Bloodborne pathogens are microorganisms that are present in blood, tissue, blood products, and other potential infectious materials (OPIM) defined by the CDC as semen, vaginal secretions, cerebrospinal fluid, pleural fluid, peritoneal fluid, pericardial fluid, amniotic fluid, synovial fluid, breast mils (not all authorities agree) and saliva in dental procedures. Workers who have occupational exposure to blood and OPIM are at risk for acquiring bloodborne infections. Workers in many different occupations are at risk of exposure. These include: first aid team members, laboratory personnel, housekeeping personnel in some settings, and nurses. The level of risk depends on the number of infected patients in the facility, the frequency and duration of exposure to contaminated material, and the likelihood that a single exposure will result in infection.

OSHA estimates that 5.6 million workers in the health care industry and related occupations are at risk of occupational exposure to bloodborne pathogens, including HIV, hepatitis B virus (HBV), hepatitis C virus (HCV), and other potentially infectious materials (OPIM). In 1991, OSHA issued the Bloodborne Pathogens Standard to protect workers from this risk. In 2001, OSHA revised the Bloodborne Pathogens Standard to clarify the need for employers to select safer needle devices, involve employees in identifying and choosing these devices and to maintain a log of injuries from contaminated sharps.

This chapter will then review the Bloodborne Pathogens Program and discuss methods for disposing of waste streams such as sharps, hazardous glass and medical wastes which may be generated in research labs.

9.1 Bloodborne Pathogens Program

Bloodborne pathogens encompass a variety of threat agents and injury pathways. Workers are covered by this program if it is reasonably anticipated that they could be exposed to bloodborne pathogens as a result of performing their job. The UW Bloodborne Pathogen Program is contained in the Bloodborne Pathogens Reference and Training Manual. Contact the Occupational Health Officer, 263-2177, or go to the Occupational Health web page (http://www.fpm.wisc.edu/occhealth/) to review the on-line training manual. The program has several major components.

- Designating persons in each department or work group to implement the Bloodborne Pathogens Program within that group.
- Establishing an Exposure Control Plan for the department or work group.
- Providing personnel protective equipment and engineered controls for employees at risk for exposure.
- Identify and train employees at risk for exposure to bloodborne pathogens.
  - Train in the correct use of appropriate personnel protective equipment and engineered controls as well as safe work practices (e.g., hand washing, no recapping of needles by hand, etc.) for the work site
  - Provide hepatitis B vaccine for employees at risk for occupational exposure to human blood or other potentially infectious materials.
  - First aid procedures if worker receives a biohazardous exposure (e.g., puncture, laceration, splash to mucous membrane, etc.)
• Procedure to notify supervisor and seek medical care as soon as possible after an exposure has occurred
• Employees must be retrained annually and the training documented
✓ Reviewing the control plan annually and monitoring compliance.

9.1.a Bloodborne Diseases
Bloodborne diseases with a occupational exposure potential include non-A hepatitis, non-B hepatitis, hepatitis B and hepatitis C as well as syphilis, malaria and human immunodeficiency virus. Many of these diseases currently have no cure, emphasizing the need for worker protection. The three most significant are hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV).

Hepatitis B (Hep B or HBV)
Hepatitis B virus causes the most serious form of viral hepatitis, commonly called serum hepatitis. Is the major infectious bloodborne hazard faced by health care workers. Approximately 300,000 cases of HBV infection are reported each year in the US. It infects approximately 8,700 health care workers annually, resulting in more than 400 hospitalizations and 200 deaths.

Hepatitis B is spread predominantly through exposure to blood or OPIM by the parenteral route (i.e., inoculation through the skin), from an infected mother to her unborn infant (transplacental) or via sexual contact. Certain groups of people are at higher risk of HBV infection than the general population. This includes:
• health care workers having frequent contact with HBV-infected blood
• past recipients of blood or blood products
• intravenous drug abusers
• persons with multiple sex partners
• residents of institutions for the developmentally disabled
• infants born to mothers with HBV infection
• immigrants from areas where many people have HBV

The most common mode of transmission of HBV to health care workers is by accidental needle sticks or other contaminated sharps injuries. An unimmunized individual has a 6% to 30% chance of becoming infected following a hepatitis B needle stick injury. Infection following mucous membrane contact of the eye (conjunctiva) or mouth with blood or OPIM, or through human bites can also occur. The transmission rate is high because HBV is present in high numbers in the blood of infected patients. Because HVB is quite stable, transmission by means of environmental surfaces that may contact mucous membranes or open skin breaks can occur, especially in areas that have significant blood contamination such as clinical laboratories and hemodialysis clinics. While the risk of transmission may appear high, the annual number of HBV cases among health care workers has been steadily decreasing because of the use of the HBV vaccine and improved medical follow-up after an occupational exposure.

The incubation period, following infection, is 4 to 28 weeks. Symptoms commonly associated with acute hepatitis B infection include headache, malaise, loss of appetite, nausea and occasional vomiting, moderate fever and chills. Urine may become dark and stool light or clay colored. Icterus (yellowing of the sclera - whites of the eyes) may, or may not, occur. Most patients either develop immunity (87 - 90%) and clear the infection or become chronic carriers (7%) with no associated symptoms. One to 3% will develop rapidly progressive, fatal liver disease. The
remaining 3% develop chronic, active hepatitis and are at increased risk of developing cirrhosis, liver cancer, or both.

**Hepatitis C (Hep C or HCV)**

Hepatitis C has only recently been recognized as the predominant agent of non-A-non-B hepatitis. HCV is spread predominantly through exposure to blood or OPIM by the parenteral route (inoculation through the skin). Transmission from an infected to her unborn infant (transplacental) may occur, but transmission via sexual contact appears to be inefficient. HCV is the most common cause of post-transfusion hepatitis.

Persons at high risk for HCV infection include intravenous drug abusers and past recipients of blood or blood products. Health care workers do not have an increased risk of acquiring HCV than the general population, however, acquisition of HCV by health care workers has occurred via needle sticks or other sharps injuries. In one study, 4% of employees who sustained a known HCV needle stick injury developed HCV infection. The risk of exposure to contaminated environmental surfaces has not been fully investigated, but is likely to be minimal because of the low concentration of virus in the blood.

The incubation period, following infection, is 2 weeks to 6 months. The clinical signs and symptoms of acute HCV infection cannot be distinguished from those of other types of acute viral hepatitis (e.g., HBV). Chronic liver disease develops in 50% of individuals with acute HCV infection. About 20% of those with chronic liver disease will develop chronic active hepatitis which is associated with an increased risk of cirrhosis and liver cancer.

**Human Immunodeficiency Virus (HIV)**

HIV, the etiologic agent of AIDS, is spread predominantly through exposure to blood or OPIM by the parenteral route (inoculation through the skin), from an infected mother to her unborn infant (transplacental) or via sexual contact. Persons at high risk of becoming infected with HIV include homosexual and bisexual males, intravenous drug abusers, heterosexuals with multiple sex partners, and hemophiliacs and other people who received blood or blood products before routine screening for HIV antibody began. Health care workers account for less than 5% of the reported AIDS cases each year, and many of these individuals report nonoccupational risk factors.

The most common mode of workplace transmission of HIV to health care workers is by inadvertent needle sticks or other contaminated sharps injuries. An individual has about a 0.4% chance of becoming infected following an HIV-contaminated needle stick injury. There are documented cases of HIV acquisition via exposure of non-intact skin to HIV-containing blood. Contaminated environmental surfaces are an unlikely source of transmission because there is a low concentration of virus in the blood of infected individuals, especially during the latent period.

In some individuals, a flu-like illness occurs within 1 to 6 weeks after exposure to the virus. Fever, sweats, malaise, muscle pains, loss of appetite, nausea, diarrhea and a sore throat are common symptoms. After a long (i.e., 7 - 10 years), symptom-free latent period, HIV infected individuals become symptomatic with development of enlarged lymph nodes, malaise, headache or diarrhea. AIDS develops when the HIV has destroyed many of the immune cells that provided protection. Individuals with AIDS develop certain types of tumors or infections caused by opportunistic
bacteria, fungi, viruses, and parasites that infrequently cause infections in otherwise healthy people. These opportunistic infections are the usual cause of death. AIDS is uniformly fatal.

9.1.b Exposure Control Plan

The consequences of bloodborne diseases are quite serious. For that reason, the OSHA Bloodborne Pathogens Standard requires that every employer with employees at occupational risk of exposure to bloodborne pathogens "establish a written control plan designed to minimize or eliminate employee exposure." The plan must:

- identify all employees with occupational exposure
- specify measures which must be taken to minimize exposure risk
- develop procedures for evaluating exposure incidents

Under OSHA, an occupational exposure is defined as "reasonably anticipated skin, eye, mucous membrane, non-intact skin, or parenteral contact with blood and other potentially infectious materials (OPIM) that may result from the performance of an employee's duties."

Given that definition, let's review some of the occupational exposure risks.

Bloodborne pathogens may be present in:
- Body fluids such as saliva, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, amniotic fluid and any other body fluids visibly contaminated with blood.
- Saliva and blood contacted during dental procedures.
- Unfixed tissue or organs other than intact skin from living or dead humans.
- Cell or tissue cultures that contain these pathogens.
- Organ cultures, culture media or similar solutions.
- Blood, organs and tissues from experimental animals infected with bloodborne pathogens.

Besides being in many types of fluids and tissues, bloodborne pathogens may enter the body and infect workers through a variety of means including:
- An accidental injury by a sharp object contaminated with infectious material. These "sharps" include:
  - needles
  - scalpels
  - broken glass
  - exposed ends of dental wires
  - anything that can pierce, puncture or cut the skin
- Open cuts, nicks and skin abrasions, even dermatitis and acne, as well as mucous membranes of your mouth, eyes or nose.
- Indirect transmission, such as touching a contaminated object or surface and transferring the infectious material to your mouth, eyes, nose or open skin.
- Contaminated environmental surfaces may be a major mode of transmission in certain settings. Some pathogens can survive on environmental surfaces dried and at room temperatures for at least one week. Surfaces and objects can be heavily contaminated by substances, such as serum or plasma, without visible signs.

Exposure Determination

The first step in the is to determine which employees may be occupationally exposed to blood or OPIM. This determine is made without regard to the use of personal
protective equipment (i.e., employees are considered to be exposed even if they wear personal protective equipment). OSHA requires a listing, by job classifications in which all employees may be expected to incur such exposure, regardless of frequency (e.g., nurse, doctor, police, etc.) and a listing of job classifications in which some employees may have occupational exposure. Since not all of the employees in this latter listing would be at risk, the specific task or procedure which would cause the employee to have occupational exposure is also listed (e.g., analyze blood samples in laboratory).

9.1.c Methods of Compliance
Workers are protected by controlling their risk of exposure. This control can be accomplished by using both administrative and engineering controls.

Universal Precautions
It is not possible to identify every patient who may transmit infection. Many people carry bloodborne pathogens without visible symptoms, many may not even be aware they are infected. For some of these agents, it takes just one exposure to become infected. Universal precautions require workers to treat all human blood and certain human body fluids as if they were known to be infected with bloodborne pathogens. These universal precautions do not only apply in a clinical setting, in research these other potentially infectious materials (OPIM) include any unfixed human tissue or organ, HIV cell or tissue cultures, organ tissue cultures, and HIV-, HBV- or HBC-containing culture media or other solutions and blood, organs, or other tissues from experimental animals infected with HIV, HBV or HCV

Engineering Controls
Engineering controls are physical or mechanical systems designed to eliminate or minimize employee exposure. Engineering controls should be the primary method to reduce the hazard. Examples of engineering controls include:
- puncture-resistant sharps containers
- recapping devices and self-sheathing needles
- biosafety cabinets
- autoclaves
- handwashing stations

Remember, the effectiveness of engineering controls depends upon the worker. A sharps disposal container provides no protection if you recap needles by hand and toss them in a waste basket.

Work Practice Controls
While engineering controls are designed to isolate or physically eliminate the hazard, work practice controls change the manner in which high risk activities are performed. These controls are specific procedures workers follow to reduce exposure to bloodborne pathogens.

Needle sticks. As a general rule, do not recap needles by hand. To avoid needle sticks:
- Do not bend, hand-recap, shear or break contaminated needles and other sharps.
- recap or remove contaminated needles from disposable syringes only when medically necessary. To recap needles, use a mechanical device or a one-handed technique.
Place contaminated sharps in an appropriate puncture-resistant, leak-proof container immediately after use.

Report any sharps containers that are mounted too high or otherwise not easily accessible.

**Handwashing.** If infectious material gets on your hands, the sooner you wash it off, the less chance you will have of becoming infected.

- Handwashing keeps you from transferring contamination from your hands to other areas of your body or other surfaces you may contact later.
- Every time you remove your gloves, you must wash your hands with nonabrasive soap and running water as soon as possible.
- If skin or mucus membranes come in direct contact with blood, wash or flush with water as soon as possible.
- Where handwashing facilities are not available, antiseptic hand cleanser or antiseptic towelettes should be provided. Use these as temporary measures only and wash your hands with soap and running water as soon as possible.

**Personal Hygiene.** In work areas where there is a reasonable likelihood of exposure to blood or OPIM, additional self-protective controls should be followed:

- Do not eat, drink, apply cosmetics or lip balms or handle contact lenses where you may be exposed to blood or other potentially infectious materials.
- Food and beverages are not to be kept in refrigerators, freezers, shelves, cabinets or on counter tops or bench tops where blood or other potentially infectious materials are present.
- Mouth pipetting / suctioning of blood or OPIM is prohibited.
- When doing procedures that involve blood or OPIM, minimize splashing, spraying, splattering and droplet generation. For example, when removing a specimen tube rubber stopper, cover it with gauze to reduce the chance of splatter.
- Avoid petroleum-based lubricants that may eat through latex gloves. Applying hand cream is acceptable if you thoroughly wash your hands first.

**Personal Protective Equipment (PPE)**

Personal protective equipment is equipment that protects you from contact with potentially infectious materials. It includes: gloves, gowns, face shields, masks, protective eyewear, mouthpieces and resuscitation bag or other ventilation devices. Under normal work conditions, protective equipment must not allow potentially infectious materials to contact your work clothes, street clothes, undergarments, skin, eyes, mouth or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used.

If your job requires you to be exposed to bloodborne pathogens, your employer will provide appropriate protective equipment and will clean, launder, repair, replace or dispose of protective equipment at no cost to you.

Just having PPE is not enough, there are a few general rules you must follow to insure your protective equipment does the job it was designed to do.

- You must be trained to use the equipment properly.
- Protective equipment must be appropriate for the task and you must use the equipment each time you perform a task.
- Your equipment must be free of physical flaws that could compromise safety.
- If, when wearing equipment, it is penetrated by blood or OPIM, remove it as soon as possible.
Before leaving the work area, remove all protective equipment and place it in the designated area or container for washing, decontamination or disposal.

Personal protective equipment should always be worn. However, if you believe using a piece of protective equipment would prevent proper patient care or jeopardize your safety or a co-worker's, you may temporarily and briefly abandon its use in an emergency. After the incident, your supervisor must investigate the circumstances to determine if such a situation could be prevented in the future.

Gloves are the most widely used form of PPE. They act as a primary barrier between your hands and bloodborne pathogens. Latex or vinyl gloves are used for medical, dental or laboratory procedures. Heavy duty utility gloves may be used for housekeeping duties. There are some general guidelines for proper use.

- You must wear gloves when you anticipate hand contact with blood, potentially infectious materials, mucous membranes or non-intact skin.
- If you are allergic to latex or vinyl gloves, tell your supervisor and you will be given hypoallergenic gloves, glove liners, powderless gloves or another alternative.
- Since gloves can be torn or punctured by sharps, bandage any cuts before putting on gloves.
- Replace disposable single-use gloves (e.g., surgical or examination gloves) as soon as possible if contaminated, torn, punctured or damaged in any way. Never wash or decontaminate gloves for reuse.
- Utility gloves may be decontaminated and reused unless they are cracked, peeling, torn, punctured or no longer provide barrier protection.

Not only are there guidelines for wearing gloves, but you must also follow a safe procedure for glove removal, being careful that no substances from the soiled glove contacts your hands.

- With both hands gloved, peel one glove off from top to bottom and hold it in the gloved hand.
- With the exposed hand, peel the second glove from the inside, tucking the first glove inside the second.
- Dispose of the entire bundle promptly.
- Remove gloves when they become contaminated, damaged or before leaving the work area.
- Wash hands thoroughly.
Good Housekeeping

Good housekeeping protects everyone and it is every worker's responsibility. Don't think removing a hazard is someone else's job. A contaminated sharp carelessly discarded in a normal trash can can jab housekeeping or others who must handle that item.

Supervisors are responsible to assuring that the work site is maintained in a clean and sanitary condition. All equipment and environmental surfaces must be properly cleaned and disinfected after contact with blood or OPIM. All bins, pails, cans and similar receptacles intended for reuse, which have the potential for contamination, must be inspected and decontaminated in a regular basis.

Your facility's exposure control plan will list housekeeping specifics. Some general guidelines to help insure a safe worksite:

- Clean and decontaminate at the end of each workshift. Clean all equipment and environmental working surfaces as soon as possible after contact with potentially infectious materials.
- Replace protective coverings (e.g., aluminum foil, plastic wrap, etc.) on equipment or surfaces at the end of the workshift, or immediately after the surface is contaminated.
- Do not pick up broken glass which may be contaminated directly with gloved or bare hands, use tongs, forceps or a dustpan and brush.
- Place contaminated sharps and infectious wastes in designated sharps containers. They should be labeled or color-coded leak-proof containers that are closable and easily accessible to those who use them. Do not overfill containers.
- Handle contaminated laundry as little as possible and with minimal agitation. Place soiled laundry in labeled or color-coded leak-proof bags or containers without sorting or rinsing. Potentially contaminated laundry should not be washed in work areas.
- Closable containers or bags that are designed to prevent leakage of fluids during handling, storage, transport or shipping must be provided for disposal of potentially infectious waste or specimens.
- Containers with biohazardous waste must be color coded or identified with a label. Once decontaminated, the labeling must be defaced or marked to indicate that the contents have been rendered noninfectious.

Remember, warning signs are designed to alert you to possible hazards. Read the label and observe precautions for appropriate hazards.

- The biohazard label must be fluorescent orange or orange-red with lettering or symbols in a contrasting color.
- Bags or containers bearing the biohazard sign tell you the container holds blood or other potentially infectious material.
- Warning labels are also used to designate contaminated equipment.
- A fluorescent orange-red biohazard sign on a door indicates that HIV, HVB, HCV or other biohazardous work takes place within. The sign lists special requirements for entering the facility.

9.1.d HIV and HBV Research Labs

Research labs which use HIV or HBV are required to adhere to practices outlined by CDC and NIH for biosafety level 2 (BL-2) labs. Specific information regarding
these practices is available from either the Occupational Health Office (263-2177) or the Office of Biological Safety (263-2037).

HIV or HBV research labs are required to have a handwashing facility and an eye wash station which is readily available within the work area. These labs must also have an autoclave available for decontamination of regulated.

Because of the risk inherent from exposure to these agents, additional training requirements are placed on these labs.

- Supervisors must assure that all employees demonstrate proficiency in standard microbiological practices and techniques and in the practices and operations specific to the facility before being allowed to begin work with HIV or HBV.
- Supervisors must assure that employees have prior experience in handling of human pathogens or tissue culture before working with HIV or HBV.
- Supervisors must provide a training program to employees who have no prior experience in handling human pathogens. Initial work activities shall not include the handling of infectious agents.

9.1.e Hepatitis B Immunization

The UW provides, at no cost, hepatitis B vaccine to all employees who have exposure to human blood or OPIM during the course of performing their duties. Immunizations are offered after the worker has received training and within 10 days of initial assignment. Workers are instructed on the efficacy, safety, method of administration, and benefits of the immunization. The vaccine is safe and effective:

- Vaccines now used are made from yeast and cannot be infected with HIV or other bloodborne pathogens.
- The complete series of HBV vaccinations is 85 to 97% effective at protecting workers from getting the disease or becoming a carrier for 9 years or longer.

The vaccine is not mandatory. If workers do now want to receive the hepatitis B vaccine, they must sign a declination form. There are persons who should not be vaccinated.

- Workers have already received the complete hepatitis B vaccination series.
- Antibody testing reveals the worker is immune.
- Specific medical reasons preclude vaccination.

The employee may, at any time, request the vaccine, even if they have previously declined. Records of the immunization of all employees are kept by the Occupational Health Officer in the Safety Department.

9.1.f Post-Exposure Evaluation and Follow-Up

Prompt evaluation and treatment is essential for exposures. If you are exposed, report the incident immediately to your supervisor. A confidential post-exposure medical evaluation and follow-up are required immediately following an exposure incident (i.e., “a specific eye, mouth, or other mucus membrane, non-intact skin or parenteral contact with blood or other potentially infectious material.”). Some of the components of this confidential post-exposure medical evaluation, follow-up and counseling includes:

- Documentation of the route(s) of exposure, including the date and time of exposure, and the job activity being performed.
- Identification of the source individual, including a blood test to determine the source individual's HBV and HIV antibody status.
✓ An employee blood test for HBV and HIV or retention of a baseline serum specimen for 3 months following the exposure incident.
✓ Post-exposure prophylaxis as medically indicated.
✓ Counseling and evaluation of reported illnesses to include a written assessment of the employee's risk and recommended follow-up due to an exposure incident which is given to the employee within 15 days of the exposure.

9.1.g Employee Training
OSHA requires that all employees with occupational exposure potential participate in a training program during working hours which will be provided at no cost to the employee. The training must be at the time of initial assignment and at least annually thereafter. The training must include:

- an accessible copy of the OSHA rules and regulations;
- an overview of bloodborne pathogens;
- an explanation of the institution's exposure control plan;
- identification of high risk procedures and situations; information of the types, proper use, location, removal, handling, decontamination, and disposal of personal protective equipment;
- an explanation of the benefits, risks, and free availability of the hepatitis B vaccine;
- information about the UW's post-exposure protocol;
- an explanation of the signs and labels and/or color coding used to identify hazards;
- an opportunity for interactive questions and answers with the person conducting the training.

The supervisor must keep a record of all training given, including a summary of the session's contents, the names and qualifications of the trainers, and the names and job titles of all persons attending the sessions. Records of training must be maintained for 3 years from the date training occurred.

9.2 Safe Handling of Human Blood and Other Potential Infectious Material (OPIM) in Laboratories

IMPORTANT: If your work at the University of Wisconsin-Madison requires you to work with human blood or other potential infectious human material (OPIM) for the Bloodborne Pathogens [HIV, hepatitis B, hepatitis C] you must be part of the UW-OSHA Bloodborne Pathogens Program. If you are not a part of this program, please contact Occupational Health – Safety Department, UW-Madison at (608) 263-2177 as soon as possible. There are Federal and State requirements for the potential risk of exposure to human blood and OPIM in the workplace. These requirements must be in place prior to any work with these materials.

Blood and other body fluid specimens from all persons are considered infective. Specimens should be placed in a well-constructed container with a secure lid to avoid leakage. Contamination of the outside of the container or the laboratory form should be avoided. Personnel who process specimens should wear gloves. Other barrier precautions such as buttoned lab coats, cover gowns, fluid resistant aprons
should be used as needed if splashing or aerosolization is anticipated. Biologic safety cabinets should be used for procedures that are likely to generate droplets or aerosols. After specimen processing, gloves should be changed and hands washed. Mechanical devices should be used for pipetting; mouth pipetting should never be done. Laboratory work surfaces and laboratory equipment should be decontaminated with an appropriate chemical germicide after blood or body fluid spills and when work is completed. Before leaving the laboratory, personnel should remove protective clothing and wash their hands.

Cleaning of environmental surfaces should be done after contamination by any human body fluid; special cleaning is not required for patients with bloodborne pathogen infections. Horizontal surfaces should be cleaned when spills or soilage occurs. EPA-registered disinfectant-detergents should be used. Spills of blood or body fluids should be cleaned up immediately. Personnel should wear gloves. Broken glass and any other sharp objects should first be removed using tongs or forceps and placed in a sharps container. Then, visible fluid should be wiped up, the absorbent materials discarded as infectious waste, and the area decontaminated with a chemical germicide that is approved for hepatitis and HIV and EPA approved as a disinfectant. For large spills, the contaminated area should be treated first with the chemical germicide and then cleaned and fresh germicide used for decontamination.

9.2.a Potential Sources and Routes of Laboratory Infection
HIV, hepatitis B and hepatitis C viruses have been detected in blood, blood components, urogenital secretions, urine, saliva, and cerebrospinal fluid. Of these materials, human blood presents the greatest potential for transmitting infections.

Potential routes of infection are considered to be the inadvertent introduction of bloodborne pathogens by parenteral or percutaneous inoculation and direct contact with skin broken by cuts, scratches, abrasions, or dermatitis, as well as exposure of mucous membranes to droplets. Certainly, direct inoculation from contaminated needles, instruments, or broken glassware presents the greatest hazard in the workplace, and the utmost care to avoid skin puncture should be exercised if it is necessary to handle such materials.

9.2.b General Precautions
Appropriate precautions must be followed when handling human blood, blood products and body fluids, as well as certain tissues. The extent of precaution depends on the degree of exposure. The full complement of precautions should be utilized when handling known HIV- or hepatitis-infected materials or large quantities of blood.

Good quality disposable gloves should be worn to avoid skin contact with blood, specimens containing blood, blood-soiled items, body fluids, excretions, and secretions. Gloves also reduce the possibility of skin penetration when handling any specimen or utensil that contains or has been exposed to infectious agents. It is important to remove gloves, wash hands and properly dispose of gloves as soon as an operational phase is completed. Wearing contaminated gloves when handling telephones, door knobs, or notebooks provides a mechanism for disseminating infectious material throughout the laboratory.

Fastened laboratory coats should be worn while working with potentially infectious materials and should be removed and left within the laboratory prior to exiting. Eye protection and face masks should be worn for procedures where there is a
possibility of splashing materials into the eyes, nose, or mouth. Use mechanical pipetting devices for the manipulation of all laboratory liquids. Never mouth pipette. Personnel should wash their hands frequently: after completion of laboratory activities, following removal of protective clothing (including gloves), and before exiting the laboratory. Mechanical liquid soap dispensers are preferable to bar soap. Hands should he kept away from the face and head area.

Biological safety cabinets or other containment (e.g., fume hood, if sterility isn’t needed) are recommended for certain aerosol-generating procedures involving clinical materials (e.g., blending, sonicating, vigorous mixing, and harvesting of tissues from infected donors). Horizontal laminar flow cabinets (such as clean benches) should never be used as containment devices since they do not afford operator protection.

- Laboratory work surfaces should be chemically decontaminated with an appropriate disinfectant upon completion of work activities and following any spill of potentially infectious material.
- All potentially contaminated laboratory materials should be collected in biohazard containers and decontaminated, preferably by autoclaving or incineration, before disposal. Glassware and other reusable items should be autoclaved prior to being washed and reprocessed. Alternatively, immersion in an effective chemical disinfectant can be used as a decontamination procedure.
- Other aspects of specimen handling are addressed in the following sections as well as in CDC’s publications. Should a needle-stick or accidental inoculation occur, encourage bleeding, followed by immediate, thorough washing and cleansing of the wound.

**9.2.c Specific Precautions**

The precautions listed above are, with slight modifications, the basic requirements for working safely in a laboratory. The basic goal is to avoid inoculation of disease organisms through common routes of entry (e.g., inhalation, ingestion, injection, absorption). Under certain conditions, additional precautions may be appropriate.

**Specimen Receipt**

- Incoming clinical specimens should be received in a designated area of the laboratory by a staff member trained to handle and segregate such material. This person should wear gloves and inspect parcels for leakage indicative of broken or improperly sealed containers. If available, a biological safety cabinet or vented hood should be utilized for handling damaged containers. Intact cartons can be carefully opened on counters of impervious material that can be easily decontaminated following manipulations.
- Broken tubes should be discarded in appropriate containers for decontamination.
- Leaking tubes or tubes with evidence of blood on the outside should be handled with the utmost care when transferring contents.
- Patient information on contaminated labels or request slips should be recopied.
- All contaminated or soiled materials should be discarded in a biohazard bag for suitable disposal.
- The work area should be cleansed with a chemical disinfectant after specimen receipt and handling.
Centrifuging Specimens

- Tubes containing blood should be capped and centrifuged in either sealed trunion buckets (adapters are available for most centrifuges) or rotor heads with covers. If such equipment is not available, blood should be spun in unbreakable, screw-capped tubes.
- After centrifugation, buckets, rotor heads, or screw-capped tubes should be opened within a biological safety cabinet or fume hood, if available. If such containment equipment is unavailable, care should be taken to minimize creating aerosols when transferring blood elements.
- Centrifuges should be routinely cleansed with an effective, non-corrosive disinfectant. If an accidental breakage of tubes containing known or suspected agents should occur, allow 30-60 minutes for aerosol settling before opening the centrifuge. Most centrifuge buckets can be decontaminated by autoclaving following an accident, and other interior parts can be chemically disinfected.
- Laboratory workers should be aware that some centrifuges designed for preparing blood films or fluids for cytological studies may disseminate hazardous aerosols.

Automated Equipment

Specialized instruments and automated processors are used to perform biochemical, immunological, and other laboratory assays. For the most part, these devices do not present a significant risk of disseminating pathogenic organisms. However, some procedures involved in the handling, preparation, and delivery of specimens can create a potential for release of infectious material. It is prudent to wear gloves, to clean and chemically disinfect all tubing periodically, and to assure that wash fluids or reservoir contents are appropriately decontaminated (by chemicals or autoclave) prior to disposal.

- Some fluorescent cell sorters may generate droplets containing infectious agents. Protective transparent shielding should be used between the operator and the source of droplets. If test results are not affected, samples can be inactivated with buffered formalin (1%) prior to assay.

Microplate Assays

The use of disposable microplates has become commonplace for many research laboratory procedures. Manipulations such as inoculation, diluting, washing, and harvesting involved in the use of these plates often produce splattering, spillage, and dissemination of droplets. Users should wear protective gloves and clothing and, when feasible, perform all test operations in a biological safety cabinet. If a cabinet is not available, manipulations should be performed on plastic-backed paper. Plastic plate covers are available to minimize spillage. Some manufacturers of microplate systems supply automated titrators that reduce aerosol release. As yet, there are no sealed buckets for centrifuging microplates, and care should be exercised to use balanced plates when sedimentation is necessary.

9.2.d Disinfection, Decontamination, and Disposal

HIV, HBV and HCV are relatively unstable viruses and are susceptible to a wide variety of disinfectants. The disinfectants listed below are effective against both viruses and are recommended for decontaminating work surfaces and equipment and for use after spills of potentially infectious laboratory materials. The choice of disinfectant depends on the situation.
Sodium hypochlorite (Clorox, common household bleach) at concentrations of 1:10 - 1:100 (i.e., 5000 - 500 ppm Cl) is an effective and inexpensive disinfectant. It is recommended by CDC for both HIV and hepatitis viruses. However, it is corrosive to metal, especially aluminum, and an alternative should be used for disinfecting equipment constructed of these materials. Since hypochlorite is somewhat unstable and easily bound by organic material (blood, mucous), fresh solutions should be prepared daily or more often, as needed.

Some sources advise against autoclaving items soaked in pans of bleach to avoid generating gaseous chlorine. An alternate disinfectant such as a quaternary ammonium compound can be substituted when autoclaving. Other alternatives to chlorine disinfectants are the iodophors (Wescodyne), the phenolic (Amphyl) and glutaraldehyde (Cidex). These should be used according to the manufacturer’s instructions. Alcohol, because of its limited pathogen spectrum and volatility, is not recommended for general use.

A laboratory policy should be established for decontamination and disposal of blood specimens and products. If feasible, such items should be autoclaved prior to disposal. Untreated blood tubes or blood-soiled materials should never be discarded in normal trash for disposal by housekeeping personnel.

Other laboratory wastes and blood collection equipment should be decontaminated in a properly functioning autoclave that is regularly monitored with biological spore strips. After decontamination, materials can be discarded in the normal trash, provided that containers are designated as safe for housekeeping personnel to handle; for example, color-change autoclave tape should be used, and the biohazard symbol on the container should be defaced. Alternatively, incineration is an excellent method for both decontamination and disposal of biohazardous materials.

Table 10-3 may provide useful disinfection information. Further questions concerning blood handling should be addressed to the Occupational Health Office at the Safety Department, 263-2177.

9.3 Sharps and Laboratory Glass Disposal

Needles, scalpel blades and other sharps can seriously injure you and your waste handlers. There are specific requirements and standards for disposal of wastes, such as sharps and other hazardous laboratory glass that can puncture skin. To help prevent injuries, you need to segregate waste types and contain sharps by using approved waste collection containers and follow correct disposal procedures. Additional precautions are required for sharps and hazardous laboratory glass that are contaminated with radioactive materials, hazardous chemicals, infectious agents or human blood. UW Hospital and a few other campus entities have more stringent sharps and glass disposal procedures. Use the disposal system established for your building.

9.3.a Sharps and Laboratory Glass

Sharps and laboratory glass consist of three main waste types. The waste type determines the waste collection container required and method of disposal:

- A Sharp is an item that is designed to cut or puncture skin. Sharps include unused, disinfected or contaminated: needles, syringes with needles, scalpel blades, lancets and razor blades. According to state law, broken vials and laboratory slides contaminated with infectious agents or human blood are also
sharps. Sharps must be disposed of in an approved, puncture resistant sharps container.

- **Hazardous glass and plastic** are other, non medical and uncontaminated laboratory items that may cause an injury if not contained. This waste type includes Pasteur pipettes, other pipettes, pipette tips, slides, coverslips and broken or fragile glass. These wastes must be disposed of separately in a suitable cardboard box.

- **Other glass and plastic** includes unbroken items that are unlikely to cause injury. This waste type includes unbroken petri dishes, microtiter plates, sturdy test tubes and bottles that have been emptied of stock laboratory chemicals and reagents. These may be disposed of in the normal trash. If broken, these wastes must be managed as hazardous glass and plastic.

Keep each of these waste types separate. Do not place sharps in a waste glass or plastic collection container.

### 9.3.b Sharps - Safe Use and Disposal

Sharps present a very serious risk to you, your colleagues and everyone who handles your waste. Custodians, waste handlers and landfill operators have been injured from loose and improperly contained waste sharps. Remember, sharps are often used with hazardous materials and human blood, so a sharps injury can also result in a harmful exposure and may lead to a serious disease. Because contamination may not be readily apparent, all waste sharps must be properly contained to minimize the risk of injury and exposure. The current UW sharps policy is:

- Segregate from other wastes.
- Place in rigid plastic boxes with tight-fitting lids.
- Fill container only 3/4 full.
- Disinfecting is not usually needed but is required for waste from BL3 labs.
- The user / lab carries container to the building’s collection site.
- No sharps are allowed to be disposed in Madison landfills.

Wisconsin Department of Natural Resources requires that waste sharps be collected in closable, puncture resistant and leakproof containers that meet U.S. Occupational Safety and Health Administration (OSHA) standards. Materials Distribution Services (MDS) and most safety supply and laboratory equipment vendors sell various sizes of approved sharps collection containers. Containers with horizontal openings are preferred (i.e., mailbox); needles tend to pyramid in containers that have smaller top openings.

Sharps containers should be labeled *Sharps*. If the sharps are contaminated with human blood or other biohazards, the container must also be labeled with the international biohazard symbol or be color-coded red. When filled, dispose of your sharps collection container by:

1. Securely close it to prevent spillage or protrusion of its contents. Strong adhesive tape (e.g., duct tape) may be necessary to secure the cap.
2. Biohazardous sharps from a BL3 lab must first be autoclaved / disinfected.
3. Leaking containers should be placed in a larger container (i.e., secondary containment). If biohazardous, review the *Biohazard Recognition and Control* manual and your biosafety safety protocol for decontamination procedures. Call the Biological Safety Office (263-2037) only if unsure.
4. If not biohazardous (e.g., has been decontaminated), deface any **biohazard** markings and biohazard symbols. Alternatively, place the autoclaved sharps container in a black or opaque bag, labeled **Autoclaved Sharps**.

5. Carry prepared sharps container to your building's sharp collection bin. Contact your building manager for the collection bin's location.

In addition to proper disposal as described above, use the following precautions to prevent injuries from needles and other sharps. The risk of a needle stick injury is one of the most serious laboratory risks, especially if the needle is contaminated. To reduce that risk:

- Place the sharps collection container as close as possible to the area where sharps are used.
- Do not handle needles more than necessary: open, use and dispose of needles in one step.
- Do not reuse needles or other sharps.
- Do not recap needles unless you use a modern, specially-designed recapping device that prevents injury or you use a one-handed technique.
- Do not cut, shear or bend needles. This is forbidden by OSHA because studies show these practices increase the number of needle sticks.
- Whenever possible, do not remove the needle from the syringe barrel. Discard the empty syringe barrel and needle together. Needle sticks are often caused by attempts to recap or remove syringe needles.
- Do not overfill collection containers. Overfilled containers tend to open when handled or may force needles through the container. Fill only ⅓ full and dispose of containers as soon as they are filled.
- Keep the sharps collection container upright during use.
- Use secondary containment if leakage is possible.

### 9.3.c Hazardous Glass and Plastic Disposal

To prevent injuries to waste handlers, hazardous glass and plastic laboratory items must be disposed of in a cardboard box. Keep hazardous glass and plastic separate from other wastes. Do not dispose of needles or other sharps in the same container as hazardous glass. Unlike glass from food and drink containers, laboratory glass is not suitable for recycling.

Make sure the glass and plastic is as clean as possible. Empty the items of all hazardous chemicals and drain liquids; disposing of contents properly. See procedure **Normal Trash 3** in Chapter 7 of this Guide if your labware is contaminated with hazardous chemicals. Biohazardous glass and plastic must be autoclaved or chemically decontaminated. Some buildings may have more stringent procedures for disposal of laboratory glassware, follow your building's established disposal methods.

You may use an ordinary cardboard box to dispose of hazardous glass and plastic as long as it is strong and sturdy so glass does not puncture it. You may (see below) need to line the inside of the box with a plastic bag. The box can be no larger than 12" × 12" (10" × 10" × 12" is best) and weigh no more than 20 pounds. Do not overload, a large box filled with glass can be unwieldy and dangerous to handle. Other strong and sturdy containers may be used as long as they contain the small glass pieces, are labeled and are used safely. Alternatively, specially-designed laboratory glass collection boxes (including small benchtop boxes) are available.

Take extra care if you use needles. Substitute needles with safer instruments; do not use needles for ordinary sampling or transfers unless necessary.

Laboratory glassware cannot be recycled.

Hazardous glass and plastic includes:
- Pasteur pipettes
- Other pipettes
- Pipette tips
- Uncontaminated slides
- Coverslips
- Broken glass
- Any fragile

Limit your box to 20 pounds.
from Fisher Scientific, Lab Safety Supply and other laboratory supply vendors. Label the box *Hazardous Glass and Plasticware* and also mark it *No Needles*. Prepare the hazardous glass box for disposal by:

1. Contain the waste by one or more of these methods, as appropriate:
   - Before use with broken glass and wet wastes, *line the box with a plastic bag* to contain slivers, small fragments and moisture from the wastes.
   - You can also contain slivers, glass fragments and other small pieces by *securing seams and corners with waterproof tape or duct tape* (*not* masking, lab, medical or cellophane tape, these are not reliable).
   - *Double-boxing* may be necessary for heavy boxes and for broken glass and pipettes that can pierce one layer of cardboard.

Remember, the box must be able to withstand handling and dropping by custodians and waste handlers and may be exposed to the weather. Broken glass and Pasteur pipettes can find their way through small openings in cardboard boxes and injure the workers handling them. Do not make the box too heavy, a heavy box is particularly susceptible to breaking open if it is dropped or thrown.

2. Tape the box closed. Don't use masking tape or lab tape because these will disintegrate or come unstuck when wet.

3. Mark or label the box *Hazardous Glass for Disposal, No Needles* and write your lab’s room number on the box.

4. Place the taped, marked box in the hallway next to your door for removal by the custodian. If boxes are in a bag, use a clear bag so the contents can easily be identified. Do not block aisles or place in a foot traffic area.

Check with the Custodial Dept. (3-3082) or building manager for details on glass disposal in your building.

### 9.3.d Other Glass and Plastic Disposal

Durable laboratory glass and plastic can be disposed of directly in your waste-basket, preferably first put these items in a cardboard box for safety. Sturdy glass and plastic for the normal trash includes strong, small bottles, clean petri dishes and most test tubes and centrifuge tubes. Tape stacks of petri plates together to keep them from opening during waste handling.

Place larger empty glass bottles next to your wastebasket for disposal by the custodian. Be sure to keep them out of aisles and other foot traffic areas.

Most laboratory chemical bottles are sturdy and not easily broken. Fragile bottles and any broken items should be disposed of as hazardous glass and plastic, as described in 9.3, above.

Waste glass and plastic should be as clean as possible. Empty them of all hazardous chemicals and drain liquids; dispose of contents properly. See procedures *Normal Trash 1-4* in Chapter 7 of this *Guide* for disposal of items containing agar and other nonhazardous substances, wet wastes, contaminated labware, and empty chemical containers. All biohazardous glass and plastic must be autoclaved / decontaminated prior to disposal.

### 9.4 Medical and other Regulated Sharps / Glass Disposal

Some types of “sharps / laboratory glass” have special disposal requirements. These include medical, chemical, radioactive, and biohazardous wastes.
UW Hospital and Clinics and certain other buildings on campus have more stringent procedures for the disposal of medical and infectious waste. As noted above, nothing that contains pathogens / human blood can go directly to Madison landfills. Besides sharps contaminated with blood, medical waste includes infectious or biologically contaminated material that can cause accidental injury. The two approved medical waste disposal methods are (1) disinfection and disposal to normal trash and (2) Madison Energy Recovery, Inc. (MERI) collection. Medical waste from BL3 labs must be disinfected prior to disposal. If you disinfect / autoclave your waste, review the Biological Safety Office's (263-2037) Biohazard Recognition and Control manual for information on autoclaving, chemical disinfection and other disposal procedures for medical and infectious waste. Then follow guidance for biohazardous sharps and glass disposal, below.

MERI collection is primarily for non-autoclaved, contaminated wastes. This material is disinfected at the MERI facility prior to ultimate disposal.
✓ Place material in a rigid, puncture-resistant container as described above.
✓ Properly label the container with the words "BioHazard" or "Infectious Waste" or use the universal biohazard symbol.
✓ The using lab is required to carry the box to the MERI collection container for their building.
✓ Place the box inside the MERI container. Only boxes in the MERI container will be removed by MERI.

9.4.a Radioactive Sharps and Glass Disposal
Waste sharps and laboratory glass that are contaminated with radioactive materials must be disposed of according to the University's Radiation Safety Regulations. Call the Safety Department or view the disposal guidelines on our web page (http://www.fpm.wisc.edu/safety/Radiation/rad.htm). Radiation Safety is not allowed to dispose of any "medical" waste. It must be disinfected first.

9.4.b Chemical Sharps and Glass Disposal
Sharps containing chemicals should be placed in an approved sharps container (see above) and disposed of through the Safety Department according to procedure On-Site Service 1 in Chapter 7 of this Guide. Prior to disposal, laboratory glass containing chemicals should first be emptied, drained of liquids and made as clean as possible. Decontaminate labware contaminated with a hazardous chemical by following procedure Labware 1 or Labware 2 in Chapter 7. Laboratory glass not easily decontaminated should be disposed of according to procedure Labware 3. See Appendix A for an alphabetic listing of disposal procedures by chemical.

9.4.c Biohazardous Sharps and Glass Disposal
Collect waste sharps and glass that are contaminated with infectious agents, human blood or body fluids in appropriate containers marked "Biohazard" and labeled with the International Biohazard Symbol. Prior to disposal, these wastes must be decontaminated. For guidance on autoclaving and chemical disinfection of biohazardous waste, see the Biohazard Recognition and control manual published by the Biological Safety Office (263-2037).

After decontamination, deface the biohazard symbol and biohazard markings on the sharps container (e.g., cross out or tape over). Alternatively, you can place the
autoclaved sharps containers in a black or opaque bag. Marking the container or bag "autoclaved" is a good idea. Then, dispose of the waste as uncontaminated sharps and laboratory glass, as described above.

For laboratory glass, autoclaving is usually the simplest decontamination method, although an overnight soak in an appropriate disinfectant (e.g., a fresh 10% bleach solution) is satisfactory for unbroken glass and other non-sharp items. Thus, if you disinfect / autoclave your waste follow these steps for proper disposal:

- Autoclave / disinfect contaminated material.
- Deface biohazard symbol.
- Place autoclaved material in a sturdy cardboard box.
- Label box "Broken Glass and Plasticware."
- Follow the building procedure for removal of normal trash.

Autoclaved / disinfected medical waste can be disposed of in the Madison landfills, however sharps must go to MERI.

9.5 Review Questions

1. HBV vaccine
   a. Will protect you from all types of viral hepatitis.
   b. Is not very effective.
   c. Is only available if it is requested within 10 days of employment.
   d. Is safe, effective, and available free of charge to all at risk employees.

2. Which bloodborne disease can be prevented through vaccination?
   a. HBV and HCV  
   b. HIV  
   c. HBV  
   d. HCV  
   e. none

3. Dishes from persons infected with HIV require special cleaning and disinfecting.
   a. True  
   b. False.

4. Performing a single finger stick does not require the use of any personal protective equipment.
   a. True  
   b. False.

5. Laboratory procedures that may create aerosols must be done in a biological safety cabinet.
   a. True  
   b. False.

6. HCV is the most common agent of:
   a. food borne hepatitis.  
   b. hepatitis following transfusion of blood or blood products.
   c. cirrhosis.  
   d. hepatitis following a needle stick.

7. Which of the following must be disposed of in a sharps container?
   a. Pasteur pipettes contaminated with human blood.  
   b. Scalpel blades.
   c. Needles.  
   d. b and c, only.  
   e. All of the above.

8. Biohazardous injuries include which of the following:
   a. Brief contact with a person's blood on intact skin.
   b. A stab wound with a clean scalpel.
   c. Contact with vomitus.
   d. Blood contact with an open cut or wound on your hand.
   e. A splash of urine in the eye.
9. Which of the following bloodborne viruses is thought to be transmitted through direct contact with a contaminated environmental source?
   a. all viruses   b. HIV   c. HBV and HCV   d. HBV   e. none

10. Which material is not considered to be high risk for transmission of HIV, HBV or HCV?
   a. blood   b. vomitus   c. spinal fluid   d. semen

11. Before disposing of a syringe:
   a. Remove the needle.
   b. Recap the needle.
   c. Cut off or bend the needle.
   d. None of the above.

12. A syringe with needle attached should be disposed of in:
   a. A strong cardboard box.
   b. A glass bottle.
   c. A lined wastebasket.
   d. A puncture resistant sharps container.

13. Important precautions for the safe disposal of Pasteur pipettes include:
   a. Use of a strong cardboard box.
   b. Using a generous amount of packing tape on the edges and corners of the box.
   c. Marking the box "laboratory glass for disposal."
   d. All of the above.

14. Plastic pipette tips should be disposed of in:
   a. A lined waste basket.   b. A puncture resistant plastic sharps container.
   c. A strong cardboard box.   d. Either a or c.

15. Blood-collecting equipment should be disposed of in a puncture-proof container without recapping, clipping, or bending needle tips.
   a. True   b. False.

16. One general safety precaution when handling human blood in laboratories is to keep hands away from face and head area.
   a. True   b. False.

17. It is acceptable practice to mouth pipette nonhazardous liquids (e.g., water).
   a. True   b. False.
Annex 9-1. Human Blood and OPIM† Spill Cleanup Procedures

1. Put on gloves and appropriate personal protective equipment (PPE) - protective eyeware, lab coats, masks, face shields if splashing likely

2. Remove any broken glass or sharp objects from the spill using mechanical means - forceps, hemostats, needle-nose pliers, broom and dust pan. never remove sharps/broken glass by hand!

3. Contain the spill by covering with paper towels and carefully pour appropriate disinfectant solution (1:10 to 1:100 dilution of household bleach) around and on the spill. take care not to splash disinfectant solution or create aerosols while pouring.

4. Remove the paper towels and repeat the process until all visual soilage is removed

5. Re-wet cleaned area with disinfectant and air dry or let stand for 10 minutes before wiping dry

6. Place all contaminated paper towels in a “red bag” or an autoclave bag for appropriate disposal (autoclaving, off site treatment, etc.)

7. Remove all PPE and immediately wash hands

†OPIM (Other Potentially Infectious Human Materials): semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, salvia in dental procedures, and any body fluid that is visibly contaminated with blood.
Annex 9-2. Sharps and Laboratory Glass Disposal

Sharps and Laboratory Glass Disposal

EMPTY GLASS AND PLASTIC CONTAINERS
- Unbroken glass and plastic items that present no hazard if disposed of as normal trash.
- Petri dishes, centrifuge tubes, and empty bottles.

HAZARDOUS GLASS AND PLASTIC ITEMS
- Items that can injure if disposed of in normal trash containers.
- Pasteur pipettes and tips.
- Other uncontaminated slides and cover slips.

Sharps: Items designed to cut or puncture skin
- Needles and syringes contaminated with human blood and body fluids.
- Lancets.
- Scalpels and razor blades.

Other Glass and Plastic: Items that can injure if disposed of in normal trash containers.
- Contaminated broken vials, hemocrit tubes, and laboratory slides.
- Plastic Sharps container.

OSHA-Approved Sharps Container:
- Closable, puncture-resistant, leak-proof.
- Obtain from: Laboratory supply/safety catalog.

Disposal Procedure:
- If contaminated with infectious agents or human blood.
- Decontaminate first.
- Empty the item of hazardous chemicals and drain liquids.
- Place in waste basket (4 liter) bottles next to waste basket.

Disposal Procedure:
- Use plastic liner.
- Place in waste basket.
- If contaminated with infectious agents or human blood.
- Decontaminate first.
- Empty the item of hazardous chemicals and drain liquids.
- Place in waste basket (4 liter) bottles next to waste basket.

Regular Lab Waste Basket:
- Use discarded boxes or obtain boxes from a lab supply catalog.
- If contaminated with infectious agents or human blood.
- Decontaminate first.
- Empty the item of hazardous chemicals and drain liquids.
- Place in waste basket (4 liter) bottles next to waste basket.

Disposal Procedure:
- Use packing tape, not lab tape or masking tape.
- Limit bottom size to 12 x 12 in.
- Use 20 lbs. of paper.
- Double box or tape seams to contain waste.

Disposal Procedure:
- Mark box with the words “Hazardous Glass for Disposal” and your room number.
- Place in hallway next to your lab door.

Some buildings (for example, Chemistry and the University Hospital) may have their own disposal methods.

Contact your building manager.

www.fpm.wisc.edu/safety

University of Wisconsin-Madison Safety Department (608) 262-8769