

BLOODBORNE PATHOGENS

Instructor/Student Module

This book belongs to: _____

Training date: _____

Instructor: _____

Bloodborne Pathogens

Career Readiness Teacher Resource – Revised October 2010

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Table of Contents

Acknowledgments.....	iii
Table of Contents.....	iv
List of Figures.....	v
Reference Materials.....	vi
Career Readiness Teacher Resource.....	vii
Training Best Practices.....	vii
Introduction.....	v
Objectives.....	2
Transmission of Bloodborne Diseases.....	2
Precautions.....	8
Hand Washing.....	3
Contaminated Items.....	3
Containers.....	4
Equipment Servicing and Handling.....	4
Work Area Rules.....	10
Personal Protective Equipment.....	4
Use of Personal Protective Equipment.....	5
Housekeeping.....	6
Cleaning and Decontaminating.....	6
Laundry.....	6
Regulated Waste.....	12
AIDS.....	7
Transmission.....	7
Signs and Symptoms.....	7
HIV Vaccination.....	7
Hepatitis B.....	8
Transmission.....	8
Signs and Symptoms.....	8
Hepatitis B Vaccination.....	8
Hepatitis C.....	8
Transmission.....	8
Signs and Symptoms.....	9
Hepatitis C Vaccination.....	9
Post Exposure Evaluation and Follow-up.....	9
Information for Health Care Professionals.....	9
Health Care Professional’s Written Opinion.....	9
Hazards.....	9
Training.....	11
Record Keeping.....	12
Medical Records.....	20
Training Records.....	20
Glossary.....	20
Knowledge Check.....	15
Answers to Knowledge Check.....	16

Module Evaluation..... 17

List of Figures

Figure 1	Biohazard Label	16
Figure 2	Biohazard Sign with Information.....	16

Reference Materials

Occupational Safety & Health Administration, U.S. Department of Labor. (2010). *Bloodborne pathogens standards*. Retrieved from http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051

Research and Curriculum Unit. (2001). *Bloodborne pathogens: Mississippi generic workforce module*. Mississippi State, MS: Research and Curriculum Unit.

Career Readiness Teacher Resource

There may be textbooks and other types of training materials that cover the subjects in this manual in more detail. Ask your instructor or supervisor to recommend additional resources.

Training Best Practices

Use in-house close calls or injury cases to bring a personal note to training.

Introduction

A bloodborne pathogen is a microorganism that is present in human blood and/or body fluids that can cause disease in humans. The three most common bloodborne pathogens in the United States are the hepatitis B virus (HBV), the hepatitis C virus (HCV), and the human immunodeficiency virus (HIV).

According to the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.1030, every employer must have an exposure control plan that describes ways to reduce the risk of exposure to these pathogens. This written plan must be made available to all employees.

In an exposure control plan, the employer must do the following:

1. Identify in writing the tasks, procedures, and job classifications where occupational exposure to blood may occur. Occupational exposure means that there is a reasonable chance of skin or mucous membrane contact with blood or other body fluids.
2. Implement a schedule for meeting the provisions of the standard.
3. Have a written record for all exposures.
4. Develop a plan to prevent reoccurrence.

In accordance with the OSHA standard 29 CFR1910 (e), this plan must be accessible to all employees. Employers must also review the standard, update it at least annually, and provide annual training to employees for bloodborne pathogens. In addition, a copy of the standard must be easily accessible to all employees.

A bloodborne pathogens trainer must be knowledgeable in the subject of bloodborne pathogens. Bloodborne training must include the following:

1. An explanation of the OSHA standard
2. A general discussion of bloodborne pathogens and their transmission
3. The components in the exposure control plan
4. A discussion of the engineering and work practice controls used to prevent or reduce the risk of exposure
5. A discussion on personal protective equipment and its proper use
6. A review of the emergency response plan including how to handle an exposure event
7. The opportunity for questions and answers; the trainer must be knowledgeable in the subject of bloodborne pathogens.

Objectives

At the conclusion of your study of this manual, you should be able to perform the following tasks:

1. Identify the ways that bloodborne diseases can spread.
2. Understand the precautions that should be practical when working with body fluids.
3. Understand work area rules and the use of personal protective equipment when working with body fluids.
4. Know what to do if exposure to body fluids occurs.
- 5.

Transmission of Bloodborne Diseases

Bloodborne pathogens include but are not limited to the hepatitis B virus (HBV), the hepatitis C virus (HCV), and the human immunodeficiency virus (HIV). These are primarily spread by blood and body fluids. These body fluids include but are not limited to blood, plasma, serum, vaginal secretions, and semen.

Employees can be exposed to or become infected when the blood and/or body fluids from an infected person come in contact with non-intact skin or mucous membranes. The most common ways that exposure can occur are the following:

1. Through the puncture of the skin with a contaminated object such as broken glass or a needle.
2. Absorption through non-intact skin; non-intact skin can include but is not limited to cuts, scrapes, rashes, hangnails, acne, boils, psoriasis, or blisters.
3. Through mucous membranes; mucous membranes are found in eye, nose, and throat tissues.

Sweat, tears, sputum, vomit, and feces typically do not contain bloodborne pathogens unless visually contaminated with blood.

Precautions

Precautions must be implemented to reduce employee exposure to bloodborne pathogens. The employer has the responsibility for enforcing the engineering and work practice controls. The best way to protect employers and employees against bloodborne pathogens is through the use of universal precautions.

An **engineering control** is a physical object such as a sharps container or a hand-washing sink that separates the hazard from the employee and/or removes it from the workplace.

A **work practice control** is a behavior or practice that reduces the chance of exposure by altering the way a particular task is performed.

An example of this is requiring that gloves are worn when handling materials contaminated with blood such as a bandage.

Universal precautions means treating all blood and body fluids as if they are known to be infected with HBV, HCV, HIV, or other bloodborne pathogens.

Hand Washing

A sink for hand washing should be provided whenever the chance exists that an employee may be exposed to human blood or body fluids. Proper hand washing is the single most important practice that can be done to reduce exposure to disease-causing organisms. If a hand-washing facility is not available, then antiseptic hand towels or hand sanitizer should be made available for employees. However, hands should be washed with soap and water as soon as possible.

Hands and any exposed skin should be washed after the removal of gloves or other protective equipment. They should also be washed after contact with anything that could be contaminated with blood or body fluids.

It is generally best to wash your hands with soap and water. When thoroughly washing your hands, follow these steps:

1. Wet your hands with running water.
2. Apply liquid, bar, or powder soap. Liquid soap is preferred because the bar can become contaminated.
3. Lather well by rubbing your hands vigorously for at least 20 seconds. Scrub all surfaces including the backs of your hands, wrists, between your fingers, and under your fingernails.
4. Rinse well.
5. Dry your hands with a clean or disposable towel or an air dryer.

Contaminated Items

OSHA revised the bloodborne pathogens standard (29 CFR 1910.1030) in response to several practices mandated by the Needlestick Safety and Prevention Act approved by Congress on November 6, 2000. These revisions clarify the requirements for employers to select safer needle devices as they become available and to involve employees in identifying and choosing the devices. The revised standard requires employers with 11 or more employees to maintain a log of injuries from contaminated sharps. Industries that are classified as low-hazard, including retail, service, finance, insurance, and real estate, are exempt from maintaining a sharps injury log.

The act requires employers to maintain a log for all needlestick and sharps injuries. At a minimum, the sharps injury log must contain the following:

1. The type and brand of device involved in the incident
2. The department or work area where the exposure incident occurred
3. An explanation of how the incident occurred

Containers

Blood specimens or other infectious materials must be in containers when collecting, handling, processing, storing, transporting, or shipping. The blood specimen or other infectious materials must be placed into a leak-proof container and then placed into a secondary leak-proof container. This double container system should contain any spills or leakage. The containers must also be labeled and color coded. (See page 16.)

Equipment Servicing and Handling

Before servicing and shipping, equipment must be examined for contamination. If the equipment is contaminated, a label must be attached to the equipment describing the type of contamination. The affected employees, the servicing representative, or the manufacturer must be informed about the contamination. The reason for doing this is to make sure that the correct precautions are taken during the handling, shipping, and servicing of the equipment. It is best to decontaminate the piece of equipment before shipment. Consult the manufacturer's recommendations for decontamination. Decontaminated equipment should also be labeled with the name of the person who did the procedure, the date of decontamination, and a brief description of how it was done.

Work Area Rules

Employers and employees need to be aware of the following rules in the work area.

- Do not eat, drink, smoke, apply makeup, or handle contact lenses in work areas where human blood or body fluids may be present.
- Do not store food and drink in the same refrigerator, counters, shelves, and cabinets as blood materials.
- Try not to splash, spray, spatter, and generate droplets when working with blood or other infectious materials.
- Do not mouth pipette or put blood or blood contaminated objects in your mouth.
- Do not bend, recap, or remove contaminated needles and other contaminated items unless told to do so for a specific medical procedure. If this is done, use a mechanical device or a one-handed technique.
- Place contaminated sharps in a proper container. The container must be puncture-resistant, labeled or color-coded, and leak-proof.
- Do not pick up contaminated sharps with bare hands. Always use some kind of mechanical device such as a dust pan and brush or tongs, and then place them into a sharps container.

Personal Protective Equipment

According to OSHA, personal protective equipment (PPE) reduces the risk of exposure to disease-causing organisms. PPE includes gloves, gowns, lab coats, face shields, eye protection, mouthpieces, and other protective barriers.

The use of PPE is appropriate when blood or other potentially infectious materials may pass through or reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes. Employers are required to provide PPE to all employees at no cost to the employee. The employer must repair and/or replace these when necessary.

Use of Personal Protective Equipment

Use personal protective equipment (PPE) under the following conditions.

Gloves

Wear gloves when hands may possibly come in contact with blood, body fluids, mucous membranes, or non-intact skin. Wear gloves when handling or touching any contaminated item.

When gloves become contaminated, punctured, or torn, replace them with a new pair. Disposable gloves cannot be washed or decontaminated for reuse. Dispose of them in an appropriate receptacle after one use.

Masks, Eye Protection, and Face Shields

Protect your eyes, nose, and mouth by wearing a mask and goggles or glasses if there is a chance of exposure through splashes, sprays, spatters, or droplets of blood or body fluids. Glasses must have a solid side shield. Regular eyeglasses are not enough to protect against splashes because the sides are open. Face shields may also be worn to protect the eyes as well as the entire face.

If non-intact skin, eyes, and/or mucous membranes come in contact with blood or other body fluids, flush the affected area with water for a minimum of 15 minutes. Soap and water should be used on affected skin.

Protective Clothing

Wear protective clothing for the task and degree of exposure anticipated. Well-fitting gowns, aprons, and other protective clothing should be available to employees working in areas of possible contamination.

Surgical Protection

Wear appropriate surgical protection during autopsies or surgery. When anticipating possible gross contamination, surgical caps, hoods, and shoe covers should be worn.

Cleaning, Laundering, and Disposal

The employer is responsible for cleaning, laundering, and disposal of PPE equipment including all apparel. The employer is also responsible for the repair and replacement of PPE that may become damaged with use.

Housekeeping

All work areas must be clean and sanitary. The employer must set forth a scheduled time for cleaning and decontaminating the work area and provide training for methods of cleaning and decontaminating.

After any contact with blood or other infectious materials, the equipment and the work area must be cleaned and disinfected. Clean and decontaminate the work area and equipment using a solution of ¼-c bleach to 1 gal. of water or germicidal cleaning agent as recommended by the manufacturer. Always practice universal precautions and wear the appropriate PPE when cleaning contaminated areas or equipment.

Cleaning and Decontaminating

Clean and decontaminate a work area and the equipment in it by doing the following:

- Clean and decontaminate the work area and the equipment after each shift.
- Clean and decontaminate the area when blood or other infectious materials have been spilled.
- Replace worn out, damaged, or contaminated coverings.
- Decontaminate and clean pins, pails, cans, and other reusable equipment on a regular basis.
- Do not pick up broken glass with hands. Use mechanical devices such as tongs, brushes, and dust pans to clean or pick up broken glass.
- If a mop is used to clean a contaminated area, the mop head must be placed in an appropriated container and disposed of as a hazardous material.

Laundry

In order to prevent exposure to blood-soaked material or other contaminated items in the laundry, handle contaminated laundry carefully. The following standards are set by OSHA for handling contaminated laundry.

- Handle contaminated laundry as little as possible.
- Place the laundry in an appropriate laundry bag and store it at the location where it was used until it can be transported to the laundry facility.
- Do not rinse or sort laundry at the location of use.
- Label laundry bags or containers with color-coded labels to let others know that the bag or container is contaminated.
- Place and transport wet contaminated laundry in a leak-proof bag or container.
- Wear appropriate gloves and other PPE when handling contaminated laundry.

Regulated Waste

Regulated waste includes refuse materials that have been contaminated with possibly infectious waste including saliva, blood, or tissue. When handling regulated waste, follow all federal, state, and local regulations including the following:

- Place regulated waste in a leak-proof, puncture-resistant container or bag. The container or bag must be color coded or labeled. Place this into a secondary leak-proof, puncture-resistant color coded, or labeled container or bag for protection from leakage.
- Place sharps in a closeable, puncture-resistant, leak-proof, disposal container.
- Place the sharps disposal container in the immediate area where the sharps are used.
- Routinely replace sharps containers when they are 2/3 full.
- Do not overfill sharps disposal containers.

AIDS

AIDS stands for Acquired Immune Deficiency Syndrome. The human immunodeficiency virus (HIV) that causes AIDS can be transmitted through sexual contact or through the sharing of needles or syringes. The AIDS virus destroys a person's immune system. With a nonfunctional or severely impaired immune system, a person cannot fight other organisms that can cause disease. The person is vulnerable to infection with bacteria, protozoa, fungi, and viruses. Any one of these can cause a life threatening illness in an AIDS patient.

Transmission

AIDS was first reported in 1981, and it has spread worldwide. The disease is typically found in homosexual or bisexual active men, hemophiliacs, drug abusers, and sexual partners of men and women in these categories, and infants born to parents in these categories. HIV is transmitted from person to person through direct contact with infected body fluids such as blood and semen and by sexual contact sharing unclean needles.

Signs and Symptoms

People infected with HIV may not show symptoms for many years. Symptoms are usually non-specific and can include swollen lymph nodes, loss of appetite, chronic diarrhea, weight loss, fever, and fatigue. Infections with other organisms occur in the latter stages of disease and signal the destruction of the immune system by the virus.

HIV Vaccination

There are currently no vaccines available to prevent HIV infection. Once infected, multi-drug cocktails have had some success for treatment, but there is no cure for the HIV infection.

Hepatitis B

The hepatitis B virus (HBV) infects and damages the liver and is frequently found in young adults in the United States. Common high-risk groups include drug abusers, people in the health-care field who have been exposed to blood or other body fluids and sexually promiscuous individuals. There is a highly effective vaccine available that will prevent the hepatitis B infection.

Transmission

The hepatitis B virus is transmitted through non-intact skin or mucous membrane exposure to infectious body fluids or fluid contaminated items. These fluids may include blood, blood products (plasma and serum), saliva, semen, or vaginal fluids. Some common methods of transmission include contaminated needles, contamination of wounds or lacerations, splashes onto mucous membranes, sexual contact, and household contact.

Signs and Symptoms

Infection with the hepatitis B virus can be asymptomatic or symptomatic. Common symptoms include loss of appetite, abdominal discomfort, nausea and vomiting, aching muscles, and jaundice (yellowing of the eyes and urine). A person showing no symptoms of hepatitis B infection can still be infectious to others.

Hepatitis B Vaccination

Employers are required to offer hepatitis B vaccinations to employees who may have occupational exposure to blood. The vaccination is free of charge to employees. The vaccination is a three-dose series that is spread out over 6 months. The first vaccination must be given 10 days before work that may lead to occupational exposure begins. The employee has the option to refuse the vaccination. If an employee decides not to take the vaccination, he or she must sign a declination form. However, the employee can later change his or her mind and then receive the vaccination free of charge.

Hepatitis C

The hepatitis C virus (HCV) also infects and damages the liver. Infection with hepatitis C is associated with cirrhosis or liver cancer. HCV is most commonly found in intravenous drug users and hemophilia patients. It is not found as frequently in sexually promiscuous individuals, homosexual men, or health-care workers.

Transmission

The hepatitis C virus is transmitted mainly through exposure to contaminated blood or blood products (plasma). Contaminated needles and syringes are important objects of

spread especially among injecting drug users. The risk of HCV transmission by household contact or sexual activity is low. In over 40% of HCV cases, the risk factor for transmission cannot be identified.

Signs and Symptoms

Infection with the hepatitis C virus can be asymptomatic or symptomatic. The symptoms are very similar to HBV infection including loss of appetite, abdominal discomfort, nausea and vomiting, and jaundice. A person with no symptoms of HCV infection can still be infectious to others.

Hepatitis C Vaccination

There is currently no vaccine available for HCV, nor are there any effective anti-viral drugs. There is no cure for the HCV infection.

Post Exposure Evaluation and Follow-up

Following the report of an exposure event, the employer is responsible for providing a medical evaluation and follow-up for the employee involved. The medical evaluation and follow-up include laboratory tests, post-exposure preventative treatment, and counseling. The medical evaluation and follow-up are at no charge to the employee.

Information for Health-Care Professionals

The employer is responsible for gathering all the necessary information related to the employee's exposure. The following information is given to health-care professionals:

- A description of the employee's duties related to the exposure event
- Documentation of the exposure event and the circumstances under which the exposure occurred
- Results of the exposed employee's blood test, if available
- Any other medical information about the exposed employee

Health-Care Professional's Written Opinion

Within 15 days of the completion of the evaluation, the employer will provide the employee with a copy of the health-care professional's written opinion. This written opinion contains the post-exposure evaluation and a description of any medical condition resulting from the exposure and any subsequent evaluation and treatment.

Hazards

Employers are required to inform employees of the correct labels and signs used to identify potentially hazardous materials. Labels must be in **fluorescent orange or fluorescent orange-red color** and must include the biohazard symbol (Figure 1).

Figure 1 – Biohazard Label



Biohazard labels must be posted on refrigerators and freezers containing blood or other body fluids, on containers of regulated waste and other containers used to transport, store, or ship blood, and other body fluids. Post the labels carefully to prevent accidental or unintentional removal. Labels can be substituted by using a **red** bag or container.

Labels or color codes are not needed in the following conditions:

- When containers of blood or blood products that are labeled with their content are used for transfusions or other clinical use
- When individual containers of blood or body fluids are placed into a labeled container used during storage, transport, shipment, or disposal
- Where there is regulated waste that has been decontaminated.

Work areas with occupational exposure such as HIV and HBV research laboratories and production facilities must have a posted biohazard sign with additional information (Figure 2).

Figure 2 – Biohazard Sign with Information



The sign must be in a fluorescent orange or fluorescent orange-red color and must include the biohazard symbol. Along with the biohazard symbol, the following information must be on the sign:

- The name of the infectious agent
- The special requirements for entering the area
- The name and telephone number of the lab director or other responsible person

Training

Employers must provide a bloodborne pathogen training program for employees with occupational exposure. The training program is at no cost to the employees and is held during regular working hours.

Training should occur at the time of initial assignment of the tasks and once a year thereafter. If changes occur or new tasks and/or procedures are added, additional training is required to cover those changes.

The bloodborne pathogen training program must consist of an explanation of the following:

- Federal regulations
- Bloodborne pathogens
- The modes of transmission
- An exposure control plan
- The tasks and activities that are involved in the exposure to blood and infectious materials
- The measures that can reduce or eliminate the exposure including engineering and work practice controls
- The types of PPE including selection, proper use, care, handling, and disposal
- Information on the hepatitis B vaccine including information about its efficacy, safety, and benefits
- The emergency response procedure if an exposure were to occur including the method of reporting the incident and the medical follow-up that is available

- The biohazard symbol and labels

Training sessions should also include a questions and answers session.

Record Keeping

The employer must have a medical record and a training record on file for each employee who may have occupational exposure.

Medical Records

Medical records must be kept confidential by the employer. Medical records cannot be released or reported without the written consent of the employee or as required by law. Each employee's record is kept during his or her employment plus 30 years.

Medical records include the following information:

- The employee's name and Social Security number
- A copy of the employee's hepatitis B vaccination status and any record related to the employee's ability to receive a vaccination
- A copy of the results of all examinations, medical tests, and follow-ups after an exposure
- The employer's copy of the health-care professional's written opinion about an exposure event
- A copy of the exposure information report provided to the health-care professional

Training Records

Training records will be kept for 3 years from the date on which the training occurred.

The training record contains the following information:

- Dates of the training sessions
- Contents and summary of the sessions
- Instructor's name and qualifications
- Name and job title of each employee who attended the session

Glossary

This glossary contains terms used in the text. If you do not understand a term in the glossary, refer to the section of the manual in which it was originally used. Use this glossary as a study guide.

Blood: Human blood, human blood components, and products made from human blood

Bloodborne pathogens: Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include but are not limited to HBV, HCV, and HIV.

Clinical laboratory: A workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials

Contaminated: The presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface

Contaminated laundry: Laundry that has been soiled with blood or other potentially infectious materials

Contaminated sharps: Any contaminated object that can penetrate the skin including but not limited to needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wire

Decontamination: The use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal

Engineering controls: Controls that isolate or remove the bloodborne pathogen hazard from the workplace

Exposure incident: An incident whereby a specific eye, mouth, other mucous membrane, or non-intact skin contacts with blood or body fluids resulting from the performance of an employee's duties

Hand -washing facilities: Facilities providing an adequate supply of clean, running water, soap, and single use towels or hot air drying machines

HBV: Hepatitis B virus

HCV: Hepatitis C virus

HIV: Human immune deficiency virus

Licensed health-care professional: A person who is legally allowed to perform the activities required for the hepatitis B vaccination and post-exposure evaluation and follow-up

Occupational exposure: The reasonably anticipated exposure of the skin, eye, or mucous membrane with blood or body fluids resulting from the performance of an employee's duties

Other potentially infectious materials: Materials including human body fluids, any body fluid visually contaminated with blood, any unfixed tissue or organ from a human,

HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing medium or other solutions and blood, organs, or other tissues from experimental animals infected with HIV or HBV

Personal Protective Equipment (PPE): Specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (uniforms, pants, shirts, or blouses) are not intended to function as protection against hazards and are not considered to be PPE.

Regulated waste: Liquid or semi liquid blood or other potentially infectious materials; contaminated items such as clothing that would release blood if squeezed, and items caked with dried blood that could release infectious materials during handling

Universal precautions: Treating all human blood and body fluids as if they are infected with bloodborne pathogens such as HBV and HIV

Work practice controls: Behaviors that reduce the likelihood of exposure by alternating the manner in which a task is performed

Knowledge Check

1. Employees can bend, recap, and remove contaminated needles.
 - a. True
 - b. False

2. What type of containers can contaminated sharps be put in?
 - a. Puncture-resistant
 - b. Labeled or color-coded
 - c. Leak-proof
 - d. All of the above
 - e. None of the above

3. What is provided by the employer to the employees at no charge?
 - a. Personal protective equipment (PPE)
 - b. Training program
 - c. Hepatitis B vaccination
 - d. None of the above
 - e. All of the above

4. What information is on the BIOHAZARD sign?

5. How long does an employer keep the medical record of an employee?

6. When handling contaminated laundry, the employees do not have to wear gloves or personal protective equipment.
 - a. False
 - b. True

7. What is hepatitis B?

8. A training program is held at the time of _____ assignment and at least _____ thereafter.

9. HBV targets what part(s) of the body?

10. Who is responsible for repairing and replacing personal protective equipment?
 - a. The employee
 - b. The employer
 - c. The health care professional
 - d. All of the above

Answers to Knowledge Check

1. b.
2. d.
3. e.
4. (1) Name of the infectious agent, (2) Special requirements for entering the area
(3) Name and telephone number of the lab director
5. During his or her employment plus 30 years
6. a.
7. Hepatitis B is a disease that damages the liver.
8. Initial, annually
9. The liver
10. b.

Module Evaluation

Thank you for using the Bloodborne Pathogens module in your training. In an attempt to constantly monitor quality control, we need your feedback. Please take a few moments to make comments about the material covered in this module. Also, we need teaching strategies/objectives for each chapter as well as learning activities and performance/knowledge checks from instructors. Your input is vital to the success of our workforce.

Did the module fully cover the subject? Why or why not?

Was the module written at your appropriate level of understanding?

If you could make changes/suggestions/improvements to the module, what would they be?

(Feel free to mark up a copy used in class and to mail it.) Please submit your input to:

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