

# SECTION 1: INFECTION BASICS AND PROTECTION

## Objective

When you complete this study unit, you'll be able to explain the chain of infection and the precautions taken to prevent it.

Healthcare professionals are always working on preventing the spread of infection and promoting health in patients. Sometimes, it's the simplest tasks that can make the biggest difference in decreasing the spread of infection. As you review the topics of infection control and medical asepsis, focus on putting these practices to work for you as you prepare to enter your Externship course as well as your new career.

Since the early nineteenth century, morbidity and mortality from infectious disease has been on the decline due to major advances in medicine like antibiotics and vaccines. Healthcare professionals and scientists also conducted many studies on ways to reduce the spread of infection. The results of many of these studies have provided the foundation of our modern infection control principles that are used today.

Do you remember the definition of *infection control*? The goal of infection control is to prevent the spread of infectious diseases. To best understand how infections are spread, take a moment to review the basic process of infection.

## CHAIN OF INFECTION

All bodies contain living microorganisms that help maintain certain bodily functions. Think of the normal flora living in our intestinal tract; they're good microorganisms that we need to help aid in the digestion of the food that we eat. On the other hand, there are *pathogens*, or microorganisms that cause disease when the opportunity arises and they're allowed to grow and multiply in the human body.

What do microorganisms need to grow and multiply? Can you answer that question without looking back in Kinn's *The Clinical Medical Assistant* textbook? Take a quick review of what a microorganism needs to grow and multiply:

**Oxygen.** Some microorganisms need oxygen to live, but many others don't. Microorganisms that require oxygen are called *aerobic*. If a microorganism requires very little or no oxygen at all, it's *anaerobic*.

**Moisture.** Microorganisms thrive in moist areas.

**Food.** All microorganisms need a food source to grow and thrive.

**Temperature.** Different microorganisms can grow and multiply at varying temperatures, depending on the individual organism. The human body provides a nice, warm place at approximately 98.6°, which is an optimal temperature for many microorganisms.

**Limited light/darkness.** Sunshine and bright light can dry out a moist area. Microorganisms prefer dark areas that are more consistently moist.

**Neutral or slightly alkaline pH.** Most microorganisms don't like acidic environments. Most do prefer a neutral or even slightly alkaline area to grow and thrive.

Now, the steps of the chain of infection are considered to be a standard and understood by all healthcare professionals—who are always looking for a way to break the chain and stop the spread of infection.

The chain of infection is as follows:

1. **Infectious Agent.** Any microorganism that is capable of causing disease is considered to be a pathogen and an infectious agent. This includes viruses, bacteria, fungi, parasites, and rickettsiae.
2. **Reservoir.** This is the place where the pathogen lives and grows as it waits for the next opportunity to spread. People, animals, insects, water, or the food supply are all examples of potential reservoirs.
3. **Portal of Exit.** There needs to be a way for the pathogen to leave the reservoir in order to spread. In humans, the pathogen may leave by our secretions or excretions. Nasal secretions, mucus, vomit, blood, urine, feces, vaginal secretions, and semen are examples of secretions and excretions.
4. **Means of Transmission.** If the pathogen has a portal of exit, then it needs a way to travel to the next reservoir to continue to spread. Pathogens can be transmitted in several different ways:
  - *Direct contact* occurs when a person directly touches the pathogen or comes in direct contact with a body fluid.
  - *Airborne transmission* happens when a pathogen is in the air and is inhaled. The common cold and tuberculosis are two examples of pathogens that can be transmitted through the air.
  - *Bloodborne transmission* occurs when infected blood/body fluids enter a susceptible host.
  - *Ingestion* happens if we eat or drink from contaminated sources.
  - *Indirect contact transmission* occurs when a person touches a *fomite*, an inanimate object or surface. Door knobs, remote controls, and keyboards are all examples of fomites. How long a pathogen can be on a fomite and still cause infection depends on each individual pathogen, the environment surrounding the pathogen, and—to some extent—whether the fomite is a porous or nonporous surface.
  - *Vector transmission* refers to when animals or insects carry disease. Mosquitos can carry the West Nile virus and deer ticks can carry Lyme disease.

5. **Portal of Entry.** Even if a pathogen can travel, it still needs a way to get into a person. Pathogens can enter through breaks in our skin, our mucous membranes, inhalation, ingestion, and sexual intercourse.
6. **Susceptible Host.** In order for a person to become infected with a pathogen, he or she must be susceptible. Vaccines can help to break the chain of infection, thereby making a person insusceptible.

You may refer back to Chapter 3: Infection Control in your textbook for more detailed information.

## THE BODY'S DEFENSE

Our bodies are designed with many protective features to help keep the pathogens from getting in. The following are just a few examples of some of our defenses:

1. Our skin is our first line of defense. It's not only our largest organ, but also a major fighter in keeping pathogens out. As long as our skin is intact, we can keep many pathogens out.
2. Eyelashes and eyebrows help to protect our eyes from pathogens.
3. Cilia help to trap pathogens that may try to enter through our respiratory system.
4. Tears, mucus, saliva, and other bodily secretions help to trap, cleanse, and remove pathogens and debris from our bodies.

When a pathogen does get past the body's defense or the body experiences trauma, protective mechanisms are triggered. This reaction is called the *inflammatory response*. It's an attempt by the body to limit the amount of damage that trauma and pathogens cause and to destroy pathogens and their byproducts. The outward symptoms of this response are redness, swelling, pain, and heat.

## STANDARD PRECAUTIONS

The CDC spent many years studying and revising precautions that should be taken by all healthcare providers. Standard Precautions is the result of all of the research and studies that were conducted.

In order for Standard Precautions to be effective, they must be observed at all times when working with patients. Assume that every patient is potentially infectious when you're providing patient care.

# BODY FLUIDS

*Body fluids* are any fluids at all that come from the human body. The following are some examples of body fluids that a medical assistant may come in contact with and be exposed to while working with patients:

## Blood

- While drawing blood
- When changing dressings on an open wound
- When taking care of a patient with epistaxis

## Vaginal Secretions

- When assisting the physician with an OB/GYN exam or handling any specimens

## Synovial Fluid

- When assisting the physician with any arthroscopic procedures or handling specimens

## Semen

- When handling semen specimens

## Sputum

- When handling sputum specimens
- When working with any patients who are expectorating sputum

## Saliva

- When assisting with any dental or oral procedures

# TRANSMISSION-BASED PRECAUTIONS

If a patient has been diagnosed or is suspected of having a highly contagious disease, healthcare workers take extra precautions in addition to the Standard Precautions. These precautions are referred to as *Transmission-Based Precautions*. The goal of Transmission-Based Precautions is to reduce the risk of airborne, droplet, and contact exposure for healthcare workers.

For example: In an ambulatory setting, a patient with suspected active TB would need to wear a surgical face mask in the waiting room and be moved into an *Airborne Infection Isolation Room (AIIR)* as soon as possible. If the patient was in the inpatient setting, he or she would be placed in an AIIR with negative pressure isolation. Healthcare professionals would want to limit transferring and moving the patient among the general population. When the patient would need to be out of isolation, he or she would need to wear a

surgical mask. Depending on the patient's diagnosis, the healthcare workers may need to wear specially designed respirators for protection. All of this would be completed in addition to the Standard Precautions.

For more detailed information on Transmission-Based Precautions (including that on airborne, droplet, and contact exposure), refer back to the textbook.

## **PERSONAL PROTECTIVE EQUIPMENT**

*Personal protective equipment (PPE)* serves as a barrier used to protect healthcare workers against body fluids. PPE consists of gloves, mask, goggles or face shield, gown, and shoe covers. What PPE a medical assistant decides to use depends on the type of patient care that the assistant is providing. However, PPE doesn't protect a healthcare worker from a needle stick injury.

# SECTION 2: SAFETY AND ASEPSIS

## Objective

When you complete this study unit, you'll be able to describe safety measures used to prevent the spread of infectious agents.

## NEEDLE STICK INJURY PREVENTION

A healthcare worker can become exposed to blood during an accidental needle stick injury after giving a patient an injection. OSHA mandates that employers provide the safest needle device available to protect the worker.

All used sharps must be placed in a special container for sharps. These containers are puncture proof and have a safety device on the top that prevents the sharps from being able to come back out once they are placed in the container.

If a needle that you're using doesn't have any type of safety device on it, and the sharps container isn't within your arms reach, then you'll use the scoop technique to place the cap back so that you can proceed to the sharps container to dispose of the sharp. Refer back to your textbook to review the scoop technique.

## OSHA REGULATIONS

OSHA protects employees by developing and implementing regulations that employers are to follow so the workplace is healthy and safe for the worker.

The Bloodborne Pathogen Standard is in place to protect employees from becoming exposed to body fluids in the workplace. Every healthcare facility must have an exposure plan. The plan must list how the employer will comply with the Bloodborne Pathogen Standard.

OSHA mandates that employers are in compliance by the following list:

1. **Standard Precautions.** Employers must follow the precautions. Washing hands is a focus and employers are required to provide sinks to wash hands.
2. **Engineering Controls/Work Practice Controls.** The employer needs to provide the equipment and devices necessary to perform the job as safely as possible. A sharps container placed close to where an employee is giving the injection is an example of engineering and work practice controls.
3. **Personal Protective Equipment.** The employer must provide PPE and make sure that it's accessible to the employees.

4. **Cleanliness of Work Areas.** It's the employer's responsibility to make sure the workplace is clean. Employers need to have written documentation detailing the cleaning schedule.
5. **Hepatitis B Vaccine.** Employers must offer the vaccine to employees free of charge. An employee has the right to refuse the vaccine but must sign a declination form. The form transfers the assumption of risk to the employee.
6. **Follow-Up Plan after Exposure.** If an employee has an accidental exposure, there must be a plan in place that's followed, including a medical evaluation.
7. **Medical Records.** If an employee has an occupational exposure, the medical record must be maintained for the length of employment, plus an additional 30 years. The medical record is confidential. The employer doesn't have privilege to the medical record.

## INFECTION CONTROL

In order to contain an infection and prevent the infection from spreading to other people, the chain of infection needs to be broken. Medical asepsis techniques are used to decrease the risk of spreading infection. The techniques focus on washing hands, cleaning, disinfecting contaminated surfaces, as well as strict adherence to Standard Precautions.

- Make sure to wash hands before and after all patient care.
- Use disposable equipment whenever possible.
- Use the biohazard waste containers for all contaminated disposable equipment.
- Always handle all specimens as if they were contaminated.
- Follow Standard Precautions and use PPE whenever exposure to body fluids is a possibility.
- If an item touches the floor, consider it contaminated. *Don't* use the item.
- If you have any breaks in your skin, make sure they're covered.
- If you aren't sure if a piece of equipment is clean or dirty, consider it contaminated and clean it before using.

This can't be stressed enough: *Washing hands is very important in infection control.* Review the CDC recommendations for when to wash your hands in your textbook. If your hands become dry, using lotion frequently will help to prevent excessive dryness and cracking. Fingernails should be kept neat and short. Artificial nails shouldn't be worn due to their ability to harbor bacteria.

Wearing gloves can help control and protect you from infection, but shouldn't be considered a substitute for washing hands. You should always wear gloves when:

- Performing venipuncture
- Giving an injection
- Performing or assisting during any invasive procedures
- Handling any specimens
- Risking coming into contact with bodily fluids during patient care

## SANITIZATION VS. DISINFECTION

Many times the words *sanitization* and *disinfection* are used interchangeably. However, they do have two different meanings and are two different processes even though we may be performing both of them as part of our daily tasks.

*Sanitization* is the actual, physical washing and cleaning of equipment. *Disinfection* uses chemicals or boiling water on inanimate surfaces and objects to destroy many pathogens. Disinfection doesn't equal sterilization. A common, inexpensive disinfectant is sodium hypochlorite. The solution is a 1:10 ratio of household bleach and water and can't be stored because it breaks down rather quickly, losing its effectiveness. To be fully effective, the solution should be mixed daily.

# SECTION 3: INHALATION MEDICATION ADMINISTRATION

## Objective

When you complete this study unit, you'll be able to explain inhalation medication delivery methods and the rights of medication administration.

## INHALATION MEDICATION

Many times medications for respiratory diseases are delivered through the inhalation route. Respiratory diseases that may need to be treated are COPD, asthma, chronic bronchitis, and other restrictive airway diseases. These medications are ordered by the physician and filled by prescription.

Inhaled medications are often delivered in the form of an inhaler. An inhaler usually contains an aerosol and fine-powdered suspension of medication. When the inhaler is activated, a fine mist is released that contains the medication. It's very important to make sure that the inhaler is well-shaken prior to using, to make sure that the powdered suspension is equally distributed and not settled to the bottom of the canister.

There are several different types of inhalers that are available for the delivery of medications:

- **Metered-dose inhaler (MDI).** Albuterol/Ventolin MDI is commonly dispensed as an emergency rescue inhaler.
- **Metered dose inhaler + spacer (MDIS).** The spacer is attached to the MDI and makes it easier for the patient to use the inhaler.
- **Dry powdered inhaler (DPI).** Advair is a medication that is delivered as a dry powdered inhaler.
- **Nebulizer.** This device changes medication from a liquid form into a mist that the patient breathes in, usually through a mask. The tubing for the mask is hooked up to the nebulizer machine, which is an air compressor. There's a medicine-holding area where the liquid medicine is placed. The tubing is connected from the nebulizer machine to the medicine-holding area and then to the mask. Once the machine is turned on, the patient wears that mask and breathes normally while receiving the medication. Some patients may not use a mask, opting instead for a mouthpiece. The patient would hold the mouthpiece while receiving the treatment. Usually, the treatments take 10–15 minutes, depending on the medication that's being delivered. Atrovent and albuterol are common medications that are delivered through a nebulizer.

# OXYGEN THERAPY

Oxygen is also considered an inhalation medication when it's being ordered to treat a disease process. When the physician orders oxygen, it'll be dosed based on the patient's condition and individual needs. Oxygen is ordered as *liters per minute (LPM)*. As a medical assistant, you'll be responsible for following the physician's orders and properly administering the oxygen.

There are certain precautions that you need to take when working with oxygen. *Remember:* Oxygen is highly flammable. Nobody should smoke or have any type of open flame near the oxygen. Static electricity can also potentially cause ignition. Using fabric softener to reduce static in clothing and wearing clothing made of natural fibers is recommended.

In an ambulatory care setting, oxygen is most often delivered using tanks. A patient may receive the oxygen from a nasal cannula or a mask. Masks are generally for more emergent situations requiring a higher concentrated dose of oxygen to reach the patient. The nasal cannula may be used in an emergent situation, but is also most often used for long-term use by a patient.

## DOCUMENTATION OF ADMINISTRATION AND THE SEVEN RIGHTS OF MEDICATION ADMINISTRATION

Documenting the care and the treatments that are provided to patients is critical.

*Remember:* If it's not documented, then it's considered not done. Always follow the rules for correct charting. Make sure to follow the seven rights of medication administration and document each right in your note. The seven rights were previously covered in your Pharmacology course. The Kinn's *The Clinical Medical Assistant* textbook presents the seven rights as follows:

1. **Right patient.** Always double-check to make sure that you have the correct patient.
2. **Right drug.** Use the "three before's" to make sure that you have the correct drug to be administered.
3. **Right dose.** Double-check the physician's order with the dose that you have ready to administer. If there's a doubt or question on the dose to be given, make sure to ask.
4. **Right route.** How is the medication to be administered? Make sure to double-check the medication order to verify the correct route.
5. **Right time.** Make sure you're administering the medication at the correct time. If the time isn't specified in military time, make sure to verify whether the medication administration time is for the morning or the evening.

6. **Right technique.** Administer the medication using the correct techniques. For example, there's a correct way to use inhalers—that would be considered the technique.
7. **Right documentation.** Document the administration of a medication immediately after you have administered the medication. Don't document the administration of a medication in anticipation of actually administering the medication because if the patient refuses, you'll have a charting error. Remember, if any of the seven rights are missed and a medication error occurs it must be reported to the provider immediately. The provider will then provide an order for correcting the error.

If you strictly adhere to following the seven rights to medication administration, you'll have a solid base for treating patients and administering medications safely. Remember, if any of the seven rights are missed and a medication error occurs it must be reported to the provider immediately. The provider will then provide an order for correcting the error.

## TAKING THE EXAM

Take your time and review the material on infection control and inhalation medication principles. Once you've finished reviewing and feel confident in your knowledge and application of infection control and inhalation medication principles then proceed to complete the multiple-choice exam located on your student portal page under your Clinical Procedures Lab course.