safe and effective from the time it is manufactured to the time it is administered to the patient, it must remain constantly at temperatures between 2°C–8°C.[4] The vaccine's strict maintenance at this temperature applies to when it is in transit and in storage.[4] For some vaccines, even one occurrence of exposure to temperatures outside of the recommended range will render the vaccine completely ineffective, and potentially not provide adequate protection against a vaccine-preventable disease if it is still administered to a patient.[4] Hence, all pharmacy personnel must understand the importance of checking and documenting the fridge temperature at least twice a day, and the importance of immediately notifying the pharmacist of any temperature fluctuations outside of 2°C–8°C.[4] The technician should also educate the patient about how the cold chain is vital for maintaining the safety and efficacy of the vaccine, especially when a patient picks up a vaccine from the pharmacy and needs to transport and store it outside of a pharmacy's strictly regulated fridge, for administration at a later date or at another location (e.g., doctor's office or health authority).[4] For vaccines that must be reconstituted (e.g. yellow fever, MMR, shingles), it is important for technicians to make sure that the reconstituted vaccine is stored properly and used within the recommended time frame in the product monograph. For example, reconstituted yellow fever vaccine must be kept refrigerated and used within 60 minutes following reconstitution.

Inventory Management

It is very important for each pharmacy to establish a routine for checking that all electronic records are an accurate representation of the vaccine stock on hand. The technician should routinely check vaccines at regular intervals (ex. every month end), and double-check prior to injecting and dispensing that they are still within the expiry date. It is also good practice to store vaccines in a medical-grade fridge with clear sliding doors (for ease of visual checks), and to always keep vaccines within the strict cold chain of 2°C–8°C. For example, there is a greater risk of exposure of the vaccines and medications to above 8°C temperatures if the technician leaves the fridge door open for too long, or takes too many vaccines out of the fridge at a time during an inventory check. All vaccines with upcoming expiries should be marked and/or segregated to be used up first, and the system should be communicated to all pharmacy staff members. During inventory checks, if the technician discovers a pattern of certain vaccines constantly expiring before use (whether due to low usage or short-dated products), then the technician should promptly adjust the ordering process accordingly to minimize future vaccine losses. It is important to be proactive in ordering only the most common vaccines to carry on hand in order to cater to patient vaccination needs, as the amount and type of vaccines do vary with each pharmacy's unique clientele and the timing in the year.

Patient Education/Adherence Factors

One of the questions most commonly asked by patients is the cost and availability of vaccines. Technicians can positively influence vaccination rates by providing accurate and educational information to the patient. It is generally best practice to check with the pharmacy's main vendor if the requested vaccine is in stock, when it can be delivered to the pharmacy, and the approximate cost to the patient. It is also a good practice to receive full or partial payment from the patient for the vaccine prior to ordering; most vendors and manufacturers do not accept any returns of vaccines under any circumstances, due to

TABLE 2 - Recommended vaccines – Quick reference chart[6,7]**

Pneumococcal	Seasonal Influenza	Varicella Zoster (Chickenpox)
Trade Names*: Pneumovax 23 (PPV23), Prevnar 13 (PCV13) Age limit: Conjugate (PCV13) ≥ 2 months Polysaccharide (PPV23) ≥ 2 years Adult Booster: Booster doses only recommended in patients ≥ 65 years old or in younger patients with specific immunocompromising conditions, Lifetime max: 3 doses of PPV 23 and 1 dose of PCV13 Special consideration: For adults, conjugate (PCV13) is ideally administered first, then followed 8 weeks later by one dose of polysaccharide (PPV23). If PPV23 has already been administered, conjugate PCV13 can be given one year later.[2] PCV13 + PPV23 combination is recommended in certain patients (asplenia, sickle cell disease, immunosuppression, chronic kidney disease, chronic liver disease) Avoid if: pregnant (no safety data available) Pneumococcal pneumonia complications, if not vaccinated: bacteremia, pleural effusion (excess fluid around the lungs)	Trade Names*: Agriflu, Fluad/Fluad Pediatric, Fluzone, Fluviral, Influvac, Vaxigrip, Flumist Quadrivalent (nasal) Age limit: ≥ 6 months old: 1 dose (if previous history of influenza vaccination) 6 mo–8 yrs old: IM 2 doses, at 0 & 1 month (if first time influenza vaccination) Flumist Quadrivalent: ≥ 2 years old: 1 dose Booster: Annually Flumist Quadrivalent only: avoid if pregnant, children < 24 months, severe asthma, 2–17 years old on acetylsalicylic acid (ASA) therapy, and immunocompromised patients. Precautions: If previously had GBS (Guillain-Barré Syndrome) or ORS (Oculorespiratory syndrome); serious acute illness. Influenza complications, if not vaccinated: Pneumonia, severe muscle inflammation	Trade Names*: Varivax III, Varilrix Age limit: ≥ 12 months old Booster: Not necessary. May test for antibodies against varicella to verify childhood immunity. If no or low immunity: Give 2 doses of univalent varicella vaccine, at least 6 weeks apart. Avoid if: pregnant, severely immunocompromised, or in close contact with immunocompromised persons. Special considerations: All existing chickenpox vaccines are LIVE, attenuated vaccines. Chickenpox complications, if not vaccinated: necrotizing fasciitis (flesh-eating infection), encephalitis, pneumonia
Measles/Mumps/Rubella(MMR II)	**Tetanus/Diphtheria /acellular Pertussis (Tdap)**	**Herpes Zoster (Shingles)**
Trade Names*: MMR II, Priorix Age limit: ≥ 12 months old Booster: Individuals born prior to 1970 (1957 for health care workers) are generally assumed to have acquired immunity, and no booster is required. Those born between 1979-1991 might have received measles/rubella only, and require a booster dose, esp. in outbreak scenario. Avoid if: Allergy to egg or neomycin, pregnant Special considerations: All existing MMR vaccines are LIVE, attenuated vaccines.MMR complications, if not vaccinated: Measles: Bronchopneumonia, acute encephalitis (brain inflammation/swelling) Mumps: meningitis, deafness, orchitis (testicular inflammation). Rubella: arthralgia, encephalitis	Trade Names*: Adacel, Boostrix Many more pediatric formulations combined with other vaccines (e.g., polio, Haemophilus influenzae type b) in Canada Age limit: ≥ 4 years Booster: Tdap: once per adult lifetime. Tetanus (Td): every 10 years. Avoid if: Allergy to neomycin or polymyxin B, or if have a seizure disorder or brain disorder (for pertussis-containing vaccines) Tdap complications, if not vaccinated: Diphtheria—membrane obstructing airway, neuritis, myocarditis Tetanus – severe muscle spasms, suffocation, neurological damage Pertussis—Apnea (suspension of breathing), seizures, pneumonia	Trade Names*: Zostavax II Adult Route/sched: SC (single dose) Age limit: ≥ 50 years old Booster: None recommended Avoid if: Pregnant, immunocompromised or in close contact with immunocompromised persons; However, NACI states that it can be administered to patients receiving low-dose immunosuppressive therapy[10] (see section on Possible contraindications to receiving LIVE, attenuated vaccine below). Special considerations: All existing shingles vaccines are LIVE, attenuated vaccines. Shingles complications, if not vaccinated: postherpetic neuralgia, vision loss, neurological problems
Polio (IPV)	**Hepatitis B**	**Human Papillomavirus (HPV)**
Trade Names*: Imovax Polio, Td Polio Adsorbed Age limit: Imovax Polio ≥ 6 weeks old Td Polio Adsorbed®: ≥ 7 years old Booster: One life-time booster after age 18 if travelling to endemic areas Avoid if: Allergy to neomycin, streptomycin, polymyxin B Polio complications, if not vaccinated: Paralysis of chest muscles, permanent paralysis	Trade Names*: Engerix B, Recombivax® Adult Route/sched: IM 0-1-6 months (infant vaccination & catch-up in grade 6) Accelerated sched: 0-7-21 days, 1 year Age limit: no age limit 0-19 years old: use pediatric dose ≥20 years old: use adult dose Booster: Only required if titre is low Hepatitis B complications, if not vaccinated: Cirrhosis, liver cancer, chronic hepatitis B infection	Trade Names*: Cervarix, Gardasil/Gardasil 9 Adult Route/sched: Gardasil/Gardasil 9: IM at 0, 2, and 6 months Cervarix: IM at 0, 1, and 6 months (Manitoba: 0 and 6 months only) Age limit: Female: 9-45 years old Male (only Gardasil): 9-26 years old Booster: Not indicated because protection lasts at least 7–9 years. Avoid if: pregnant HPV complications, if not vaccinated: Cervical, vaginal, vulvar, penile, anal and oropharyngeal cancers; genital warts

TABLE 2 CONTINUED - Travel vaccines – Quick reference chart**

Hepatitis A	Meningitis	Rabies
Trade Names*: Havrix, Avaxim, Vaqta Route/sched: Vaqta: 2 doses IM at 0 and 6-18 months Avaxim: 2 doses IM at 0 and 6-36 months Havrix: 2 doses IM at 0 and 6-12 months Age limit: ≥ 1 years old Vaqta: 1-17 years old: use pediatric dose ≥ 18 years old: use adult dose Avaxim: 1-15 years old: use pediatric dose > 12 years old: use adult dose Havrix: 1-18 years old: use pediatric dose ≥19 years old: use adult dose Booster: 20-25 years and if titre is low Avoid if: allergy to neomycin Hepatitis A complications, if not vaccinated: Prolonged and relapsing liver disease lasting up to 6 months.	Trade Names*: Menactra, Menjugate, Meningitec, NeisVac-C, Menveo, Nimenrix, Menomune, Bexsero Route/schedule for travel purposes only: ≥ 2 years old: 1 dose IM booster (Meningococal C vaccines are part of childhood immunization schedules) Age limit: > 2 months old Special indications: travelling for Hajj, close living quarters (dorms) Avoid if: pregnant Meningitis complications, if not vaccinated: deafness, gangrene (tissue death), amputation, neurological damage.	Trade Names*: Imovax Rabies Route/sched: IM 3 doses at 0, 7, and 21 to 28 days Age limit: No age limit Booster: 2 years if at risk Avoid if: high-risk pregnancy, allergy to neomycin Rabies complications, if not vaccinated: Delirium, convulsions, death due to respiratory paralysis
Hepatitis A + B	**Yellow Fever**	**Cholera/E. coli (Travellers' diarrhea and cholera vaccine)**
Trade Names*: Twinrix Route/sched: IM 0-1-6 months Accelerated sched: 0-7-21 days, 1 year Age limit: ≥ 1 years old 1-18 years old: use pediatric dose ≥19 years old: use adult dose (1-15 years old alternate schedule: 2 adult doses given at 0 & 6–12 months) Booster: Hepatitis A: 20-25 years and if titre is low Hepatitis B: Only required if titre is low Avoid if: allergy to neomycin Hepatitis A + B complications, if not vaccinated: see separate Hep. A and Hep. B sections above.	Trade Names*: YF-VAX Route/sched: SC (single dose) Age limit: ≥ 9 months old Booster: Every 10 years Special indications: Certain countries in Africa, Central America and South America require proof of vaccination to grant entry into the country. Avoid if: Allergy to eggs, pregnant (women must have pregnancy test prior to administration) Special considerations: All existing Yellow Fever vaccines are LIVE, attenuated vaccines. Yellow Fever complications, if not vaccinated: kidney, liver failure, coma, death	Trade Names*: Dukoral Route/sched: >6 years old: PO 2 doses at 0, 7 days 2-6 years old: give 3 doses (space all doses at least 1 week apart, and finishing the last dose at least 1week before departure) Age limit: ≥ 2 years old Reactions: bad taste, abdominal pain, diarrhea Booster: For E. Coli protection (If last dose was taken between 3 mo – 5 yrs ago): 1 single dose 2 weeks prior to departure. For cholera protection (If last dose was taken between 2-5 yrs ago): 1 single booster dose 2 weeks prior to departure. After 5 years: full course required. Avoid if: pregnant Cholera/E. coli complications, if not vaccinated: debilitating severe diarrhea
Hepatitis A + Typhoid	**Typhoid (injectable)**	**Japanese Encephalitis**
Trade Names*: Vivaxim Route/sched: IM (1 dose) Age limit: ≥ 16 years old Booster: Hepatitis A: 6-36 months Typhoid: 2-3 years Avoid if: allergy to neomycin Hepatitis A + Typhoid complications, if not vaccinated: see separate Hep.A and Typhoid sections above.	Trade Names*: Typhim Vi, Typherix Route/sched: IM (single dose) Age limit: ≥ 2 years old Booster: In 2-3 years **Typhoid (oral)** Trade Names: Vivotif Route/sched: 1 capsule PO on days 1, 3, 5, and 7 (4 pills total) Age limit: > 5 years old Booster: 7 years Avoid if: pregnant Typhoid complications, if not vaccinated: Encephalitis, endocarditis, delirium.	Trade Names*: Ixiaro Route/sched: IM 2 doses 0, 28 days Age limit: ≥ 18 years old Booster: 12-24 months if at risk (limited long-term data) Avoid if: pregnant Japanese Encephalitis complications, if not vaccinated: seizures, confusion, paralysis

IM–intramuscular injection; NACI–National Advisory Committee on Immunization; PO–oral/take by mouth; SC–subcutaneous injection

*Only common trade names are listed as a general reference only, and trade names listed are current in Canada as of 2015. This table does not contain an inclusive list of all possible vaccine trade names on the market. Please refer to the Canadian Immunization Guide[6] for an updated list of active vaccines.

**All vaccine schedules listed in Tables 2 serve as a general and initial reference only. All vaccine schedules may be subject to possible changes over time and to variances between provincial guidelines, and it is vital to consult the latest Canadian Immunization Guide[6] for the most up-to-date vaccine schedule and guideline in your province.

the many challenges of ensuring that the cold chain has been kept intact.

A technician can positively influence vaccination uptake by educating and reassuring patients that receiving a full course of a vaccine is the best way to protect themselves and those around them from preventable diseases. Technicians can also inform patients that the most common adverse reactions to all vaccines include minor pain, redness or swelling at injection site, and possible fever or fatigue for one to three days post-vaccination.[5] These vaccine-related side effects are usually very mild or absent, and are preferable to contracting the disease and its possible serious complications. Many vaccinations require booster doses, and a technician can use the quick reference guide (Table 2) to provide accurate and timely answers to most general questions about vaccine eligibility and contraindications.

Vaccines available for distribution or administration at the pharmacy

Table 2 summarizes key information for vaccines available for distribution or administration at the pharmacy. Trade names, availability and recommended dosing schedules may vary among the provinces. It is important to note that all "recommended vaccines" listed in Table 1, with the exception of the influenza and the shingles vaccine, are included as part of routine childhood vaccination schedules (which vary by province). It would be very useful for the technician to consult Canada's vaccination guide for infants and children[9] and print out the individual set of childhood schedules specific for the province of practice, as a reference for the pharmacy.

During any preliminary conversation with patients, one of the most important checks is for a technician to rule out general contraindications to receiving immunizations. Although the injecting pharmacist will always re-confirm the absence of contraindications, the patient can receive seamless and professional care if the technician does the initial screening prior to committing the patient to purchasing or booking an appointment for a vaccine.

Possible Contraindications to receiving an inactivated vaccine[5]

- Patient history of a severe, allergic reaction (hives, throat swelling, difficulty breathing, and/or shock) to related medications, vaccines, egg/egg products, gelatin, thiomersal, neomycin, gentamicin, formaldehyde, and/or latex
- Active infection or illness, especially a respiratory infection (cold or flu)
- Patient history of Guillain-Barré Syndrome directly after receiving a vaccination
- Female only: Pregnant or breastfeeding, currently and within the next month

TABLE 3 - Other vaccinations that are available in Canada but NOT routinely offered at pharmacies:

- Bacille Calmette-Guérin (BCG) Vaccine
- Haemophilus influenzae type B Vaccine
- Poliomyelitis Vaccine
- Rotavirus Vaccine
- Smallpox Vaccine

Possible Contraindications to receiving LIVE, attenuated vaccine[2,5]

- All contraindications that apply to an inactivated vaccine
- Patient history of receiving another live, injectable vaccine in the last 28 days. (Multiple live vaccines can be administered at the same time or 4 weeks apart). Live, injectable vaccines include:
  - Varicella zoster (Chickenpox)
  - Herpes Zoster (Shingles)
  - MMR
  - Yellow Fever
- Certain immunological, neurological, or blood disorders
- Patients undergoing treatments for cancer, leukemia, HIV or any other immune system condition
  - Administer live, injectable vaccines at least 14 days prior to onset of ongoing treatment.
- Patients taking strong or high-dose immunosuppressant medications.
  - **Significant immunosuppression includes use of:**
    - Prednisone > 20mg for 14 days or more
    - disease-modifying antirheumatic drugs (DMARDs): e.g., etanercept (Enbrel), infliximab (Remicade)
    - Asplenia, HIV and other known immunodeficiency states
  - **Drugs NOT considered as significant immunosuppression:**
    - Prednisone ≤ 20 mg/day
    - Methotrexate < 0.4 mg/kg/week
    - Azathioprine < 3 mg/kg/day
    - 6-Mercaptopurine < 1.5 mg/kg/day
    - Sulfasalazine
    - Hydroxychloroquine
    - Topical, nasal, inhaled or intra-articular (joint) corticosteroid injections
- Patient history in the past year of receiving a blood transfusion, or being given immune (gamma) globulin or having radiation therapy

If there is a concern with any of the above contraindications, the technician can explain to the patient that it is possible for an injection-certified pharmacist or other healthcare practitioner to assess a patient on a case-by-case basis and still proceed with a vaccination. However, the injecting healthcare practitioner would most often take extra precautions specific to the patient's medical history (e.g. strict monitoring for anaphylaxis post-vaccination, using specific vaccine brands or medical supplies to avoid an allergen, or using a nonstandard vaccine dose/schedule).

How technicians can best assist a pharmacist in providing vaccinations to patients

Screening at each patient encounter

- It is our duty as professionals working in the healthcare field to improve public vaccination rates and educate patients to make informed decisions regarding vaccine-preventable diseases.
- A technician can prompt a conversation and ask each of the following groups of patients if they have received the following applicable vaccinations:
  - **50 years old and up**
    - Shingles
    - Influenza
    - Pneumococcal
    - Tetanus
    - Tdap
  - **Anyone who is going to travel (Book a travel health consult with the pharmacist to assess travel needs, if the pharmacy provides this service)**
    - Hepatitis A & B
    - Typhoid
    - Tetanus
    - Traveller's diarrhea & cholera
    - Others, less common: Yellow fever,

Rabies, Japanese encephalitis, meningitis

- **Pediatric (5 to 18 years old)**
  - · HPV (also females 9–45 and males 9–26 years)
  - · Hepatitis B
  - · Remember: an injection-certified pharmacist in Canada can only inject patients above a certain age limit (Example: 5 years or older in BC and Ont, but 7 years or older in MB). All patients younger than the age limit (province-specific) must be referred to their doctor or local health unit to complete their childhood vaccinations. (Legislation that regulates pharmacist-administered injectable vaccines and intranasal flu vaccine (e.g. Flumist) is still varied throughout the provinces.)

Scheduling appointments

- Assess need to obtain prescription from a physician prescriber for insurance coverage
- Screen for absolute contraindications for the vaccination (refer to Table 2 above and to sections on possible contraindications to inactivated and live vaccines) and refer to pharmacist for obvious concerns during screening.
- Check for stock availability from local supplier
- Book an appointment time for patient after anticipated stock delivery date
- Process full payment or partial deposit for the cost of vaccine
- Ensure vaccine order is successfully placed with appropriate vendor

During/after the appointment

- Choose the appropriate consent form for the patient to fill out
- Ask important screening questions:
  - Do you have any serious illness or are you feeling sick today?
  - Any allergies to medications or vaccines?
  - Are you taking any medication that may affect or impair your immune system?
  - NOTE: if the patient says YES to any of these important questions (often contraindications to vaccination), the pharmacist must be consulted to assess if they can proceed with the vaccination.
- Notify the injections pharmacist immediately to prepare for the vaccination
- Help process any applicable prescriptions for the vaccine(s) and process billing for public and/or private insurance coverage (In certain provincial legislations, some vaccinations are covered under some third-party insurances without the requirement of a physician's prescription)
- Process payment for the vaccine and the vaccination service if not prepaid already.
- Once this is all completed, provide the patient with proper expectations:
  - To wait in a designated area and the patient will be called as soon as the pharmacist is ready to provide the vaccination
  - To be prepared to wait on the premises for at least 15 minutes following any type of vaccination. Emphasize that this is for the patient's safety so that the pharmacist is available on hand, in the rare event of any allergic reactions, to help assess and treat the patient.
  - The pharmacist will provide the patient with documentation of the vaccine(s) he or she received, including the vaccine name, lot number, dose, etc. Our pharmacy will also be keeping permanent records of vaccines administered in our pharmacies. The pharmacist can also help document vaccinations in patients' own personal record book, if they have that available. It is highly recommended for everyone to keep a record of their own personal vaccination history in their medical records.
  - For vaccinations related to travel, patients should carry their vaccination records with them. (This is especially important for the yellow fever vaccination, as such documentation is a mandatory requirement in certain countries to allow entry and travel.)
- If a series of vaccinations is required, the pharmacy technician could set reminders to contact the patient before the date of the next vaccinaction and increase compliance.

Keeping current with vaccine information

Vaccination information such as dosing schedules, new recommendations, doses, and types of products available on the market, can change very rapidly with time and with provincial legislation changes, and it is vital that all technicians try to always provide patients with the most accurate and current information. Listed below is a useful list of reference links for keeping up with the most current vaccine recommendations:

- Health Canada / Canadian Immunization Guide - www.hc-sc.gc.ca/index-eng.php
- Immunize Canada – www.immunize.cpha.ca/en/default.aspx
- National Advisory Committee on Immunization (NACI) - www.phac-aspc.gc.ca/naci-ccni/index-eng.php
- CDC Disease Outbreak – www.cdc.gov/outbreaks/
- CDC Traveler's Health – http://wwwnc.cdc.gov/travel/notices
- Government of Canada - http://healthycanadians.gc.ca/healthy-living-vie-saine/immunization-immunisation/index-eng.php
- Public Health Agency of Canada – www.phac-aspc.gc.ca/temp-pmv/notices-avis/index-eng.php

• World Health Organization (WHO) – www.who.int/topics/immunization/en/

Summary

Many health authorities across the country are recognizing the significant contribution injection-certified pharmacists have on increasing immunization rates. However, the general adult Canadian population is under-immunized for routine vaccine-preventable diseases, and pharmacies will continue to be called upon by the public to help remedy their unmet vaccination needs.[8] A technician can provide the best bridge to seamless care between that first patient inquiry to the moment the patient finally receives a vaccine from an injection-certified pharmacist. Many patients may approach the counter with concerns about vaccinations, and a technician can act as a solid healthcare figure, providing reassurance and educational information. A technician's thorough understanding of the various vaccines offered and the critical steps needed to ensure safe and appropriate vaccination, will streamline a pharmacy's workflow and efficiency, and ultimately reduce the risk of morbidity and mortality from devastating vaccine-preventable diseases.

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QUESTIONS

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

1. Routine vaccinations such as MMR, tetanus, and hepatitis B vaccines, are only required once in a lifetime during the initial childhood immunization schedules.

a) TRUE b) FALSE

2. To properly regulate and maintain the cold chain of a vaccine and preserve a vaccine's safety and potency, a technician must:

a) Check the fridge temperature once every 2 days
b) Ensure all vaccines taken out of the fridge are returned back to the fridge at the end of the business day.
c) Check that vaccine product is always stored between 2°C -8°C.
d) Educate the patient that if a vaccine is picked up at the pharmacy, it has been stored properly and hence can be left at room temperature in the patient's home setting.

3. A technician can help provide accurate and educational information to the patient, by reassuring the patient of the following:

a) Most of the effective vaccines are very expensive, but can be ordered promptly from the manufacturer for delivery to the pharmacy.
b) To help the patient make an informed decision about a vaccine, the pharmacy staff can help figure out the approximate cost of vaccines prior to ordering a vaccine and can co-ordinate with any insurance plans for payment.
c) If the cost of the vaccine is a concern for the patient, the patient can choose not to receive the full course of a vaccine and still receive adequate protection from the disease.
d) Most pharmacies can order the vaccine ahead of time for the patient, and return the vaccine back to the manufacturer should the patient change their mind.

4. One of the most frequently asked questions by patients is regarding the side effects of receiving a vaccination. A technician can confirm that for most vaccines, in general, common side effects can:

a) Include minor pain and soreness at the injection site
b) Include nausea and vomiting
c) Often persist for 10-14 days after a vaccination
d) Cause permanent side effects

5. Which of the following is NOT a live vaccine?

a) Hepatitis B vaccine
b) Herpes Zoster (Shingles) vaccine
c) Oral Typhoid vaccine
d) Yellow Fever vaccine

6. Which of the following statements is TRUE?

a) All inactivated vaccines are safe for children 2 years and older
b) The possible side effects of most vaccines are more serious than the complications of disease the vaccine prevents.
c) If the patient is pregnant, it is recommended that she avoid all vaccinations in all trimesters, including the influenza vaccine.
d) To ensure the most effective protection against a disease, some vaccines require booster shots depending on the patient's age, medical history and the risk of exposure to the disease.

7. An absolute contraindication to receiving a vaccine is a patient history of being severely allergic to a substance. Which of the following are NOT common ingredients in a vaccine?

a) Egg protein
b) Preservatives (e.g. formaldehyde, thiomersal)
c) Shellfish protein
d) Antibiotics (e.g. neomycin, gentamicin)

8. Which of the following statements is FALSE:

a) The polio vaccine should be administered as a booster every time a traveller visits an endemic area.

b) A tetanus vaccine booster is recommended for all adults every 10 years.
c) The shingles vaccine can be administered to patients over 50 years of age.
d) The live MMR (mumps, measles, rubella) vaccine cannot be given to women who are pregnant.

9. In situations where ongoing medication (e.g., chemotherapy or radiation treatments) will cause immunosuppression, a live vaccine can be administered at least how long before the onset of treatment?
a) 7 days b) 14 days
c) 1 month d) 1 year

10. If a patient has received a live, injectable vaccine, they can receive a different live, injectable vaccine 28 days later.
a) TRUE b) FALSE

11. Which medications are considered strong immunosuppressant medications and may be a contraindication to a patient receiving a live vaccine?
a) Sulfasalazine
b) Inhaled corticosteroids
c) Prednisone > 20 mg/day for more than 14 days
d) Hydroxychloroquine

12. When screening patients for vaccine eligibility, which of the following vaccines is NOT routinely recommended in patients aged 50 years and up?
a) Shingles vaccine
b) Influenza vaccine
c) Meningitis vaccine
d) Pneumococcal vaccine

13. Which of the following statements about travel vaccinations is TRUE?
a) All travellers to Asia must be screened to receive a Yellow Fever vaccine.
b) Most travel vaccines have to be administered separately from each other by 28 days.
c) The vaccination needs of each traveller will vary depending their age, medical history, travel destination and travel activities.
d) A pregnant woman can receive most travel vaccinations, without restrictions.

14. Which of the following actions would help expedite the pharmacy workflow to help provide a safe and efficient vaccination service for the patient?
a) Telling the patient to hold on to all questions about a vaccination until the pharmacist can administer the vaccine.
b) Reassuring the patient that cost of vaccines is generally very affordable and the patient can pay after the vaccine has been administered.
c) Check the approximate cost and availability of the vaccine prior to booking the patient for an appointment.
d) Assume that most vendors would have the vaccine available and promptly book the patient for an appointment on the next order delivery day to not waste the patient's time.

15. As soon as the injection-certified pharmacist has completed the injection, the technician can reassure the patient that they can leave the premises and to call the pharmacy if they experience any side effects post-vaccination.
a) TRUE b) FALSE

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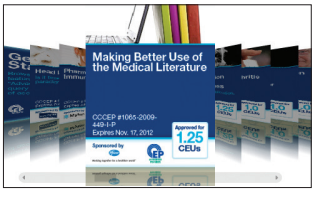

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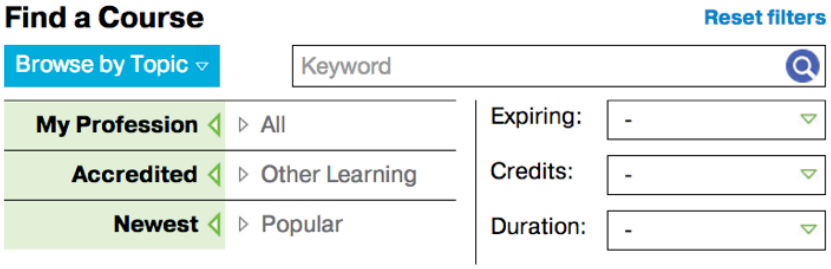

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