Infection Control
Learning Objectives

• Define, spell, and pronounce the terms listed in the vocabulary.
• Describe the characteristics of pathogenic microorganisms and the diseases they cause.
• Apply the chain-of-infection process to healthcare practice.
• Compare viral and bacterial cell invasion.
• Differentiate between humoral and cell-mediated immunity.
Learning Objectives

• Summarize the impact of the inflammatory response on the body’s ability to defend itself against infection.
• Analyze the differences among acute, chronic, latent, and opportunistic infections.
• Specify potentially infectious bodily fluids.
• Integrate OSHA’s requirement for a site-based Exposure Control Plan into office management procedures.
• Explain the major areas included in the OSHA Compliance Guidelines.
Learning Objectives

• Remove contaminated gloves while following Standard Precautions principles.
• Perform an eyewash procedure for the removal of contaminated material.
• Summarize the management of postexposure evaluation and follow-up.
• Apply the concepts of medical and surgical asepsis to the healthcare setting.
• Demonstrate the proper hand-washing technique for medical asepsis.
Learning Objectives

• Differentiate among sanitization, disinfection, and sterilization procedures.
• Demonstrate the correct procedure for sanitization of contaminated instruments.
• Apply patient education concepts to infection control.
• Discuss legal and ethical concerns regarding medical asepsis and infection control.
Disease

• An alteration in the normal structure or function of an organism or a cell.

• Causes specific clinical signs, symptoms, and laboratory findings that set it apart.

• A disease could be either inherited, drug-induced, autoimmune, degenerative, or infectious.

• Any disease caused by the growth of pathogenic microorganisms in the body is considered an infectious disease.
Conditions Required for Microbial Growth

To maintain a healthcare environment that is as free as possible of pathogenic organisms, the medical assistant (MA) must prevent or eliminate as many growth requirements as possible.
Chain of Infection

• Infectious diseases can spread only if certain factors occur.

• These factors, or *links*, make up the chain of infection. Break the chain, and you break the infectious process.

• Wearing appropriate protective equipment and effective hand washing can break the chain of infection.
Chain of Infection

- Infectious agent
- Reservoir host – an infected patient
- Means or portal of exit – coughing, sneezing, blood product, specimen, etc.
- Method of transmission – contaminated hands, equipment or supplies; air borne; contaminated food or water; etc.
- Portal of entry into a new host – exposure to contaminated equipment, inhalation, broken skin, etc.
- Susceptible host – unvaccinated, weak, debilitated individual
Chain of Infection

1. Infectious agent
2. Reservoir host
3. Portal of exit
4. Mode of transmission
5. Portal of entry
6. Susceptible host
Reservoir Hosts

- May be people, insects, animals, water, food, examination rooms, contaminated instruments, and so on
- Supply nutrition for the organism, allowing it to multiply
- Either cause infection in the host and/or exit from the host to cause disease in another host
Portal of Exit

• How the pathogen escapes the reservoir host

• Includes mouth, nose, eyes, intestines, urine, reproductive tract, and so on

• Standard precautions prevent spread
Transmission

• **Direct**—contact with infected person or with discharges (feces, urine, sputum, etc.)

• **Indirect**—from droplets expelled with coughing, sneezing, or speaking; vectors; contaminated food; contaminated objects called fomites.

• Controlled with sanitization, disinfection, sterilization, and so on
Portal of Entry

• How the pathogen gains entry to a new host
• Similar to means of exit (e.g., mouth, eyes, nose)
• Intact integumentary system is first line of defense
• Inflammatory response and immune system are second lines of defense.
Susceptible Host

• Must be capable of supporting the pathogen

• Susceptibility depends on:
  – Location of entry
  – Dose of pathogen
  – Health state of new host
  – Immunization status
Infectious Agents

- **Pathogenic microorganisms** include:
  - **Viruses**—smallest; obligate intracellular parasites; palliative treatment; EX: hepatitis B
  - **Bacteria**—classified by their morphology; some produce spores; normal flora vs. pathogenic microbes; EX: tuberculosis
  - **Protozoa**—unicellular parasites; frequently transmitted by vectors; EX: giardiasis
  - **Fungi**—molds and yeasts; mycotic infections and tineas; EX: candidiasis
  - **Rickettsiae**—similar to both viruses and bacteria; carried by vectors; EX: Rocky Mountain spotted fever
Antibiotic Resistance

- Antibiotic resistance is one of the world’s most significant public health problems.
- Infectious microorganisms whose presence were once easily treated with antibiotics are growing increasingly resistant to the drugs.
- Resistance occurs when an antibiotic is used inappropriately to treat an infection.
- The pathologic organism mutates, decreasing the effectiveness of the drug.
The Inflammatory Response

- The inflammatory response is the body’s protective reaction to a foreign substance or antigen.
- To defend itself, the body initiates specific responses that destroy and remove pathogenic organisms.
- The release of inflammation mediators, through three separate actions, results in an increase in white blood cells (WBCs) at the site.
- WBCs attack the pathogen and attempt to contain the infection at its original site.
Four Classic Signs and Symptoms of Inflammation

• Redness or erythema
• Swelling or edema
• Pain
• Heat
Infectious Bodily Secretions

• OSHA has designated the following bodily fluids as potentially infectious with blood-borne pathogens:

  – Cerebrospinal fluid (CSF); synovial, pleural, pericardial, peritoneal, mucous, and amniotic fluids

  – Blood, vaginal and seminal secretions, saliva, and human tissue
Exposure Control Plan

- Plan must detail employee protection procedures.
- Must identify job classifications and/or specific work-related tasks that might lead to exposure.
- Must contain specifics on controls including PPE, training, hepatitis B immunization, record keeping, postexposure follow-up, and labeling and disposal of biohazard waste.
- Must be reviewed and updated at least annually to incorporate the use of safer medical devices.
- Must be available to employees for review and training.
Hand Hygiene

- Studies show that even after careful hand hygiene, healthcare workers with artificial nails have more pathogenic microbes than workers with natural nails.

- Natural nail tips should be no longer than $\frac{1}{4}$ inch.

- Contact dermatitis from alcohol handrubs is uncommon.
Barrier Protection

- Protective equipment must be used if you will be involved in any of these activities:
  - Touching a patient's blood and body fluids, mucous membranes, or broken skin
  - Handling items and surfaces contaminated with blood and body fluids
  - Performing venipuncture, finger punctures, injections, and other vascular-access procedures
  - Assisting with any surgical procedure. If a glove is torn or an injury occurs, the glove is removed and replaced with a new glove. The instrument is removed from the sterile field.
  - Handling, processing, and disposing of all specimens of blood and body fluids.
  - Cleaning and decontaminating spills of blood or other body fluids.
Personal Protective Equipment (PPE)

• Specialized clothing or equipment that prevents blood or other potentially infectious material from passing through to reach the healthcare worker

• Includes latex gloves, face masks, face shields, protective glasses, laboratory coats, barrier gowns, shoe covers, mouthpieces, and resuscitation bags that protect the healthcare worker from potentially infectious substances
Personal Protective Equipment (PPE)
Environment Protection

• Observe warning labels on biohazard containers and equipment.
• Minimize splashing, spraying, and spattering of drops.
• *Bandage any breaks on hands before gloving.*
• *Do not recap, bend, break, or resheath contaminated sharps.*
• Immediately after use dispose of sharp items in a labeled, leakproof, puncture-resistant biohazard container.
Environment Protection

- Contaminated equipment should be sanitized before being repaired in the office or transported to the manufacturer.
- Smoking, eating, drinking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is reasonable likelihood of contamination from blood-borne pathogens.
- Food and drink cannot be kept in the same areas as potentially infectious materials.
Aseptic Techniques: Prevention of Disease Transmission

*Medical asepsis:*

- **Medical aseptic** techniques: Create an environment as free of pathogens as possible to prevent reinfection or cross-infection.

*Surgical asepsis:*

- **Surgical aseptic** or sterile technique: Used when the patient’s skin or mucous membranes are disrupted. Prevents patient exposure to all microbes (e.g., for minor surgery, urinary catheterizations, injections).
Sanitization

- Cleaning of contaminated articles or surfaces to reduce the number of microorganisms to a safe level as dictated in public health guidelines.
- Removes debris such as blood and other body fluids from instruments or equipment.
- Must wear utility gloves to prevent possible personal contamination.
- Completed immediately after use in a separate workroom or area to avoid cross-contamination.
Sanitization

- Separate sharp instruments from others to prevent injury and protect instruments.
- Open hinges and scrub serrations and ratchets.
- Rinse instruments in hot water and check proper working order.
- Items should be hand dried.
- Ultrasonic sanitizers are helpful because they do not damage instruments and workers are protected from accidental sharps injuries.
Sanitization
Disinfection

• Process of killing pathogenic organisms or making them inactive.

• Not always effective against spores and viruses.

• 1:10 bleach solution is an effective disinfectant for surfaces contaminated with viruses, including HIV.

• Important to follow the manufacturer’s guidelines on how to properly prepare and use each disinfectant.
Disinfection
Sterilization

- Destruction of all microorganisms.
- Requires space for a sink as well as receiving basins, proper cleaning agents, brushes, autoclave wrapping paper, sterilizer envelopes and tape, sterilizer indicators, disposable gloves, and designated biohazard waste containers.
- Another area needed for storage of sterile items.
Role of the Medical Assistant

• It is important that aseptic techniques and infection control be done on such a routine basis that they become an unbreakable habit.

• MA should teach patients about infection control and the potential danger of blood and body fluids, including demonstrating aseptic techniques, the management of infectious materials at home, and the importance of frequent and consistent hand washing.