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Certified Patient Care Technician Module

Infection Control and Safety Precautions

Infection Control

What You'll Learn

After you finish this lesson, you will be able to:

- Define infection control.
- Cleanse your hands according to the correct procedure.
- Differentiate between standard and transmission-based precautions.
- List requirements of the Bloodborne Pathogens Standard.
- Explain vaccinations.

Infection Control

What causes people to get sick? How is a disease spread from one person to another? What can we do to stop the spread of infection and disease?

As a healthcare worker, it is important to know the answers to these questions. When you understand what causes infection, you can learn how to prevent it. **Infection control** is a set of practices and procedures that prevent or stop the spread of infection in healthcare settings.

Infectious and Communicable Diseases

Diseases can be classified according to whether or not they can be transmitted from one person to another person. An **infectious disease** results from an

invasion of microorganisms, such as bacteria or viruses. A **communicable disease** is a type of infectious disease that can be transmitted from one person to another person.

Not all infectious diseases are communicable. For example, lyme disease is caused by bacteria, but it cannot be transmitted from person to person. Hepatitis B, on the other hand, is caused by a virus. The hepatitis B virus can be passed from person to person if exposure to blood or bodily fluids occurs.

One of the goals of infection control is to prevent the transmission of these communicable diseases.

Transmission of Communicable Diseases

Not all communicable diseases are transmitted the same way. Some communicable diseases are spread through direct contact. Examples of **direct contact** are touching an open wound on an infected person or having a sexual relationship with an infected person. Communicable diseases can also be spread through indirect contact. **Indirect contact** includes inhaling the air after an infected person has sneezed or handling soiled bed sheets from an infected patient.

For example, AIDS, Hepatitis B, and strep throat can be spread only through direct contact. On the other hand, chicken pox, pink eye, and pneumonia can be spread through direct or indirect contact. There are many different types of communicable diseases, and health care workers must become familiar with the mode of transmission for each disease.

Chain of Infection

For a communicable disease to be passed from one person to another, certain conditions must be met. These conditions are known as the **chain of infection**.

The following list describes the steps in the chain of infection:

1. The chain of infection begins with a pathogen, which is called the **infectious agent, or causative agent**.
2. The infectious agent must find a **reservoir**, or a place for the infectious agent to live and grow. A reservoir could be a human, an animal, or any surface or object.
3. Next, the pathogen must have a **portal of exit** to leave the reservoir. In humans, pathogens can leave the body through blood, bodily fluids, or excrement.
4. After the pathogen leaves the reservoir, it must be moved to another reservoir where it can continue to live and grow. This process is called the **mode of transmission**.
5. The pathogen must have access to a **portal of entry**, which is the place the pathogen will enter the new reservoir.
6. If the new reservoir has weak defenses, it will contract the disease or infection. The new reservoir is called the **susceptible host**.

If any part of the chain is broken, the spread of the disease or infection will stop. Healthcare workers must practice the principles of infection control in order to break the chain of infection.

Mode of Transmission

In the chain of infection, transmission can be direct or indirect.

Direct transmission occurs in the following ways:

- **Contact**: Direct contact includes touching skin-to-skin, kissing, sexual intercourse, and touching soil or vegetation that contains infectious organisms. Examples of infections spread by contact include MRSA, mononucleosis, and gonorrhea.
- **Droplet**: Droplet transmission occurs when droplets are expelled by an infectious patient during talking, coughing, or sneezing. Droplets are large and do not remain suspended for long. They cause infection when

they contact the eyes, nose, or mouth. Examples of droplet-acquired infections include COVID-19, meningitis, and pertussis.

Indirect transmission occurs in the following ways:

- **Airborne**: Airborne transmission occurs when infectious particles remain suspended in the air for long periods of time. These particles travel easily through air currents (such as HVAC systems) and cause infection when inhaled. Examples of airborne infections include measles and tuberculosis.
- **Vehicleborne**: A vehicle is an object that can indirectly transmit disease, such as food, water, blood, and surfaces. An example of an infection that can be spread by a vehicle is Hepatitis A, which is contracted by ingesting contaminated food and water.
- **Vectorborne**: A vector is an organism, such as an animal or insect, that can carry and transmit infectious pathogens. Examples of vectors include mosquitoes, fleas, and ticks. Infections spread by vectors include Lyme disease, malaria, and rabies.

Respiratory Hygiene

With recent outbreaks of infectious diseases such as SARS and COVID-19, standard precautions have been expanded to include respiratory hygiene, also called "cough etiquette." As with hand hygiene, the importance of respiratory hygiene cannot be ignored.

A simple two-step respiratory hygiene process can greatly help reduce the spread of infectious agents from one person to another.

Step 1: Cover Coughs and Sneezes

Options include:

- Cover mouth and nose with a tissue
- Cover mouth and nose with your upper sleeve
- Wear a surgical mask

Step 2: Clean Hands

Options include:

- Wash hands with soap and water
- Clean hands with alcohol-based hand cleanser

Standard Precautions

The Center for Disease Control and Prevention (CDC) developed a list of standard precautions that should be used for all patients, regardless of their type of illness. **Standard precautions** are the minimum infection guidelines that apply to all patient care in any healthcare setting.

They include guidelines for patient contact, respiratory hygiene, and environmental cleanliness and are designed to protect healthcare workers and patients alike, and to prevent them from spreading healthcare-acquired infections.

Transmission-Based Precautions

Standard precautions are practiced with all patients. But there is another set of precautions that are used with patients with a confirmed or suspected communicable diseases. These precautions are called transmission-based precautions.

Transmission-based precautions, when used in addition to standard precautions, help to prevent the spread of communicable diseases in a healthcare setting. Healthcare workers must follow strict guidelines when caring for a patient on transmission-based precautions. The three types of transmission-based precautions are contact, droplet, and airborne.

When caring for patients on transmission-based precautions, the protective measures required to prevent the spread of infection are important to keep in mind. One way to approach understanding the types of transmission-based precautions is to think of them as escalating from the lowest level of

transmission-based precautions, which is contact, to the highest, which is airborne.

With that simplistic approach, transmission-based precautions can be thought of in this way:

- Contact = Standard Precautions + Gown
- Droplet = Standard Precautions + Gown + Surgical Mask
- Airborne = Standard Precautions + Gown + Respirator + Eyewear

Click the links below to learn more about transmission-based precautions:

- Airborne Precautions
- Droplet Precautions
- Contact Precautions

Bloodborne Pathogens

Bloodborne pathogens are pathogens that are transmitted through blood or bodily fluid from an infected person to another person. Bloodborne pathogens include HBV, HCV, and HIV. **HBV** and **HCV** are the viruses that cause hepatitis B and C. **HIV** is the virus that causes AIDS.

Bloodborne Pathogens Standard

Health care workers may be exposed to blood and body fluid.
The **Occupational Safety and Health Administration** (OSHA) is a government agency that enforces safety standards in the workplace. One of these standards is called the Bloodborne Pathogens Standard.
The **Bloodborne Pathogens Standard** includes, but is not limited to, these requirements:

- Have an exposure control plan to minimize exposure to blood and other potentially infectious materials (OPIMs)
- Identify workers who are at risk

- Wear personal protective equipment (PPE), such as gloves, face shields, and gowns
- Use safety needles and dispose of needles in puncture proof containers
- Decontaminate equipment and work areas and dispose of wastes in containers with the biohazard label
- Provide hepatitis B vaccinations to workers who are at risk
- Report incidents of workers being exposed to blood and OPIMs
- Evaluate and treat workers who have been exposed to blood and OPIMs
- Train workers each year on bloodborne pathogens

Vaccinations

Vaccination is the process of administering weakened or deadened microorganisms to people in order to give them resistance, or immunity, to disease. Vaccinations trigger patients' immune systems to resist disease. Vaccinations prevent people from getting diseases, as opposed to curing diseases once people have gotten them.

More specifically, when people are given a vaccination, their immune systems destroy the weakened or deadened microorganisms. If the people are exposed to the actual disease in the future, their immune systems are able to quickly destroy it. In most cases, the people never even know that they were attacked by the disease.

Available Vaccinations

Vaccinations are used to protect people from many diseases that may cause severe illness and even death. These diseases include the following:

- Diphtheria
- Hepatitis A
- Hepatitis B
- Measles
- Mumps
- Rubella

- Pertusis, or whooping cough
- Pneumonia
- Polio
- Tetanus, or lockjaw
- Varicella, or chickenpox
- Influenza, or the flu
- Tuberculosis
- Bacterial meningitis
- Smallpox
- Typhoid fever
- Anthrax

Vaccinations have made many once-common diseases rare.

Vaccinations and Health Care Workers

Vaccinations protect health care workers from disease. And vaccinated health care workers protect patients and their families, co-workers, and their own families. As a result, the Centers for Disease Control and Prevention (CDC) recommends that health care workers receive vaccinations for these diseases:

- Tetanus, or lockjaw
- Diphtheria
- Pneumonia
- Hepatitis B
- Influenza, or the flu
- Measles
- Mumps
- Rubella
- Varicella, or chickenpox

In certain circumstances, the CDC recommends that health care workers also receive vaccinations for these diseases:

- Tuberculosis
- Hepatitis A
- Bacterial meningitis
- Typhoid fever
- Smallpox
- Pertussis, or whooping cough

Asepsis

Asepsis is a condition that is free of pathogens. Maintaining asepsis in a health care facility is the primary way to prevent the spread of disease from person to person. It works by breaking the chain of infection.

Medical and Surgical Asepsis

The two basic types of asepsis are medical asepsis and surgical asepsis. **Medical asepsis** is maintaining a clean environment in order to reduce the number of pathogens. It is also called clean technique. Common medical aseptic practices include handwashing, routine cleaning, and using personal protective equipment (PPE), such as gloves and masks.

Surgical asepsis is maintaining a sterile field. A **sterile field** is an environment that is free from all microorganisms and spores. Surgical asepsis is also known as sterile technique. It is required for most invasive procedures and operations. In order for an environment to stay sterile, only sterile items can come into contact with other sterile items. Surgical asepsis takes skill and foresight.

Click the links below to learn more about asepsis:

- Sterilizing
- Disinfecting
- Cleaning

Hand Cleansing

Hand cleansing is the most basic and important type of medical asepsis. Hand cleansing is the number one way to prevent the spread of infection. Hands can act as a mode of transmission in the chain of infection by carrying pathogens from one patient to another patient. Additionally, when pathogens are on a health care worker's hands, the health care worker is in danger of contracting the disease or infection. Because of this danger, health care workers must use appropriate hand cleansing hygiene.

When to Cleanse Hands

Health care workers should cleanse their hands frequently, including:

- When arriving at the health care facility and immediately before leaving the facility.
- Before and after every patient contact.
- Before and after performing a procedure.
- Before and after handling a specimen.
- Before and after touching the mouth, eyes, or nose.
- Before donning gloves and immediately after removing gloves.
- After contacting soiled or contaminated items.
- After picking up any item from the floor.
- After using the bathroom.
- After coughing, sneezing, or using a tissue.

Methods of Hand Cleansing

According to the CDC, there are two methods health care workers should use to cleanse their hands.

The first method is hand washing. **Hand washing** involves using plain soap and water to cleanse the hands. Health care workers should wash their hands when they are visibly dirty or soiled.

The second method is an alcohol-based handrub. An **alcohol-based handrub** involves using an alcohol-based lotion or gel to cleanse the hands.

Alcohol-based handrubs should contain at least 60% alcohol, and be used when soap and water are not readily available at the point of care.

Procedure for Hand Cleansing

Individual agencies may have specific procedures that their employees must follow. The following process is an example of a hand cleansing procedure that might be found at any agency.

Hand Washing

1. Dispense a paper towel and use it to turn the faucet on. Do not touch the inside of the sink, as it is considered contaminated.
2. Test the temperature of the water with your hand. Allow the water to reach a warm temperature. Hot water damages the skin. Dispose of the paper towel into a waste container.
3. Point your fingers downward and wet your hands and wrists.
4. Dispense liquid soap into your hands and work the soap into a lather.
5. Lather all surfaces of your wrists, hands, and fingers for at least 20 seconds. Rub firmly, as friction is needed to rub pathogens off the skin. You may find it helpful to hum "Happy Birthday" twice in your head to be sure that you wash long enough.

Procedure for Hand Cleansing (continued)

6. Clean your fingernails with a nail brush or by rubbing fingertips against the palm of the opposite hand.
7. Rinse your hands and wrists while keeping your fingers pointed downward. Pointing them upward may contaminate your hands, wrists, or arms with dirty water.
8. Dispense a clean paper towel and use it to dry your hands and wrists. Dispose of the paper towel when it becomes wet. If needed, dispense another paper towel to finish drying. Dispose of the towel.
9. Dispense a clean paper towel and use it to turn off the faucet. Dispose of the paper towel.

Alcohol-based Handrub

10. Dispense the appropriate amount of alcohol-based liquid or gel into the palm of your hand. Check the manufacturer guidelines for the amount of liquid or gel to use.
11. Rub your hands together, covering all surfaces, until the liquid has dried.

Lesson Summary

In this lesson, you practiced hand cleansing.

In this lesson, you learned that:

- Infection control is a set of practices to help prevent the transmission of disease.
- Standard precautions are used for all patients regardless of their sickness, but transmission-based precautions are only used with patients who have been diagnosed with highly communicable diseases.
- Bloodborne pathogens are transmitted through blood or bodily fluid from an infected person to another person.
- Vaccination is the process of administering weakened or deadened microorganisms to people in order to give them resistance, or immunity, to disease.
- Hand cleansing is the most effective way to prevent the transmission of pathogens.

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Infection Control Lesson Plan

UNIT 1: INTRODUCTION TO INFECTION CONTROL
LESSON OBJECTIVES Upon successful completion of this unit, the students will be able to:

Lesson 1- Microorganisms • Analyze the difference between microorganisms, non-pathogens, and pathogens. • Identify types of pathogens, bacteria, parasites, and fungi. • Identify diseases caused by bacteria, parasites, fungi, and viruses.

Lesson 2- Infection • Distinguish between endogenous, exogenous, nosocomial, or healthcare-acquired (HAI), and opportunistic diseases. • Define infectious disease and communicable disease. • Identify the components of the chain of infection. • Explain the primary modes of transmission in the chain of infection.

Lesson 3- Asepsis • Explain the importance of maintaining asepsis to prevent the spread of disease. • Compare and contrast the two basic types of asepsis, medical and surgical, and the best practices for each

method. • Describe the three levels of asepsis and the characteristics of each process.

Lesson 4- Hand Hygiene • Explain the importance of hand cleansing and its role in preventing the spread of infection. • Identify when to cleanse hands. • Analyze the two methods healthcare workers should use to cleanse their hands.

Lesson 5- Cleaning Equipment • Explain the importance of cleaning objects or equipment. • Identify the items needed to clean objects or equipment properly. • Explain the benefits and uses of an ultrasonic unit for cleaning objects or equipment.

STUDENT TASKS

In Unit 1: Introduction to Infection Control, the students will: • View online content. • Answer lesson comprehension and reflection questions. • Complete student worksheet. • Use checklists to practice unit concepts.

MATERIALS

The items below are provided for this unit: • eLearning Lessons • Form: Student Worksheet • Microorganisms PowerPoint • Infection PowerPoint • Asepsis

PowerPoint • Hand Hygiene PowerPoint • Cleaning Equipment PowerPoint • Skills Checklists