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FOR TECHNICIANS**

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Instructions

1. After carefully reading this lesson, study each question and select the one answer you believe to be correct. Circle the appropriate letter on the attached reply card.
2. Complete the card and mail, or fax Mayra Ramos at (416) 764-3937.
3. Your reply card will be marked and you will be advised of your results in a letter from *Tech Talk*.
4. To pass this lesson, a grade of 70% (7 out of 10) is required. If you pass, you will receive 1 CEU.

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Infectious diseases and the pharmacy technician

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Statement of objectives

Upon successful completion of this lesson, the technician should be able to:

1. Describe the different types of infectious diseases that pharmacy technicians may encounter.
2. Review prevention strategies for infectious diseases, including hand washing and vaccination.
3. Outline inventory management issues that may arise in the case of an infectious disease outbreak and how to manage them.

Introduction

Infectious diseases are common concerns in any healthcare setting. Several routes of transmission exist for infectious diseases, but in most cases more than just casual contact is necessary to contract an infection from another individual. Within the pharmacy environment, through contact with patients who are ill, pharmacy technicians may be at risk of contracting or transmitting infecting pathogens.

This lesson will review some common infectious diseases that may be encountered in the pharmacy and how pharmacy technicians can protect themselves and others. Pharmacy technicians can refer to the Health Canada website at www.hc-sc.gc.ca/pphb-dgsp-sp/ah-sa_e.html for further information on other infectious diseases. How to ensure appropriate pharmacy supplies and customer service in the event of an infectious disease outbreak will also be addressed. Treatment of specific infectious diseases is beyond the scope of this lesson.

Infectious diseases in the healthcare setting

An infectious disease is an acute condition caused by a pathogen, or an organism, such as a virus, bacteria or fungus that is foreign to the host or person who is infected. Infectious diseases are transmitted by various routes, including through direct contact with blood, by the fecal-oral route, via aerosol or in an airborne fashion. These routes of transmission are described in further detail in the context of the infections discussed below.

The common cold

The common cold is a viral infection of the upper respiratory tract (i.e., the nose, throat and upper airways) and is one of the most common acute conditions. There are many different types of virus that can cause the common cold, including rhinoviruses and coronaviruses. Symptoms of a cold are generally mild, including nasal congestion and discharge, sneezing, sore throat and dry cough that eventually becomes productive. Most colds last about one week and are self-limiting. Although colds generally do not have serious conse-

quences, they can lead to lost work and school days. Cold viruses are easily transmitted by hand-to-hand contact and also via contact with other objects that have been in contact with infected people (such as telephones or cash registers).¹

Influenza

Influenza is an infection of the upper respiratory tract that causes fever, muscle aches and dry cough. It takes three to five days after infection for symptoms to develop, and a person can remain infectious from the day before symptoms appear until seven days afterwards. The infection usually lasts for about a week.²

Influenza is transmitted via aerosol droplets, and it can spread rapidly, especially in crowded settings, such as health-care facilities. During the winter season in Canada, the weather enables the influenza virus to survive longer outside the body than in warmer, more humid conditions, thus leading to an increase in outbreaks between November and April. Elderly people, or those with chronic illnesses such as diabetes or kidney

disease, are more likely to have serious consequences from influenza, including pneumonia and subsequent death.^{2,3}

Gastrointestinal infections

Various types of pathogens can cause gastrointestinal infections, which often manifest with acute diarrhea. The most common types of gastrointestinal infections that can be passed from person to person are those caused by *Shigella*, a bacteria found in contaminated food or water, or viruses, such as the Norwalk virus. These infections can be transmitted by the fecal-oral route, by consuming contaminated food or beverages, and through close contact (such as sharing food or drink). Failing to wash hands after using the bathroom contributes to the spread of infection.⁴ Since these types of infections can be spread by contact, hand washing plays an important role in prevention.

Hepatitis

Hepatitis is an infection that causes inflammation of the liver. The most common types of hepatitis virus are A, B and C. Hepatitis B and C are more likely than the others to be transmitted in the healthcare setting. Hepatitis causes symptoms such as jaundice, dark urine, fatigue, nausea, vomiting and abdominal pain. An individual can become infected with one of these viruses if they come into contact with blood or other body fluids from an individual who is infected with the virus.

Hepatitis A is generally transmitted by the fecal-oral route, either through contaminated food or water or through interpersonal contact (including household and sexual contact). The hepatitis A vaccine is recommended for individuals who may be at risk (e.g., travellers to areas of poor hygiene, homosexual men).⁵

Hepatitis B is the most serious type of hepatitis, potentially leading to cirrhosis or liver cancer. Hepatitis B is spread when the blood or body fluids of an infected person enters someone who is not immune to the disease, not by casual contact or through food or water.⁵ Fortunately there is a vaccine available to prevent this infection.

Hepatitis C is transmitted via infected blood, primarily through the use of contaminated needles in injection drug users. There is currently no vaccine for hepatitis C.⁶

SARS

SARS (Severe Acute Respiratory Syndrome) is believed to be transmitted via aerosol droplets. This mode of transmission occurs when small droplets are excreted by coughing or sneezing and ultimately reach another person through the nose or throat. There is currently no information about the degree of exposure that causes transmission of SARS to another individual.

SARS causes a number of symptoms including high fever, dry cough and difficulty breathing. It is believed that

the virus can incubate for two to 10 days before these symptoms appear. Symptoms can become more serious, and some patients have required the use of a ventilator to support breathing.⁷ According to the World Health Organization, the overall mortality rate due to SARS is estimated at about 15 per cent.

The recent SARS outbreak resulted in the implementation of serious measures, including quarantine, to control the disease. However, health authorities did not recommend barrier precautions (e.g., face masks) for people in the community (including pharmacy teams) who had not been exposed to SARS. In the event that SARS occurs again, it is important to consider the risks involved when delivering medication to a quarantined patient's home. Pharmacies should have a process in place, based on current public health recommendations, for precautions to take when making home deliveries to these individuals.

HIV (Human Immunodeficiency Virus)

HIV is the virus responsible for causing AIDS (Acquired Immunodeficiency Syndrome). This disease causes severe impairment in immune response, thus leading to a high risk of serious infections and, ultimately, to death.

Although HIV is more commonly spread through sexual contact, in the healthcare setting, it can be spread through infected blood (needle

stick injuries). Pharmacy technicians should avoid handling sharps that have come into contact with blood or other body fluids where possible to prevent transmission of HIV and other blood-borne viruses, such as hepatitis B. It is important to note that HIV is not spread through casual contact with a person with HIV or AIDS.⁸

Prevention of infectious diseases

Hand hygiene

Frequent hand washing is the single most important practice that pharmacy technicians should adopt to prevent transmission of infectious diseases. The optimal method of washing hands involves the following steps:

- Remove jewelry from hands.
- Rinse hands under warm running water.
- Lather with soap or cleanser—create friction by rubbing hands together (remember thumbs, under nails and backs of hands and fingers).
- Rinse hands under warm running water.
- Dry hands with a single-use towel.
- Turn the faucet off with the towel to avoid recontamination.⁹

Hands should be washed frequently throughout the day, including when entering the pharmacy (e.g., when starting work or when coming back after lunch or a break), after using the washroom or dealing with currency, and when leaving for the day. Hands should be dried with disposable paper towels; hot air drying has been associated with increased bacterial contamination.^{10,11}

Various types of cleansers are available (see Table 1). Soaps are detergents that remove dirt and organic substances from the hands. Unless they have an antimicrobial ingredient, they are not antibacterial but can remove some transient sur-

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face microbes. Liquid soaps in pump dispensers are less likely to cause contamination than bar soaps. Antibacterial soaps are not necessarily required. There is no evidence that there is a decreased incidence of infection when using antibacterial agents versus plain soap in the general healthcare setting.^{10,12}

When running water is not available, hand sanitizers may be used. The active ingredient in gel-based hand sanitizers is alcohol, which has an antimicrobial effect and reduces bacterial counts on the hands when used appropriately. Hand sanitizers can reduce infection rates in healthcare workers by 30 to 36 per cent compared to when alcohol is not used. The most effective sanitizers have alcohol concentrations of 60 to 95 per cent. There is no specific guideline that recommends the amount of hand sanitizer to use for hand hygiene; as a rule of thumb, if hands feel dry after 10 to 15 seconds of rubbing, then more of the product should be used. Soap, rather than alcohol, should be used for hands that are visibly dirty.^{13,14}

Other cleansers used in the healthcare setting include chlorhexidine gluconate, iodine-based products (e.g., povidone-iodine) and triclosan. All of these agents are considered antiseptics, and all can reduce bacteria and viruses on the skin.¹⁵

Vaccination

Vaccination is another important step that a pharmacy technician can take to prevent the spread of infectious diseases and to prevent illness. The Health Canada Canadian Immunization Guide (2002) is available at www.hcsc.gc.ca/pphb-dgspsp/publicat/cig-cigi/.

An annual influenza vaccine is important for pharmacy technicians. The influenza vaccine composition changes

Table 1: Types of cleansing agents¹⁵

Classification	Function
Antimicrobial	Kills or suppresses the growth of micro-organisms.
Antiseptic	Kills micro-organisms on the skin or mucous membranes.
Disinfectant	Inactivates disease-producing micro-organisms on inanimate objects
Non-antimicrobial soap	Detergent-based cleanser used to physically remove dirt or micro-organisms.

on an annual basis in response to recommendations from the World Health Organization, which tracks patterns of influenza viruses around the world. The vaccine is particularly important for individuals who are at highest risk of getting influenza complications, such as pneumonia; these people include those over 65 years of age and those with chronic disease or immunodeficiency.¹⁶ Although a young, otherwise healthy individual can become infected with influenza and recover fully, it is easy to transmit the virus to a more fragile person with reduced immune function for whom the consequences can be serious. Therefore, it is important for healthcare workers to receive the influenza vaccine annually.

Hepatitis B vaccine is recommended for all adults, especially those who work in healthcare facilities and who may come into contact with infected blood.

There are currently no vaccines available to protect against the virus that causes SARS or against HIV.

Managing outbreaks

During the recent SARS outbreak, much hysteria resulted from lack of understanding and knowledge of the route of transmission of the virus. In the community, an increased customer demand for N95 masks and hand sanitizers occurred very quickly.

Generally, infectious outbreaks are not common in the community. In case of an outbreak, however, pharmacy technicians must strive to understand prevention and management strategies and the supplies required to manage such situations. Technicians must ensure, with the help of the pharmacist, that adequate supplies of necessary items and medications are procured in a timely fashion. In the event of a serious public health event, proactive discussion among the pharmacy team will help determine anticipated customer demands.

The general public trusts their local pharmacy for both advice and products to help cope with public health issues such as infectious outbreaks. By learning the facts about emerging infectious diseases, the pharmacy technician can help to minimize the panic that can occur should this situation arise again.

The technician's role

The pharmacy technician is a key contact point for the patient in the community pharmacy setting. In the institutional setting, the pharmacy technician also plays an important role in managing internal "customers" (including nurses and other staff). Close contact with ill individuals or those caring for them presents a risk of exposure to infectious diseases. Thus, it is

important for the pharmacy technician to be aware of common infectious diseases and how to prevent their spread.

Technicians should also be familiar with measures to take in the event of a possible occupational exposure to a blood borne pathogen, such as HIV, hepatitis B or hepatitis C. For more information, a brief overview is provided in the Clin-Info section of the *Compendium of Pharmaceuticals and Specialties*.

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QUESTIONS

- 1. Which type of hepatitis infection is the most serious?**
 - a) Hepatitis A
 - b) Hepatitis B
 - c) Hepatitis C
 - d) Hepatitis D
- 2. Why is it important to get a flu shot each year?**
 - a) The virus changes each year, so the vaccine changes also.
 - b) To prevent SARS.
 - c) A booster is required to maintain protection.
 - d) It is only important for the elderly and those with chronic disease.
- 3. Which concentration of alcohol is acceptable for use in hand washing?**
 - a) 20%
 - b) 65%
 - c) 5%
 - d) 45%
- 4. How long will it take for a person with the SARS virus to experience symptoms of infection?**
 - a) 2 to 3 weeks
 - b) 2 to 5 hours
 - c) 2 to 10 days
 - d) 3 to 4 months
- 5. Which of the following techniques is important to implement when hand washing?**
 - a) Use a hot air dryer to dry hands after washing.
 - b) Rub hands vigorously under running water for 20 seconds.
 - c) Use bar soap to avoid touching dispensers.
 - d) Use alcohol based cleansers for hands that are visibly soiled or dirty.
- 6. Which type of infection is transmitted by the fecal-oral route?**
 - a) Influenza
 - b) Hepatitis B
 - c) Norwalk virus
 - d) SARS
- 7. Which of the following is an important consideration during an outbreak of SARS?**
 - a) All staff should receive the flu shot each year to prevent SARS.
 - b) Procedures for delivery of medications to patients who are quarantined must be determined to minimize transmission of the infection.
 - c) Pharmacy technicians should wear N95 respirator masks when working in the community.
 - d) Pharmacy technicians should ensure that adequate supplies of antivirals are in stock during the outbreak.
- 8. Which of the following is a symptom of SARS that is similar to influenza?**
 - a) Inflammation of the liver
 - b) Fever
 - c) Productive cough
 - d) Runny nose
- 9. Which of the following is true?**
 - a) Soaps are detergents that remove dirt.
 - b) Alcohol based cleansers do not reduce bacterial counts.
 - c) Soap, rather than alcohol, should be used to reduce bacteria.
 - d) Alcohol is very drying and should not be used in the winter.
- 10. To prevent spread of infections in the community pharmacy, pharmacy technicians should:**
 - a) Wear gloves when receiving and filling prescriptions.
 - b) Avoid accepting patients' sharps for disposal to prevent needle stick transmission of hepatitis B or HIV.
 - c) Wash hands when entering the pharmacy, after eating and using the bathroom.
 - d) Avoid coming to work when an outbreak of an infectious disease occurs in the community.