

# Chapter 13

## Preventing Infection

# Lesson 13.1

- Define the key terms and key abbreviations in this chapter.
- Identify what microbes need to live and grow.
- List the signs and symptoms of infection.
- Explain the chain of infection.
- Describe healthcare-associated infections and the persons at risk.
- Describe the principles of medical asepsis.

# Lesson 13.1 (Cont.)

- Explain how to care for equipment and supplies.
- Describe disinfection and sterilization methods.
- Describe Standard Precautions and Transmission-Based Precautions.
- Explain the Bloodborne Pathogen Standard.
- Perform the procedures described in this chapter.
- Explain how to promote PRIDE in the person, the family, and yourself.

# Infection

- Infection is a major safety and health hazard.
- The health team follows certain practices and procedures to protect patients, residents, visitors, and staff from infection.

# Microorganisms

- A microorganism (microbe) is a small living plant or animal seen only with a microscope.
  - Pathogens are microbes that are harmful and can cause infections.
  - Non-pathogens are microbes that do not usually cause an infection.
- Microbes need a reservoir (host) to live and grow.

# Microorganisms (Cont.)

- Multidrug-resistant organisms (MDROs) can resist the effects of antibiotics.
  - Antibiotics are drugs that kill microbes that cause infections.
  - MDROs are caused by:
    - Doctors prescribing antibiotics when they are not needed
    - Not taking antibiotics for the prescribed length of time
  - Two common MDROs are resistant to many antibiotics:
    - Methicillin-resistant *Staphylococcus aureus* (MRSA)
    - Vancomycin-resistant Enterococcus (VRE)

# Infection

- An infection is a disease state resulting from the invasion and growth of microbes in the body.
  - A local infection is in a body part.
  - A systemic infection involves the whole body.

# The Chain of Infection

- The chain of infection is a process.
  - It begins with a source (a pathogen).
  - It must have a reservoir where it can grow and multiply.
  - To leave the reservoir, the pathogen needs a portal of exit.
  - After leaving the reservoir, the pathogen must be transmitted to another host.
  - The pathogen enters the body through a portal of entry.
  - A susceptible host is needed for the microbe to grow and multiply.



# Resisting Infection

- The ability to resist infection relates to:
  - Age
  - Nutrition
  - Stress
  - Fatigue
  - Health
  - Drugs
  - Disease
  - Injury

# Healthcare-Associated Infection (HAI)

- Healthcare-associated infection (HAI)
  - An HAI is an infection that develops in a person cared for in any setting where health care is given.
  - HAIs are caused by:
    - Microbes normally found in the body
    - Microbes transmitted to the person from other sources
  - Microbes can enter the body through equipment and supplies.
  - Staff can transfer microbes from one person to another and from themselves to others.
  - HAIs are prevented by:
    - Medical asepsis (including hand hygiene)
    - Standard Precautions and Transmission-Based Precautions
    - The Bloodborne Pathogen Standard

# Medical Asepsis

- Asepsis is being free of disease-producing microbes.
- Medical asepsis (clean technique) is the practices used to:
  - Remove or destroy pathogens
    - The number of pathogens is reduced.
  - Prevent pathogens from spreading from one person or place to another person or place

# Contamination

- Contamination is the process of becoming unclean.
  - In medical asepsis, an item or area is clean when it is free of pathogens.
  - In medical asepsis, an item or area is contaminated if pathogens are present.
  - A sterile item or area is contaminated when pathogens or non-pathogens are present.
  - Sterile means the absence of all microbes.

# Common Aseptic Practices

- Common aseptic practices
  - To prevent the spread of microbes wash your hands:
    - After urinating or having a bowel movement
    - After changing tampons or sanitary pads
    - After contact with your own or another person's blood, body fluids, secretions, or excretions
    - After coughing, sneezing, or blowing your nose
    - Before and after handling, preparing, or eating food
    - After smoking a cigarette, cigar, or pipe

# Prevent the Spread of Microbes

- To prevent the spread of microbes, also do the following:
  - Provide all persons with their own linens and personal care items.
  - Cover your nose and mouth when coughing, sneezing, or blowing your nose.
  - Bathe, wash hair, and brush your teeth regularly.
  - Wash fruits and raw vegetables before eating or serving them.
  - Wash cooking and eating utensils with soap and water after use.

# Hand Hygiene

- Hand hygiene is the easiest and most important way to prevent the spread of infection.
- Practice hand hygiene before and after giving care.

# Supplies and Equipment

- Supplies and equipment
  - Most health care equipment is disposable.
    - Single-use items are discarded after use.
    - A person uses multi-use items many times.
  - Non-disposable items are cleaned and disinfected.
    - Then they are sterilized.
  - Cleaning reduces the number of microbes present and removes organic matter.
  - Disinfection is the process of destroying pathogens.
  - Sterilization is the process of destroying all microbes (non-pathogens and pathogens).
    - Very high temperatures are used.



# Other Aseptic Measures

- Other aseptic measures include:
  - Controlling reservoirs (hosts—you or the person)
  - Controlling portals of exit
  - Controlling transmission
  - Controlling portals of entry
  - Protecting the susceptible host

# Isolation Precautions

- Blood, body fluids, secretions, and excretions can transmit pathogens.
  - Sometimes barriers are needed to prevent their escape.
- Recommendations described in the Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007 are followed.
  - The guideline was issued by the Centers for Disease Control and Prevention (CDC).

# Isolation Precautions (Cont.)

- Isolation precautions prevent the spread of communicable diseases (contagious diseases).
  - They are diseases caused by pathogens that spread easily.
- Isolation precautions are based on determining what is clean and what is dirty.
  - Clean areas or objects are free of pathogens.
  - Dirty areas or objects are contaminated with pathogens.
  - Clean and dirty also depend on how the pathogen is spread.

# Standard Precautions

- The CDC's isolation precautions guideline has two tiers of precautions:
  - Standard Precautions
    - They reduce the risk of spreading pathogens and known and unknown infections.
    - They are used for all persons whenever care is given.
    - They prevent the spread of infection from:
      - Blood
      - All body fluids, secretions, and excretions (except sweat) even if blood is not visible
      - Non-intact skin
      - Mucous membranes

# Transmission-Based Precautions

- Transmission-Based Precautions
  - Understanding how certain infections are spread helps you understand the 3 types of Transmission-Based Precautions.
    - Contact precautions
    - Droplet precautions
    - Airborne precautions

# Personal Protective Equipment

- Protective measures

- Isolation precautions involve wearing personal protective equipment (PPE).
  - Gloves, a gown, a mask, and goggles or a face shield
- Removing linens, trash, and equipment from the room may require double-bagging.
- Follow agency's procedures when collecting specimens and transporting persons.

# Gloves and Gowns

- **Gloves**

- Wear gloves whenever contact with blood, body fluids, secretions, excretions, mucous membranes, and non-intact skin is likely.
- Wearing gloves is the most common protective measure used with Standard Precautions and Transmission-Based Precautions.

- **Gowns**

- Gowns protect your clothes and body from contact with blood, body fluids, secretions, and excretions.
- They protect against splashes and sprays.
- Gowns must completely cover you from your neck to your knees.
- Gowns are used once.
- A wet gown is contaminated.

# Masks and Respiratory Protection

- Masks and respiratory protection
  - Masks prevent contact with infectious materials from the patient or resident.
  - Masks are disposable.
  - A wet or moist mask is contaminated.
  - Practice hand hygiene before putting on a mask.
  - When removing a mask, touch only the ties or the elastic bands.
- Goggles and face shields protect your eyes, mouth, and nose from splashing or spraying of blood, body fluids, secretions, and excretions.
  - The outside of goggles or a face shield is contaminated.



# Bagging Items

- Bagging items
  - Contaminated items are bagged to remove them from the person's room.
    - Leak-proof plastic bags are used.
    - Bags have the *BIOHAZARD* symbol.
  - Biohazardous waste is items contaminated with blood, body fluids, secretions, or excretions.
  - Bag and transport linens following agency policy.
  - Trash is placed in a container labeled with the *BIOHAZARD* symbol.
  - Follow agency policy for bagging and transporting trash, equipment, and supplies.
  - Double-bagging is not needed unless the outside of the bag is soiled.

# Collecting and Transporting

- Collecting specimens
  - Blood, body fluids, secretions, and excretions often require laboratory testing. Specimens are transported to the laboratory in biohazard specimen bags. Follow agency procedures to collect and transport a specimen when a person is on Transmission-Based Precautions.
- Transporting persons
  - Persons on Transmission-Based Precautions usually do not leave their rooms, but sometimes they go to other areas for treatments or tests.

# Meeting Basic Needs

- Meeting basic needs
  - Often love, belonging, and self-esteem needs are unmet when Transmission-Based Precautions are used.
  - You need to:
    - Remember, the pathogen is undesirable, not the person.
    - Meet love, belonging, and self-esteem needs.

# Bloodborne Pathogen Standard

- The Bloodborne Pathogen Standard protects against the human immunodeficiency virus (HIV) and the hepatitis B virus (HBV).
  - It is a regulation of the Occupational Safety and Health Administration (OSHA).

# Bloodborne Pathogen Standard (Cont.)

- HIV and HBV are found in the blood.
- They are bloodborne pathogens.
- They are spread to others by blood and other potentially infectious materials (OPIMs).
- OPIMs are contaminated with blood or with a body fluid that may contain blood.
- Semen, vaginal secretions, and saliva.
- Needles, suction equipment, soiled linens, dressings, and other care items.

# Bloodborne Pathogen Standard (Cont.)

- Staff at risk for exposure to blood or OPIMs receive free training:
  - Upon employment
  - Yearly
  - For new tasks involving exposure to bloodborne pathogens
  - For changed tasks involving exposure to bloodborne pathogens

# Hepatitis B

- Hepatitis B vaccination
  - Hepatitis B is a liver disease caused by HBV.
  - HBV is spread by blood and sexual contact.
  - The hepatitis B vaccine produces immunity against hepatitis B.
    - Immunity means that a person has protection against a certain disease.
  - You can receive the hepatitis B vaccination within 10 working days of being hired.
    - The agency pays for it.

# Engineering and Work Practice Controls

- Engineering and work practice controls
  - Engineering controls reduce employee exposure in the workplace.
  - Special containers for contaminated sharps and specimens remove and isolate the hazard from staff.
    - Containers are:
      - Puncture-resistant
      - Leak-proof
      - Color-coded in red
      - Have the *BIOHAZARD* symbol
  - Work practice controls also reduce exposure risks.
    - All tasks involving blood or OPIMs are done in ways to limit splatters, splashes, and sprays.
    - Producing droplets is avoided.



# PPE

- Personal protective equipment (PPE)
  - Blood or OPIMs must not pass through PPE.
    - They protect your clothes, under-garments, skin, eyes, mouth, and hair.
  - PPE is free to employees.
  - OSHA requires special measures for the safe handling and use of PPE.

# Equipment and Laundry

- Contaminated equipment is cleaned and decontaminated.
  - Decontaminate work surfaces with a proper disinfectant:
    - Upon completing tasks
    - At once when there is obvious contamination
    - After any spill of blood or OPIM
    - At the end of the work shift when surfaces have become contaminated since the last cleaning
  - Use a brush and dustpan or tongs to clean up broken glass.
    - Discard broken glass into a puncture-resistant container.
- OSHA requires special measures for handling contaminated laundry.

# Exposure Incidents

- Exposure incidents
  - An exposure incident is any eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or OPIMs.
    - Parenteral means piercing the mucous membranes or the skin barrier.
  - Report exposure incidents at once.
  - You are told of any medical conditions that may need treatment.
  - The source individual is the person whose blood or body fluids are the source of an exposure incident.