UNIT SIX: FUNDAMENTALS OF CLINICAL MEDICAL ASSISTING

INFECTION CONTROL

SCENARIO

Rosa Lucia is a certified medical assistant working in a multiphysician pediatric practice. She is quite concerned about contracting an infectious disease while caring for her patients. Rosa learned about Standard Precautions while enrolled in her medical assistant program and now must implement that knowledge in the workplace. Two important factors in preventing the spread of infection are understanding how to break the chain of infection and recognizing the importance of proper and frequent hand washing.

While studying this chapter, think about the following questions:
- How can Rosa achieve these goals?
- What is the significance of an Exposure Control Plan in Rosa's pediatric office?
- What are the important details of the office's compliance with the guidelines established by the Occupational Safety and Health Administration (OSHA)?
- How can Rosa implement required infection control procedures in the pediatric office?

LEARNING OBJECTIVES

1. Define, spell, and pronounce the terms listed in the vocabulary.
2. Apply critical thinking skills in performing patient assessment and care.
3. Describe the characteristics of pathogenic microorganisms and the diseases they cause.
4. Apply the chain-of-infection process to healthcare practice.
5. Compare viral and bacterial cell invasion.
6. Differentiate between humoral and cell-mediated immunity.
7. Summarize the impact of the inflammatory response on the body's ability to defend itself against infection.
8. Analyze the differences among acute, chronic, latent, and opportunistic infections.
9. Specify potentially infectious body fluids.
10. Integrate OSHA's requirement for a site-based Exposure Control Plan into office management procedures.
11. Explain the major areas included in the OSHA Compliance Guidelines.
12. Remove contaminated gloves while following Standard Precautions principles.
13. Perform an eye wash procedure to remove contaminated material.
14. Summarize the management of postexposure evaluation and follow-up.
15. Participate in a mock environmental exposure event with documentation of the steps taken.
16. Apply the concepts of medical and surgical asepsis to the healthcare setting.
17. Demonstrate the proper hand-washing technique for medical asepsis.
18. Differentiate among sterilization, disinfection, and sanitation procedures.
19. Demonstrate the correct procedure for sanitizing contaminated instruments.
20. Apply patient education concepts to infection control.
21. Discuss legal and ethical concerns regarding medical asepsis and infection control.
**VOCABULARY**

- anaphylaxis (an-uh-fuh-lak’sis): An exaggerated hypersensitivity reaction that in severe cases leads to vascular collapse, bronchospasm, and shock.
- antibodies (an’ti-bah-deez): Immunoglobulins produced by the immune system in response to bacteria, viruses, or other antigenic substances.
- antigen (an’ti-jen): A foreign substance that causes the production of a specific antibody.
- antiseptics (an’t-sep-tiks): Substances that inhibit the growth of microorganisms on living tissue (e.g., alcohol and povisodine iodine solution [Bordatique]).
- autoimmune (o-to-im’-yooht): Pertaining to a disturbance in the immune system in which the body reacts against its own tissue. Examples of autoimmune disorders include multiple sclerosis, rheumatoid arthritis, and systemic lupus erythematosus.
- candidiasis (kan-dih-dee-as’-is): An infection caused by a yeast that typically affects the vaginal mucosa and skin.
- contagious (ka-uhg-uh-sis): To form into clogs.
- contaminated (kuh-tab-uhnt): Soiled with pathogens or infectious material; nonsterile.
- disinfectant (di-sin-fek-tant): A liquid chemical that is capable of eliminating many or all pathogens but is not effective against bacterial spores.
- fomites (for-may-tees): Contaminated, nonliving objects (e.g., examination room equipment) that can transmit infectious organisms.
- germicides (jem-seyd-ees): Agents that destroy pathogenic organisms.
- hereditary (her-i-deh-tree): Pertaining to a characteristic, condition, or disease transmitted from parent to offspring on the DNA chain.
- interferon (in-fer-uh-fon): A protein formed when a cell is exposed to a virus; the protein blocks viral action on the cell and protects against viral invasion.
- opportunistic infections (opp-or-too-nis): Infections caused by a normally nonpathogenic organism in a host whose resistance has been decreased.
- pellitative: A substance that relieves or alleviates the symptoms of a disease without curing the disease.
- parenteral (pa-ren’tuh-ral): The injection or introduction of substances into the body by any route other than the digestive tract (e.g., subcutaneous, intravenous, or intramuscular administration).
- pathogenic (path-uh-jen’-ik): Pertaining to a disease-causing microorganism.
- permeable (per-may-uh-buh): Allowing a substance to pass or soak through.
- pneumonia (nuh-muh-nay’-uh): The presence of pus-forming organisms in the blood.
- relapse: The recurrence of the symptoms of a disease after apparent recovery.
- remission: The partial or complete disappearance of the clinical and subjective characteristics of a chronic or malignant disease.
- resident bacteria: Bacteria that live in or on a certain part of the body, such as the skin or mucosa.
- rhinitis (ruh-nil’-tis): Inflammation of the mucous membranes of the nose.
- spores (spore): A thick-walled, dormant form of bacteria that is very resistant to disinfection measures.
- sterile (ster’-uhl): Free of all microorganisms, pathogenic and nonpathogenic.
- tinea (ti-ne-uh): Any fungal skin disease that results in scaling, itching, and inflammation.
- transient bacteria: Bacteria temporarily living in or on a certain body part, such as the hands.
- urticaria (uhr-tik’-uh-ree-uh): A skin eruption that creates inflamed wheals; hives.
- vectors: Animals or insects (e.g., ticks) that transmit the causative organisms of disease.

**DISEASE**

Disease is defined as any sustained, harmful alteration of the normal structure, function, or metabolism of an organism or cell. This pathologic condition of the body presents a group of clinical signs, symptoms, and laboratory findings that set it apart as an abnormal entity, different from other normal and pathologic conditions. We recognize and categorize many types of diseases: hereditary (genetic), drug-induced, autoimmune, degenerative, communicable, and infectious, to name only a few. Sometimes a specific disease may fit two or more categories.

Any disease caused by the growth of pathogenic microorganisms in the body falls into the category of infectious diseases. The entrance of a living microbe into the body is not disease, because until the infected cell or individual shows a harmful alteration in structure, physiology, or biochemistry, disease either is not detected or is not considered present. In fact, a pathogen may be...
The chain of infection starts with the infectious agent. Five groups make up the potentially pathogenic agents or microorganisms: viruses, bacteria, protozoa, fungi, and rickettsiae. (Additional information about typical diseases caused by these pathogens is presented in Chapter 55.) Infection cannot occur without the presence of an infectious microorganism, so the best way for healthcare workers to prevent the spread of disease is to use adequate infection control procedures, such as consistent hand washing and proper use of antiseptics, as well as effective disinfection and sterilization methods.

The smallest of all pathogens, viruses, lead the list of important disease-causing agents. Viral microorganisms are intracellular parasites that take over the deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) of the invaded cell. Viral infection may not cause significant immediate symptoms, because how cells infected with viruses can produce a substance called interferon, which protects nearby cells. Interferon leaves the infected cell and acts somewhat like a Paul Revere, warning neighboring cells that "a virus is coming!" The neighboring cells then produce antiviral proteins that may destroy the viruses once they enter. Antibiotics are unable to destroy viral invaders that enter a normal cell and multiply within the cell. The only way to destroy a viral invader is to destroy the host cell. Therefore, the treatment for viral infections typically focuses on relieving symptoms, or palliative treatment. To counteract and slow the rate of viral replication, interferon and the antiviral agents acyclovir (Zovirax), valacyclovir hydrochloride (Valtrex), adefovir dipivoxil (Hepsera), penciclovir (Denavir), and famciclovir (Famvir) may be prescribed, depending on the specific viral agent. Viral diseases include

**CONDITIONS REQUIRED FOR MICROBIAL GROWTH**

To grow and flourish, microbes require certain conditions. To maintain a healthy environment as free of pathogenic organisms as possible, the medical assistant must prevent or eliminate as many of these growth requirements as possible.

- **Nutrients:** Pathogens thrive on contaminated surfaces and equipment. Most microbes need the same nutrients we do: carbohydrates, proteins, and fats.
- **Moisture:** Microbes require moisture for cellular activities.
- **Temperature:** Most pathogenic microbes flourish at body temperature (98.6°F / 37°C).
- **Oxygen:** Some microbes, called aerobes, require oxygen to grow and multiply; others, called anaerobes, thrive in environments without oxygen.
- **Neutral pH:** pH refers to the acid-base level of a solution on a scale of 1 to 14, with 7 being neutral. Most pathogens prefer a neutral pH for optimum growth.

**THE CHAIN OF INFECTION**

Certain factors are required for an infectious disease to spread. These factors, or links, make up the chain of infection. Break the chain, and you break the infectious process (Figure 27-1).
the common cold, influenza, herpes, infectious hepatitis, and acquired immunodeficiency syndrome (AIDS), which is caused by the human immunodeficiency virus (HIV).

Bacteria are tiny, simple cells that produce disease in a variety of ways. Pathogenic bacteria can secrete toxic substances that damage human tissues, act as parasites inside human cells, or grow on body surfaces, disrupting normal human functions. Bacteria are classified according to their shape, or morphology; they may be spherical (cocci), rod shaped (bacilli), or spiral shaped (spirochaetes) (see Chapter 55). Some bacteria can produce resistant internal structures, called spores, that make treatment difficult. When bacteria invade the body, the patient can be treated in a number of ways. The most common approach is to use antibiotics to destroy the invader or inhibit its growth. We all have nonpathogenic bacteria that reside in various body systems; for example, a harmless form of Escherichia coli (E. coli) lives in the large intestine. These bacteria protect against disease by competing for nutrients that pathogenic bacteria require to grow and multiply. Common diseases caused by bacteria include tuberculosis, urinary tract infections, pneumonia, and strep throat.

The second link in the chain of infection is the reservoir. Reservoirs may be people, insects, animals, water, food, or contaminated instruments. Most pathogens must gain entrance into a host or else they will die. The reservoir host supplies nutrition for the organism, allowing it to multiply. The pathogen either causes infection in the host or, in the case of vector-borne diseases, exits the host in great enough numbers to cause disease in another host.

The chain of infection continues with the means, or portal, of exit; that is, how the pathogen escapes the reservoir host. Exits include the mouth, nose, eyes, ears, intestines, urinary tract, reproductive tract, and open wounds. The use of Standard Precautions, such as latex gloves, masks, proper wound care, correct disposal of contaminated products, and hand washing, all help control the ability of infectious material to spread from one host to another.

After exiting the reservoir host, organisms spread by transmission. Transmission either is direct or indirect. Direct transmission occurs from contact with an infected person or with discharges from an infected person, such as feces or urine. Indirect transmission occurs from droplets in the air expelled by coughing, sneezing, or sneezing; vectors that harbor pathogens; contaminated food or drink; and/or contact with contaminated objects (called fomites). Proper sanitization of water and food; the use of sanitization, disinfection, and sterilization procedures; and the use of germicides, such as Windex and Clorox, help control the transmission of pathogens.

The next step in the chain of infection is the means, or portal, of entry. This is how the transmitted pathogen gains entry into a new host. Like the means of exit, the means of entry may be the mouth, nose, eyes, ears, intestines, urinary tract, reproductive system, or an open wound. The first line of defense against pathogenic infection is the intact integumentary system, or skin, which serves as a mechanical barrier to infection. Anatomic defense mechanisms also include tears, saliva, mucous membranes, and the pH of body fluids. The body's second line of defense includes the inflammatory process and immune system response. The immune system responds by producing antibodies specifically designed to combat the presence of a foreign substance, or antigen. This process is called humoral immunity and is the responsibility of the body's B cells. The immune system also reacts at the cellular level with T-cell activity in cell-mediated immunity by causing the destruction of pathogenic cells at the site of invasion. An example of cell-mediated immunity is phagocytosis, in which specialized immune system cells called macrophages actually ingest and destroy pathogenic microbes (see Chapter 54 for further discussion). If the host is susceptible (i.e., capable of supporting the growth of the infecting organism), the organism multiplies. Factors that affect a host's susceptibility include the location of entrance, the dose of organisms, and the individual's state of health. If conditions are right, the organism reaches infectious levels, and the susceptible host can start the chain of infection all over.

Individuals who are effectively immunized against a disease, such as hepatitis B, are not susceptible to the disease even if they are exposed to the pathogen, because their immune system has created antibodies to protect them. In addition to immunization,
other ways to reduce susceptibility to disease organisms are
good nutrition and a healthy lifestyle.

THE BODY’S NATURAL
PROTECTIVE MECHANISMS

The body has multiple levels of protection against the invasions of patho-
genic microorganisms. The following are some of these mechanisms:
- Intact skin serves as a natural barrier to disease.
- Mucous membranes lining the openings of the body help protect
  underlying tissues and trap foreign substances.
- Tiny, hairlike projections, called cilia, line the respiratory tract and
  move in a coordinated upward motion to expel trapped foreign
  substances.
- Tapped substances can be expelled with sneezing and coughing
  before the organisms invade underlying tissue.
- Some body secretions, such as tears, have antimicrobial properties
  that help destroy invading pathogens.
- The natural pH of many of the body’s organs discourages the
  growth of microbes. The acidic pH of urine, the vaginal mucosa,
  and the stomach helps prevent pathogenic invasion. The body’s
  resident microbes create and maintain this environment.

CRITICAL THINKING APPLICATION 27-2
Tommy Andersson, a 5-year-old patient, is seen in the office because of an
outbreak of impetigo. Ross must apply the concepts of the chain of infec-
tion and infection control methods to teach Tommy and his mother how
to prevent the spread of the infection to other members of the family.
What procedures should they follow after Tommy’s visit to prevent the
spread of the infection to other patients, other staff members, and herself?

THE INFLAMMATORY RESPONSE

When trauma occurs to the body or it is exposed to pathogens, protective mechanisms are alerted, and the body responds in a predictable manner, called the inflammatory response (Figure 27-2). To defend itself, the body initiates specific responses to destroy and remove pathogenic organisms and their byproducts; or, if this is not possible, to limit the extent of damage caused by the invading pathogen. This process results in the four classic symptoms of inflammation: erythema (redness), edema (swelling), pain, and heat.

When the body is exposed to an infectious agent or a foreign substance, cellular damage occurs at the site. Inflammation medi-
ators (i.e., histamine, prostaglandins, and leukotrienes) are released and cause three different responses at the cellular level. All three actions are designed to increase the number of white blood cells (WBCs) at the injury site.

First, blood vessels at the site dilate, causing an increase in local blood flow, which results in redness (inflammation) and heat. Blood vessel walls become more permeable, which assists in the release of WBCs to the site. The WBCs begin to form a fibrous capsule around the site to protect surrounding cells from
damage or infection. Blood plasma also filters out of the more
permeable vessel walls, resulting in edema, which puts pressure
on the nerves and causes pain. Finally, chemotaxis, or the release
of chemical agents, occurs, attracting even more WBCs to the
site. The increased number of WBCs at the site results in phago-
cytosis, or the engulfing and destruction of microorganisms and
damaged cells. Destroyed pathogens, cells, and WBCs collect in
the area and form a thick, white substance called pus. If the
pathogenic invasion is too great for localized control, the infec-
tion may collect in the body’s lymph nodes, where more WBCs
are present to help fight the battle. This causes swollen glands,
or lymphadenopathy. If the body is too weak or the number of
pathogens is too great, the infection may spread to the blood-
stream. An systemic infection, called septicemia or blood poisoning,
may occur that ultimately could affect the entire body. Another
term for septicemia is pyemia. Without appropriate medical
intervention, death can occur.

CRITICAL THINKING APPLICATION 27-3
Ross’s next patient appears to have a localized inflammatory response to
a splinter. What signs and symptoms should he also expect the patient to show?
Ross answers a telephone call from a patient who had surgery 3 days
ago. The patient is concerned that the incision site is red, swollen, and
hot. Is this a normal postoperative response? How might Ross know
whether the response is abnormal?

TYPES OF INFECTIONS

Acute Infection

An acute infection has a rapid onset of symptoms but lasts a relatively
short time. The prodromal period is that time when the
patient first shows vague, nonspecific symptoms of disease. In an
acute viral infection, the host cell typically dies within hours or
days. Symptoms appear after the tissue damage begins. In most
acute infections, such as the common cold, the body’s defense
mechanisms eliminate the virus within 2 to 3 weeks.
Chronic Infection
An infection that persists for a long period, sometimes for life is called a chronic infection. In the case of chronic hepatitis B, patients are asymptomatic, or without symptoms, but the virus is detectable with blood tests and remains transmissible throughout the person’s life. Hepatitis B, or serum hepatitis, is transmitted by blood or blood products and by all body fluids. It is a serious health hazard to medical personnel. All individuals employed in a healthcare setting should be immunized against hepatitis B.

Latest Infection
A latent infection is a persistent infection in which the symptoms cycle through periods of relapse and remission. Cold sores and genital herpes are latent viral infections caused by the herpes simplex virus (HSV) types I and II, respectively. The virus enters the body and causes the original lesion. It then lies dormant, in nerve cells away from the surface, until a certain provocation (illness with fever, sunburn, or stress) causes it to leave the nerve cell and seek the surface again. Once the virus reaches the superficial tissues, it becomes detectable for a short time and causes a new outbreak at the site. Another herpes virus, varicella-zoster virus, causes chickenpox (varicella). This virus may lie dormant along a nerve pathway for years and later erupt as the painful disease shingles (zoster).

Opportunistic Infections
Opportunistic infections are caused by organisms that are not typically pathogenic but that occur in hosts with an impaired immune system response, such as individuals infected with HIV. Over time, the person’s immune system becomes weakened, and disease result that are not typically seen in patients with a healthy immune system, such as certain types of pneumonia and oral candidiasis.

OSHA STANDARDS FOR THE HEALTHCARE SETTING
Chapter 7 introduced the role of OSHA in protecting patients and healthcare personnel from potentially harmful substances in the medical facility. In 1987, in response to concern about the increasing prevalence of HIV and the hepatitis B virus (HBV), the Centers for Disease Control (now the Centers for Disease Control and Prevention (CDC)) recommended a new approach to potentially infectious materials called Universal Precautions. The underlying concept of Universal Precautions is that because healthcare workers cannot know whether a patient has an infectious disorder, all blood and certain body fluids must be treated as if known to be infectious for blood-borne pathogens. Therefore, precautions must be implemented for all patients, regardless of the information available about the person's individual health history. In turn, Universal Precautions protect patients from blood-borne infections the healthcare worker may carry.

Exposure Control Plan
OSHA recognizes that healthcare employees face significant health risks as the result of occupational exposure to blood or other potentially infectious materials that may contain HIV, the hepatitis C virus (HCV), or HBV. In July 1992, OSHA began enforcing work practice controls to reduce or eliminate occupational exposure to blood-borne pathogens. Employers whose workers are at risk for occupational exposure to blood or other infectious materials must implement an Exposure Control Plan that details employee protection procedures. The Exposure Control Plan must identify job classifications and specific work-related tasks in which an employee potentially may be exposed to blood and/or body fluids. The plan must describe how an employer will use a combination of controls, including personal protective equipment (PPE), training, medical surveillance, hepatitis B immunizations, record keeping of occupational injuries, postexposure follow-up, and labeling of hazardous materials. Engineering controls, such as safer medical equipment, puncture-proof sharps containers, and shielded needle devices, as well as PPE (e.g., gloves, gowns, and face shields) are recommended as the primary ways to reduce or eliminate employee exposure. The plan must be reviewed and updated at least annually to incorporate the use of safer medical devices designed to eliminate or minimize occupational exposure to contaminated waste. In addition, the Exposure Control Plan must be readily available to all employees for review and training. It does not have to be a separate document and may be included as part of the facility’s procedures manual or in the health and safety manual developed by the site.

OSHA’s Bloodborne Pathogen Standard
The CDC estimates that medical personnel annually experience almost 600,000 exposure incidents from contaminated sharps. In response to the CDC’s concern about employee risk, Congress passed the Needlestick Safety and Prevention Act, which took effect in April, 2001. Employers are required to keep a confidential sharps injury log that describes the device involved in the incident and the details of how and where the incident occurred. Employees also must make available to employees effective sharps management devices, such as syringes with self-sharpening needles, needles that retract after use, and needleless intravenous (IV) systems that do not require sharps for parenteral administration. Parenteral exposure includes accidental needle sticks, occupation-related human bites, and exposure to potentially infectious material to nonintact skin, such as cuts and abrasions on the employee’s hands. An employer who fails to comply with OSHA’s Bloodborne Pathogen Standard could face a maximum penalty of $7,000 for the first violation and up to $70,000 for repeated violations.

The Bloodborne Pathogen Standard also clarifies the use of washing or flushing of any exposed body area or mucous membrane immediately or as soon as possible after exposure to poten-
Potentially Infectious Fluids

Items contaminated with any of the following potentially infectious materials require special handling:

- Cerebrospinal fluid (CSF)
- Nasal and sputum, pleural, pericardial, peritoneal, and amniotic fluids
- Liquids or semiliquid blood
- Vaginal and seminal secretions
- Saliva in dental procedures
- Body fluid visibly contaminated with blood
- Unknown body fluid
- Wound drainage
- Human tissue, including tissue culture, cells, or extrudates
- The human immunodeficiency virus (HIV) has been isolated from CSF and synovial and amniotic fluids; hepatitis antigens have been detected in synovial, amniotic, and peritoneal fluids.

Compliance Guidelines

Because the Pathogen Standards are written to cover employees working in all health fields, only some of the regulations apply to the ambulatory care setting. Safety and infection control fundamentals go beyond hand washing and a knowledge of the disease cycle. The information presented here is as it applies to the medical assisting profession.

Barrier Protection

Medical assistants routinely should use appropriate barrier precautions when contact with blood or other body fluids is expected. Barrier protection, or PPE, includes specialized clothing or equipment that prevents the healthcare worker from coming in contact with blood or other potentially infectious material, thereby preventing or minimizing the entry of infectious material into the body. Barrier devices include disposable gloves, face masks, face shields, protective glasses, shoe covers, laboratory coats, barrier gowns, mouthpieces, and resuscitation bags (Figure 27-3).

Since the implementation of Universal Precautions, the use of latex gloves has become commonplace in healthcare facilities. Unfortunately, allergic reactions associated with latex products have also increased. Hypersensitivity reactions to latex gloves or the powder that lines them may be localized, involving urticaria, dermatitis, conjunctivitis, or rhinitis or systemic, producing anaphylactic reactions or anaphylaxis. If a healthcare worker or a patient shows signs of sensitivity to latex, the healthcare provider is required to provide gloves made of nonallergenic materials as a barrier device.

Gloves must be used when the medical assistant is at all likely to be involved in any of the following activities (Procedure 27-1):

- Touching a patient’s blood, body fluids, mucous membranes, or skin that is not intact.
- Handling items and surfaces contaminated with blood and body fluids.

Visibly soiled hands should be washed for a minimum of 15 seconds with antimicrobial soap and warm running water.

Gloves reduce hand contamination by 70% to 80%. Alcohol hand rubs should be used before and after contact with each patient, as well as after removing gloves, to prevent cross-contamination among patients and healthcare workers.

To use an alcohol hand rub properly, apply the label-recommended amount to the palm of one hand and rub the hands together, covering all surfaces until the hands are dry.

Studies have shown that even after careful hand hygiene, healthcare workers with artificial nails have more pathogenic microbes under their nails and on their fingertips than workers with natural nails. Artificial nails also cause nail changes that contribute to the transmission of microbes.

Natural nail tips should be no longer than 1/4 inch to prevent microbial growth in the nail bed.

Allergic contact dermatitis from alcohol hand rubs is uncommon (Figure 27-3).

The best way to reduce the occupational risk of infection is to follow the Pathogen Standards. Healthcare workers must take adequate and consistent precautions to protect themselves and their patients. Figure 27-4 summarizes the Bloodborne Pathogens Standard. If an exposure incident occurs, such as an accidental needle stick, the facility must have specific policies and procedures in place for management of the employee who was exposed.
Requirements or Employers: OSHA Bloodborne Pathogens Standard

EXPOSURE CONTROL PLAN

Each medical office must develop a written exposure control plan (ECP).

The purpose of the ECP is to identify tasks where there is the potential for exposure to blood and other potentially infectious materials.

- Atranspose must be published including when and how communication of potential hazards will occur.
- The employer must offer employees the hepatitis B vaccine within 10 working days of employment (at no cost to the employees). If employees refuse to receive the vaccine, they can change their mind at no cost to the employee.
- The employer must document the steps that should be taken in case of an exposure incident, including postexposure evaluation and follow-up, and recordkeeping. Implementation of engineering controls, provision for personal protective equipment, and general housekeeping standards. This plan must be posted in the medical office.
- There must also be written procedures for evaluating the circumstances of an exposure incident.
- Training records must be kept for 3 years.

ENGINEERING CONTROLS AND WORK PRACTICES

The employer must provide engineering controls or equipment and facilities that minimize the possibility of exposure. Examples of engineering controls include the following:

- Providing puncture-resistant containers for used sharps.
- Providing hard-handling facilities that are readily accessible.
- Equipment for sanitizing, decontaminating, and sterilizing.

The employer must also enforce work practice controls. Work practice controls also minimize the possibility of exposure by making sure employees are using proper techniques while working. Examples include the following:

- Entraining proper handwashing or sanitizing procedures.
- Entraining proper technique for using and handling needles to prevent needle stick.
- Entraining proper techniques to minimize the splashing of blood.

PERSONAL PROTECTIVE EQUIPMENT

Employees must provide, and employees must use, personal protective equipment (PPE) when there is possibility exists of exposure to blood or contaminated body fluids. This equipment must not allow blood or potentially infectious materials to pass through the employee's clothes, skin, eyes, or mouth. Examples of PPE include the following:

- Gloves
- Face shields
- Goggles
- Boots

SAFETY ALERT

If an employee has an allergy to powder or latex, the employer must provide hypoallergenic or powderless gloves. The employee cannot be charged for PPEs.

EXPOSURE INCIDENT MANAGEMENT

An exposure incident is contact with blood or other potentially infectious material that occurs when doing one's job. When an exposure incident is reported, the employee must arrange for an immediate and confidential medical evaluation. The information and actions required are as follows:

- Documenting how the exposure occurred.
- Identifying and testing the "source" individual, if possible.
- Testing the employee's blood. If consent is granted.
- Providing counseling.
- Evaluating, training, and following up on any reported illness.

Medical records must be kept for each employee with occupational exposure for the duration of employment plus 30 years.

COMMUNICATION OF POTENTIAL HAZARDS TO EMPLOYEES

A medical assistant will be exposed to hazardous chemicals on the job. Most chemicals handled by assistants are not any more dangerous than those used in the home. In the workplace, however, exposure is likely to be greater, concentrations higher, and exposure times longer.

The "right-to-know" law (OSHA's hazard communication standard) states that each employee has a right to know what chemicals he or she is working with in the workplace. The right-to-know law is intended to make the workplace safer by making certain that all information regarding chemical hazards is known to the employee. This information is supplied in the material safety data sheet (MSDS), a fact sheet about a chemical that includes the following information:

- Identification of the chemical
- Listing of the physical and health hazards
- Precautions for handling
- Identification of the chemical as a carcinogen
- First-aid procedures
- Name, address, and telephone number of manufacturer

Many MSDS information sheets can be obtained in repositories on the Internet. An MSDS should be updated at least every 3 years. Employers must ensure that all products have an up-to-date MSDS when they enter the workplace.

Potential hazards are also communicated with labels and color. Any containers with hazardous waste must be orange (or reddish orange) and must display the hazardous symbol. These labels and colors alert employees to the risk of possible exposure.
**CRITICAL THINKING APPLICATION 27-5**

Rosa is caring for an injured 3-year-old child with an open wound on his right knee. She puts on disposable gloves to clean the wound, and the mother demands to know why. How can she explain her actions?

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**Environmental Protection**

Environmental protection refers to minimizing the risk of occupational injury by isolating or removing any physical or mechanical health hazard in the medical workplace. Every medical assistant must adhere to these safety rules:

- **Observe warning labels on biohazard containers and equipment.**

- **Minimize splashing or spraying of potentially infectious materials.** Blood that splatters onto open areas of the skin or mucous membranes is a proven mode of transmission of HBV.

- **Bandage any breaks or lesions on your hands before gloving.**

- **If exposed body surfaces, such as the eyes, come in contact with body fluids, flush with water and/or scrub with soap and water as soon as possible using an eye wash unit (Figure 27-7 and Procedure 27-2).**

- **Contaminated needles and other sharps should never be recapped, bent, broken, or resheathed. Needle units are now required to have sliding shields or some other protective device for use after injection.**

- **Reusable sharps that are contaminated should not be processed in a way that requires employees to reach into containers to grasp them.**

- **Immediately after use, dispose of syringes and needles, scalpel blades, and other sharp items in a labeled, leak-proof, puncture-resistant biohazard container. The container must be located as close as possible to the area where the instruments are used.**

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**Figure 27-5** Personal protective equipment.

**Figure 27-6** Removing a contaminated gown. (From Fuller JK: Surgical technology: principles and practice, ed 3, St Louis, 2010, Saunders.)

**Figure 27-7** Eye washing unit.
Train in and Practice Standard Precautions: Use Standard Precautions to Remove Contaminated Gloves and Discard Biohazardous Material

**GOAL:** To minimize exposure to pathogens by aseptically removing and discarding contaminated gloves.

**EQUIPMENT and SUPPLIES**
- Latex or alternative disposable examination gloves
- Biohazard waste container with labeled red biohazard bag

**PROCEDURAL STEPS**
1. With the dominant hand, grasp the glove of the opposite hand near the palm and begin removing the first glove (Figure 1). The arm should be held away from the body with the hands pointed down.
   **PURPOSE:** Holding the hands down and away from the body helps prevent possible contamination.
2. Pull the glove inside out until you reach the fingers, holding the contaminated glove in the dominant gloved hand (Figure 2).
   **PURPOSE:** Taking off the glove inside out prevents transmission of pathogens to another surface.
3. Insert the thumb of the ungloved hand inside the cuff of the other contaminated glove (Figure 3).
4. Pull the glove down the hand inside out over the contaminated glove being held, leaving the contaminated side of both gloves on the inside.
   **PURPOSE:** This technique protects the wearer from the contaminated surfaces of both gloves.
5. Properly dispose of the inside-out, contaminated gloves in a biohazard waste container (Figure 4).
   **PURPOSE:** To prevent the spread of infection.
6. Perform a medical aseptic hand wash as described in Procedure 27-4 or sanitize the hands.
   **PURPOSE:** To minimize the number of pathogens on the hands, thereby reducing the number of transient bacteria and the risk of transmission of pathogens.
CHAPTER 27 Infection Control

PROCEDURE 27-2

Demonstrate the Proper Use of Eye Wash Equipment: Perform an Emergency Eye Wash

GOAL: To minimize the risk of occupational exposure to pathogens if body fluids come in contact with the eyes.

EQUIPMENT and SUPPLIES
- Plunger or self-contained eye wash unit
- Disposable gloves

PROCEDURAL STEPS

1. Don gloves and remove contact lenses or glasses.
   PURPOSE: To avoid flushing or all material in the eyes.

2. Following the manufacturer's directions, turn on the eye wash unit. If it is a plumbed unit, the control valve should remain on until the unit is manually turned off.
   PURPOSE: The unit must be unplugged so that it can remain on until manually turned off.

3. Hold the eyelids open with the thumb and index finger to ensure adequate rinsing of the entire eye and eyelid surface.

4. Avoid aiming the water stream directly onto the eye(s).

5. Flush the eyes and eyelids for a minimum of 15 minutes, rolling the eyes periodically to ensure complete removal of the foreign material.

6. Soak your hands.

7. After completion of the eye wash, follow postexposure follow-up procedures.
   PURPOSE: The facility's policies may include physician follow-up and completion of an exposure incident form.

- All specimens must be placed in a container that prevents leakage, cutting, handling, processing, storage, transport, and shipping. Avoid contaminating the outside of the container or the label with the specimen substance.
- The container should be disinfected. One method is to use a 1:10 dilution of sodium hypochlorite (household chlorine bleach and water) and place the container in a leakproof bag for transport. The container must have a hazardous label to alert others that it holds potentially infectious material. Gloves should be worn throughout this procedure.
- Mouth spitting or the sucking of blood through tubing is prohibited.
- Specimens containing blood should be decontaminated before reprocessing or should be placed in impervious bags and disposed of according to policy.
- Equipment requiring repair that has been contaminated with blood or body fluids should be decontaminated before being repaired in the office or transported for repair. There is no documented evidence of HIV transmission from contaminated environmental surfaces, but surface contamination is a proven mode of transmission for HBV.
- Smoking, eating, drinking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where the reasonable likelihood of contamination from pathogens exists.
- Food and beverages cannot be kept in refrigerators, freezers, or cabinets or on countertops where infectious materials could be present.

Housekeeping Controls

The Bloodborne Pathogens Standard requires certain housekeeping measures to ensure a sanitary work area. Facilities must post a schedule for cleaning and decontaminating each work area where exposures could occur. This documentation must include information about the surface cleaned, the type of waste encountered, and procedures performed in the designated area.

- Work surfaces must be immediately decontaminated with a disinfectant (e.g., 1:10 solution of sodium hypochlorite) after accidental spills of blood or body fluids at the end of each procedure, and at the end of each shift.
- Disinfection and decontamination of all reusable containers must be done on a routine basis.
- Sharps containers must be as close as possible to the work area. Never attempt to reach inside a sharps container and do not overfill them. Replace containers on a routine basis, and be certain that the lid is closed securely before preparing them for biohazard waste disposal.
- Never pick up spilled material or broken glassware with the hands. Brooms, brushes, dusters, and pickup tools or forceps should be used, and the material should be placed immediately into an impervious biohazard bag or container at the spill site (Figure 27-6). Use an absorbent, professional biohazard spill preparation as directed to decontaminate the site.
- Handle soiled linen as little as possible and always wear gloves or other protective equipment during disposal. Linens soiled with blood or body fluids should be double bagged and transported in labeled, leakproof biohazard bags.
- Contaminated materials and/or infectious waste must be handled with extreme caution to prevent exposure. Biohazard waste must be collected in impermeable red polyethylene or polypropylene biohazard-labeled bags or containers and sealed (Figure 27-9). This waste must be disposed of in accordance with all federal, state, and local regulations.

Disposal methods include treatment by heat, incineration, steam sterilization, chemical treatment, or other equivalent
methods that renders the waste inactive before it is placed in a landfill.

**CRITICAL THINKING APPLICATION 27-6**

Using the techniques learned in Chapter 1, create a mind map that outlines the details of OSHA's Bloodborne Pathogens Standard.

**Hepatitis B Vaccination**

Hepatitis B vaccine must be available free of charge to all employees at risk for occupational exposure to blood-borne pathogens, whether they are full-time or part-time workers, within 10 days of starting employment. The vaccine is administered by intramuscular injection in three doses. The second injection is administered 4 weeks after the first, and the third injection 6 months after the first. The U.S. Public Health Service does not currently recommend routine boosters for hepatitis B immunization. However, if they are recommended in the future, boosters must be made available to eligible employees without cost.
Although vaccination is almost 96% effective, employees should have a blood titer drawn after completion of the injection cycle to determine whether they have created antibodies against the disease. If the employee did not respond to the first series or if the series was not completed, revaccination with a second three-dose series is recommended. If antibodies still do not develop, no further vaccination is given.

Employees have the right to decline hepatitis B immunization, but they are required to sign a declination form that is kept on file as a record of worker refusal. A sample declination form developed by OSHA is shown in Figure 27-10. An employee who changes his or her mind may receive the vaccine at a future date free of charge.

**Postexposure Follow-Up**

If a worker is exposed through an accidental needle stick, a human bite, exposure to broken skin, or from a splash or splatter onto mucous membranes, such as the eyes, certain procedures must be followed. Procedure 27-3 presents the specific steps to be taken for exposure to contaminated waste:

- Immediately, or as soon as possible after exposure, the worker should wash or flush the exposed area.
- The exposure incident must be immediately reported to the supervisor.
- The employee must immediately receive a confidential medical evaluation. The physician caring for the exposed employee must receive written details of the exposure incident, including the route and circumstances surrounding the incident. All documentation related to the exposure must remain confidential, may not be disclosed to any individual without the employee’s express written permission, and must be kept for at least the duration of the employee’s employment plus 30 years.
- An incident report must be filed that documents the details surrounding the exposure incident, the route or type of exposure, and the identity, if known, of the source individual. The source individual is the person, living or dead, whose blood or potentially infectious material was the source of the occupational exposure.

- The source individual is screened for HBV, HCV and HIV. Depending on state regulations, consent may or may not be required from the source individual to perform the screening. If consent is required but not given, the employer must document that consent was not received from the source individual. If screening is done, OSHA requires that the employer be informed of the results of the source individual’s tests.
- The exposed worker is tested for HBV, HCV and HIV if consent is given. If the employee refuses the tests but blood is drawn, the sample must be stored 90 days for the worker to decide whether screening is wanted.
- If the employee has not been vaccinated against HBV, vaccination is offered.
- The injured employee must receive a copy of the healthcare provider’s written opinion within 15 days of completion of the evaluation.
- The exposed worker must receive health counseling about the risk of illness or other adverse outcomes of exposure and the potential for and consequences of transmission of the disease to family, patients, and others.

Healthcare workers are at risk for blood-borne pathogen exposure and should follow all OSHA guidelines designed to protect individuals from exposure. A complete, unabridged copy of OSHA’s Bloodborne Pathogens Standard may be obtained at the OSHA Web site at www.osha.gov.

**Critical Thinking Application**

Rosa’s office was especially busy today. While administering an injection to a frightened 6-year-old child, a coworker accidentally sticks herself with the needle. She tells Rosa about the incident, but she doesn’t know what to do next. What steps should be taken to manage the situation?

**Aseptic Techniques: Prevention of Disease Transmission**

_Asepsis_ means freedom from infection or infectious material. _Medical asepsis_ is defined as the destruction of disease-causing organisms after they leave the body. When we practice the principles of medical asepsis, we are directing our efforts at preventing reinfection of the patient or the cross-infection of other patients or ourselves. The goal is to eliminate or minimize pathogens by following OSHA’s Bloodborne Pathogens Standard and disinfecting objects as soon as possible after contamination. This creates a healthcare environment as free of pathogens as possible.

_Surgical asepsis_ is the destruction of organisms before they enter the body. This technique is used for any procedure that invades the body’s skin or tissues, such as surgery or injections. Any time the skin or mucous membrane is punctured, pierced, or incised (or will be during a procedure), surgical aseptic techniques are practiced. Everything that comes in contact with the patient should be sterile, including gowns, drapes, instruments,
Participate in a Mock Environmental Exposure Event with Documentation of Steps: Implement the Facility's Environmental Safety Plan

**GOAL:** To manage an exposure incident according to OSHA standards.

**SCENARIO:** Rosa is administering a hepatitis B vaccine, and the patient suddenly jumps back. The contaminated needle becomes dislodged and jams Rosa. What procedural steps must be taken to comply with OSHA standards?

**EQUIPMENT and SUPPLIES**
- Antiseptic soap and warm running water
- Exposure incident report form

**PROCEDURAL STEPS**

1. Immediately wash the exposed site with antiseptic soap and warm running water.
   - **PURPOSE:** To sanitize and disinfect the exposure site as quickly and thoroughly as possible.
2. Immediately report the exposure incident to the site supervisor.
   - **PURPOSE:** The facility supervisor (e.g., office manager, practice manager, physician) is responsible for following through with the facility's Exposure Control Plan.
3. Complete an exposure incident report that details the type of injury, the details surrounding the incident, the equipment involved, and any other pertinent details.
   - **PURPOSE:** The facility must report exposure incidents to OSHA. OSHA evaluates the incident based on required standards, including employee training, availability of current protective devices (e.g., needle covers and location of sharps containers) and the extent of employee injury. The incident report also serves as a written record of the incident, which establishes the need for employee healthcare.
4. After the incident report has been completed, the employee is immediately sent for a confidential medical evaluation. This may be a related employee health office, local emergency department, or private physician’s office. The employee must cover the costs of all related healthcare.

**PURPOSE:** All employee records regarding the exposure incident must be kept completely confidential and separate from any other employee records.

**1. A blood sample is taken from the “source” individual to test for hepatitis B or C and for the human immunodeficiency virus (HIV).**

**PURPOSE:** A blood sample from the source is tested to determine whether the person is positive for any of these infectious diseases.

**2. A blood sample is taken from the employee to test for hepatitis B and C and for HIV.**

**PURPOSE:** To determine whether the employee is currently infected with hepatitis B or C or HIV.

**3. If the patient's blood tests negative, the employer must provide free education and counseling for the employee. If the patient’s blood tests positive for hepatitis B or C or HIV, the employee is offered free care as well as counseling.**

**PURPOSE:** If the patient’s screening test is negative, it is still possible that the person may have been recently exposed and the screening did not detect the early stages of the disease. The employee must be offered follow-up testing for 6 months to ensure that he or she was not infected. If the patient tested positive for any of the three infectious diseases, the employee is offered treatment (appropriate medications, education, and counseling) and follow-up screening. According to the Centers for Disease Control and Prevention (CDC), if no indication of disease is seen within 6 months, it will not develop.

**4. Confidential medical records of the exposure incident, blood work outcomes, and treatment must be kept for the duration of employment plus 30 years.**

The most effective barrier against infection is the unbroken skin. If the skin and mucous membranes are intact, medical asepsis can be practiced for most noninvasive procedures (i.e., those that do not penetrate human tissues), such as pelvic and proctologic examinations. Instruments and objects used in medical aseptic procedures must be disinfected or sterilized before use on another patient. Medical aseptic procedures may include the use of gowns and masks, but these are not sterile and are worn to protect the healthcare worker more than the patient.

Another practical application of aseptic technique is to set up work areas in the medical office's laboratory so that one side of the laboratory is the "clean" side, where only noninfectious procedures are performed, and the other is the "dirty" side, where potentially infectious materials are processed or cleaned.
Hand Washing

The hands must be washed, using the correct technique, before and after each patient is examined or treated and also when stipulated by the Bloodborne Pathogens Guidelines. A thorough scrub is not necessary each time, but the first scrub in the morning should be extensive, lasting 2 to 4 minutes. Subsequent hand washing may be brief unless the hands are extensively contaminated. A good antimicrobial soap with chlorhexidine (e.g., Hibiclens), which has antiseptic residual action that lasts several hours, should be used. Each office sink should be equipped with a liquid soap dispenser. A water-soluble lotion may be rubbed into the hands after they have been washed and dried. Dry, cracked, chapped skin is no longer intact and can result in the transmission of disease.

Proper hand washing depends on two factors: running water and friction. The water should be warm, because water that is too hot or too cold causes the skin to become chapped. Friction is the firm rubbing of all surfaces of the hands and wrists.

Remember that your fingers have four sides, and fingernails have two sides. For medical hand washing, all jewelry except a plain wedding band is removed. A wristwatch may be left on if it can be moved up from the forearm away from the wrist area. The hands are washed under running water with the fingertips pointing downward. Soap and friction are applied to the hands and wrists. The water is allowed to wash debris away from the wrists and down toward the fingertips (Procedure 27-4).

Remember, the goal of aseptic hand washing is to protect you from infection and prevent cross-contamination from one patient to another. Use this procedure after you finish with one patient and before you attend to another patient; after you finish handling one specimen and before you handle another specimen; before and after you use toilet facilities; whenever you touch something that causes your hands to become contaminated; when you arrive at work and before you leave the office; before and after eating; and at the end of the day.

As stated earlier, alcohol-based hand rubs may substitute for hand washing unless the hands are visibly contaminated.

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**PROCEDURE 27-4**

**Train in and Practice Standard Precautions: Perform Medical Aseptic Hand Washing**

**GOAL:** To minimize the number of pathogens on the hands, thus reducing the risk of transmission of pathogens.

**EQUIPMENT and SUPPLIES**

- Sink with warm running water
- Antimicrobial liquid soap in a dispenser (bar soap is not acceptable)
- Nail brush or orange stick
- Paper towels in a dispenser
- Water-based antiseptic lotion
- Biohazard waste container with labeled red biohazard bag

**PROCEDURAL STEPS**

1. Remove all jewelry except your wristwatch if it can be pulled up above your wrist and a plain gold wedding ring.  
   **PURPOSE:** Jewelry can harbor microorganisms.
2. Turn on the faucet with a paper towel and regulate the water temperature to lukewarm.  
   **PURPOSE:** Use a paper towel to prevent touching of contaminated surfaces; water that is too hot can cause skin to become dry and chapped.
3. Wet your hands, apply soap, and lather using a circular motion with friction while holding your fingertips downward (Figure 1). Rub well between your fingers. If this is the first hand wash of the day, use a nail brush or an orange stick and clean under every fingernail. Inspect your nails thoroughly.  
   **PURPOSE:** Friction removes soil and contaminants from the hands and wrists.
4. Rinse well, holding your hands so that the water flows from your wrists downward to your fingertips (Figure 2).  
   **PURPOSE:** Soil and contaminants will wash off the skin and down the drain.
5. If this is the first hand wash of the day or if your hands are obviously contaminated, wet your hands again and repeat the scrubbing procedure using a vigorous, circular motion over the wrists and hands for at least 1 to 2 minutes.  
   **PURPOSE:** Time is required for friction and motion to eliminate all possible soil and contaminants.
6. Rinse your hands a second time, keeping the fingers lower than your wrists.  
   **PURPOSE:** To ensure removal of all transient bacteria.
7. Dry your hands with paper towels. Do not touch the paper towel dispenser as you are obtaining towels (Figure 3).  
   **PURPOSE:** Touching the dispenser contaminates your hands, and you will need to start over.
8. If the faucets are not foot operated, turn them off with a paper towel (Figure 4).  
   **PURPOSE:** The faucet is dirty and will contaminate your clean hands.
9. After you finish drying your hands and turning off the faucets, place used towels into a biohazard waste container.  
   **PURPOSE:** Always discard contaminated waste in a biohazard waste container immediately to eliminate the source of infection.
10. Apply a water-based antibacterial hand lotion to prevent chapped or dry skin.  
    **PURPOSE:** Chapped skin eliminates the first line of defense against infectious organisms.
11. Repeat the procedure as indicated throughout the day.  
    **PURPOSE:** To eliminate contaminants and prevent the transmission of pathogens to yourself and others.
Evidence suggests that hand antisepsis with an alcohol-based hand rub is more effective at reducing nosocomial infections than plain hand washing. Using antimicrobial-impregnated wipes (e.g., towelettes) is not a substitute for using an alcohol-based hand rub or antimicrobial soap.

Sanitization
Instruments and other items used in office surgery, examination, or treatment must be carefully cleaned before proceeding with the steps of disinfection or sterilization. Sanitization is the cleaning process that reduces the number of microorganisms to a safe level, as dictated in public health guidelines. This cleaning process removes debris such as blood and other body fluids from instruments or equipment. Blood and debris must be removed so that later disinfection with chemicals or sterilization with steam, heat, or gas can penetrate to all the instrument's surfaces (Procedure 27-5).

The medical assistant should always wear gloves (thick utility gloves if the instruments have sharp or pointed edges) while performing sanitization to prevent possible personal contamination with potentially infectious body fluids that may be present on the articles being cleaned. The procedure should be completed immediately after use of the instruments in a separate workroom or area or on the "dirty" side of the utility room to prevent cross-contamination of clean instruments and equipment. If this is not possible, rinse the used items under cold water immediately after the procedure and place them in a low-sudsing, rust-inhibiting, enzyme-containing detergent solution. Never allow blood or other substances that can coagulate to dry on an instrument.

When you are ready to sanitize instruments, drain off the soaking solution and rinse each instrument in cold running water. Separate the sharp instruments from the others, because metal instruments may damage the cutting edges, and sharp instruments may damage other instruments or injure you. Clean all sharp instruments at one time, when you can concentrate on preventing injury to yourself. Open all hinges and scrub serrations and notches with a small scrub brush or toothbrush. Rinse the instruments in hot water and then check carefully that they are in proper working order before they are disinfected or sterilized. The items should be hand dried with a towel to prevent spotting.

Sanitization is a very important step, and it cannot be overlooked or done carelessly. The use of disposable instruments minimizes the need for sanitization, disinfection, and sterilization.
PROCEDURE 27-5

Train in and Practice Standard Precautions: Use Standard Precautions for Sanitizing Instruments and Discarding Biohazardous Material

GOAL: To follow Standard Precautions in removing all contaminated matter from instruments in preparation for disinfection or sterilization.

EQUIPMENT and SUPPLIES
- Sink with hot running water
- Sanitizing agent or disinfecting soap with enzymatic action
- Utility gloves that are decontaminated and show no signs of deterioration
- Chin-length face shield or goggles and face mask if contamination with blood-borne pathogens is possible
- Disposable brush
- Disposable paper towels
- Disposable gloves
- Disinfectant cleaner prepared according to manufacturer's directions
- Biohazard waste container with labeled red biohazard bag

PROCEDURAL STEPS

1. Put on utility gloves.
   PURPOSE: To provide personal protection against potentially infectious matter and sharp instruments.

2. Put on a face shield or goggles and mask if potential for splashing of infectious material exists (Figure 1).
   PURPOSE: To provide personal protection against potentially infectious matter.

3. Separate the sharp instruments from other instruments to be sanitized.
   PURPOSE: To prevent possible self-injury and exposure to infectious matter.

4. Rinse the instruments under cold running water.
   PURPOSE: To help remove debris and prevent coagulation of body fluids.

5. Open hinged instruments and scrub all grooves, crevices, and serrations with a disposable brush (Figure 2).
   PURPOSE: Microorganisms can hide under contaminants and may not be destroyed by the disinfection process.

6. Rinse well with hot water.
   PURPOSE: Hot water removes all soap and contaminant residue.

7. Towel dry all instruments thoroughly and dispose of contaminated towels and disposable brush in a biohazard waste container. Do not touch the paper towel dispenser as you are obtaining towels.
   PURPOSE: All contaminated material must be discarded in a labeled biohazard container and/or a labeled red biohazard bag. Touching the dispenser contaminates your hands. Wet instruments can rust or become dull and also dilute disinfectant or sanitizing chemicals.

8. Remove the utility gloves and wash your hands according to Procedure 27/2.
   PURPOSE: To remove any possible contaminants.

9. Towel dry your hands and put on disposable gloves. Decontaminate the utility gloves and work surfaces using disinfectant cleaner.

10. Dispose of the contaminated towels in a biohazard waste container.
    PURPOSE: All contaminated material must be disposed of in a labeled biohazard container and/or a labeled red biohazard bag.

11. Remove the disposable gloves according to Procedure 27/2. Dispose of the gloves in a biohazard waste container. Sanitize the hands.
    PURPOSE: To prevent the spread of infectious organisms and to remove any possible contaminants.

12. Towel dry your hands and place sanitized instruments in a designated area for disinfection or sterilization.
    PURPOSE: Sanitized instruments must be removed from the cleaning area to prevent possible cross-contamination.
Ultrasonic Sanitization

Sound waves can be used to sanitize instruments. The instruments are placed in an ultrasonic bath of cleaner and water. Sound waves cause the solution to vibrate, which loosen the materials stained to the instruments. Ultrasonic cleaners are beneficial because they do not damage even the most delicate instruments, and workers do not run the risk of an accidental sharps injury.

Disinfection

Disinfection is the process of killing pathogenic organisms or of rendering them inactive. It is not always effective against spores, the tuberculosis bacillus, and certain viruses. Disinfectant chemicals may kill microbes within a short time, but they usually are very hard on instruments. Some chemicals, such as Cide, are effective enough to kill all organisms, but the usual immersion time for these sterilizes is 10 hours or longer. For equipment and countertops surfaces, the cheapest and most reliable method of disinfection is to use a 1:10 bleach solution. This is an effective and noncaustic disinfectant that can be used to wipe laboratory countertops where human blood and other body-fluid samples are handled. It also can be used for soaking reusable rubber goods before sanitation. In addition, bleach solution is an effective disinfectant for surfaces that have come in contact with viruses, including HIV.

Many types of disinfecting agents are available and have varying degrees of effectiveness. It is important to follow the manufacturer’s guidelines on how to use each product properly and to understand its advantages and disadvantages, as well as the possible sources of error.

Disinfection is very difficult to verify, because no convenient indicators ensure destruction of organisms. Even when the manufacturer’s directions for chemical strength and immersion times are followed, common errors can cause chemicals to lose their effectiveness:

- Instruments are not thoroughly sanitized, and attached organic matter inhibits or prevents the action of the disinfectant. No chemical can kill unless it reaches all instrument surfaces; therefore, complete sanitization is absolutely necessary.
- Sanitized instruments are not dried, and the moisture on the instruments dilutes the disinfectant solution beyond effective concentration levels.
- The disinfectant solution is left in an open container and evaporation changes its concentration.
- Solutions are not changed after the recommended period for use has expired.
- Solutions are not prepared properly or are not mixed properly before use.
- The manufacturer’s recommended temperature for use and storage is not maintained.

Sterilization

Sterilization, or the destruction of all microorganisms, is essential for surgical asepsis. To ensure proper sterilization for aseptic procedures, an area should be set aside in each office for just this purpose. The area should be divided into two sections. One section is used for receiving contaminated materials. This area should have a sink, receiving basins, proper cleaning agents, brushes, autoclave wrapping paper, sterilizer envelopes and tape, sterilizer indicator, disposable gloves, and designated biohazard waste containers. The other section should be reserved for receiving the sterile items after removal from the autoclave. Clean, clear plastic bags in which to store sterile packs may be kept in the sterile area. Both areas should be spottlessly clean and well organized. Sterile technique is addressed in Chapter 57.

Role of the Medical Assistant in Asepsis

Medical asepsis is one of the few procedures that directly affect the health of the patient, the physician, and the staff. The spread of pathogens in the ambulatory care setting can be controlled only through effective, consistent application of the Bloodborne Pathogens Standard and by proper sanitization, disinfection, and sterilization of supplies, equipment, and work surfaces.

The medical assistant must develop an inner sense for performing aseptic procedures properly. It is important that these techniques be done on such a routine basis that they become an unbreakable habit. The use of disposable items is highly recommended for infection control purposes. However, when disposable equipment is used, the assistant must follow recommended disposal guidelines.

Closing Comments

Patient Education

The medical assistant should take every opportunity to educate patients about the infection process and about ways to prevent the transmission of disease. The best time to instruct a patient in aseptic techniques that can be used at home is while performing the aseptic procedure. For example:

- While washing your hands, explain to the patient that this routine is part of daily hygiene and is particularly important for patients who are very young or old or who seem to get sick frequently. Instruct the patient that the hands should be washed before and after meals; after sneezing, coughing, or blowing the nose; after using the restroom;
before and after changing a dressing; and after changing an infant's diaper.

- Advise the patient to carry an alcohol-based hand rub and to use it as indicated throughout the day.
- Explain to the patient how using disposable tissues to cover the nose and mouth when coughing or sneezing reduces the chance of spreading illness among household members.
- Discuss proper ways of discarding used tissues, especially if a member of the household has or might have a communicable disease.
- Instruct the patient in the differences between sterile and clean dressings and bandages. Demonstrate each step in changing a dressing properly and explain how to dispose of contaminated items.

A medical assistant can help patients live healthier lives in many ways. For example, here are a few more suggestions for teaching the patient about asepsis and infection control:

- Set up an information table in the waiting room with take-home pamphlets and literature.
- Mail a periodic newsletter to patients about infection control, especially during flu season.
- Demonstrate and explain aseptic procedures to patients and family members, inviting them to participate.

### Legal and Ethical Issues

Medical asepsis and infection control in the ambulatory care setting give rise to numerous legal and ethical concerns. Personal discipline is the primary concern in medical asepsis. Typically, the medical assistant is alone when performing a medical aseptic procedure; therefore, if contamination occurs, he or she is the only one who knows. If contamination should occur, the medical assistant must start over again with clean supplies.

One of the medical assistant's main responsibilities is to perform disinfection and sterilization procedures with precision and total effectiveness. There is no room for compromise. Patients should have absolute assurance that they are being treated in an aseptic atmosphere and under aseptic conditions. This assurance is just as important for the protection of the physician and staff as it is for the patient. Allowing the physician to assume that the correct aseptic techniques were used when preparing a procedure and allowing him or her to use contaminated equipment on a patient may result in a malpractice lawsuit. Honesty on the part of the medical assistant builds self-respect and contributes to professional achievement.

A primary reason for performing aseptic procedures completely and effectively is to prevent the development of nosocomial infections in susceptible patients. These infections, which are acquired in the healthcare environment, can be especially dangerous for elderly or debilitated patients. Ignorance of the various aseptic techniques or carelessness can be dangerous and is inexcusable before the law.

More than 48 states have adopted Good Samaritan legislation, which protects bystanders and first responders from liability when they perform lifesaving procedures at the scene of an accident. If the individual acts in good faith, is not compensated, and performs techniques to the best of his or her knowledge, the person is not liable for civil damages. However, because OSHA regulates employer responsibility for the management of blood-borne pathogens, exposure at the scene of an accident is not covered by employer postexposure incident policies. Therefore, healthcare workers who volunteer their assistance in an emergency must enact blood-borne precautions as much as possible without expecting medical follow-up at the workplace.

### SUMMARY OF SCENARIO

Implementing Standard Precautions throughout daily practice is crucial to the welfare and protection of both the patient and the healthcare worker. Rosa must be sure to wash her hands routinely and/or to use an alcohol-based hand rub. She also must familiarize herself with the office's Exposure Control Plan; follow OSHA's Bloodborne Pathogen Standard; use PPE when needed; follow environmental protection guidelines; use appropriate procedures for cleaning up contaminated spills and other housekeeping controls; and understand postexposure follow-up if an accidental exposure occurs. In addition, Rosa must follow guidelines for sanitation, disinfection, and sterilization of appropriate equipment.

### SUMMARY OF LEARNING OBJECTIVES

1. Define, spell, and pronounce the terms listed in the vocabulary.

   Spelling and pronouncing medical terms correctly bolsters the medical assistant's credibility. Knowing the definitions of these terms promotes confidence in communication with patients and coworkers.

2. Apply critical thinking skills in performing patient assessment and care.

   Completing the Critical Thinking Application exercises throughout the chapter helps the student become more adept at critical analysis of realistic situations.

3. Describe the characteristics of pathogenic microorganisms and the diseases they cause.

   Pathogenic microorganisms include viruses, bacteria, protozoa, fungi, and rickettsia.

4. Apply the chain-of-infection process to healthcare practice.

   The chain of infection is the way infectious disease is spread. It begins with the infectious agent and moves to the host, the means or portal of exit from the host, the mode of transmission, and the means or portal of entry into a new host. It ends with the presence of the infection in a susceptible host. At least one of these links must be broken to stop the spread of infection.

5. Compare viral and bacterial cell invasion.
Bacterial infections can be treated with antibiotics, but viral infections, which involve viral takeover of cellular DNA or RNA material, cannot be treated with antibiotics, because viruses are not cells but parasites within a cell.

6. Differentiates between humoral and cell-mediated immunity.
   Humoral immunity creates specific antibodies to combat antigens. Cell-mediated immunity attacks the source of infection at the cellular level.

7. Summarizes the impact of the inflammatory response on the body's ability to defend itself against infection.
   The inflammatory response is one aspect of the body's ability to defend itself against infection. It involves the body's reaction to the introduction of a foreign substance or antigen, an increase in blood flow to the site, and the release of inflammatory mediators that attract white blood cells to the site, helping isolate and destroy the source of infection.

8. Analyze the differences among acute, chronic, latent, and opportunistic infections.
   Acute diseases have a rapid onset and short duration. Chronic diseases develop over a long period, perhaps a lifetime. Latent diseases cycle through relapse and remission phases. Opportunistic infections are caused by organisms that are not typically pathogenic but occur in hosts with impaired or weakened immune system response, such as individuals with HIV.

9. Specify potentially infectious body fluids.
   Potentially infectious body fluids include CSF, mucus, synovial, pleural, pericardial, peritoneal, and amniotic fluids; blood, vaginal and seminal secretions; saliva; and human tissue.

10. Integrate OSHA's requirement for a site-based Exposure Control Plan into office management procedures.
    OSHA requires incorporation of a site-based Exposure Control Plan into office management procedures. The plan must be revised annually and be available for employees to review. It must reflect current safety technology, identify employees at risk for exposure, and contain specifics about protection from bloodborne pathogens, including PPE, training, hepatitis B immunization, exposure, follow-up, record keeping, and the labeling and disposal of all biohazard waste.

11. Explain the major areas included in the OSHA Compliance Guidelines.
    The OSHA Compliance Guidelines include barrier protection devices, environment protection, housekeeping controls, hepatitis B immunization, and postexposure follow-up.

12. Remove contaminated gloves while following Standard Precautions principles.
    Refer to Procedure 27-1.

13. Perform an eyewash procedure for the removal of contaminated material.
    Refer to Procedure 27-2.

14. Summarize the management of postexposure evaluation and follow-up.
    Postexposure evaluation and follow-up are as follows: The site is cleaned and the exposed individual reports to the supervisor immediately. Medical assessment is performed immediately. Testing of the source individual and worker's blood is performed if possible and if consent is given. Health counseling is provided. Strict confidentiality of all medical records is maintained.

15. Participate in a mock environmental exposure event with documentation of the steps taken.
    Procedure 27-3 summarizes the steps required for the management of a postexposure needle stick.

16. Apply the concepts of medical and surgical asepsis to the healthcare setting.
    Medical asepsis is the removal or destruction of pathogens. Medical aseptic techniques are used to create an environment that is as free of pathogens as possible. Surgical asepsis is destruction of all microorganisms. Surgical asepsis is used when the patient's skin or mucous membranes are disrupted.

17. Demonstrate the proper hand-washing technique for medical asepsis.
    Refer to Procedure 27-4.

18. Differentiate among sanitization, disinfection, and sterilization procedures.
    Sanitization is cleaning of contaminated articles or surfaces to reduce the number of microorganisms. Disinfection involves the physical or chemical means to destroy pathogens or their components on inanimate surfaces or objects. Sterilization removes all living microorganisms.

19. Demonstrate the correct procedure for sanitizing contaminated instruments.
    Refer to Procedure 27-5.

20. Apply patient education concepts to infection control.
    Take every opportunity to demonstrate aseptic techniques, to educate patients about proper management of infectious materials at home, and to emphasize the importance of frequent and consistent hand washing.

21. Discuss the legal and ethical concerns regarding medical asepsis and infection control.
    The medical assistant is responsible for applying infection control procedures in all situations at all times to prevent cross-contamination and the development of nosocomial infections in patients.

CONNECTIONS

Study Guide Connection: Go to the Chapter 27 Study Guide. Read and complete the activities.

Evolve Connection: Go to the Chapter 27 lab at evolve.elsevier.com to complete the Chapter Review and Chapter Quiz. Pursue other resources listed for this chapter to increase your knowledge of infection control.