



HARVARD UNIVERSITY EXPOSURE CONTROL PLAN

In 1991 the Occupational Safety and Health Administration (OSHA) issued a standard on Occupational Exposure to Bloodborne Pathogens. Its purpose is to ensure that workers are protected from exposure to the *Human Immunodeficiency Virus* (HIV), *Hepatitis B Virus* (HBV), and other disease causing organisms in human blood, body fluids, and tissues.

The Harvard University Biosafety Office has prepared this manual to be used as a guide in developing a site-specific plan for reducing exposures to bloodborne pathogens in your workplace. It also summarizes pertinent Harvard University Policies and Procedures.

OSHA BBP Standard CFR 1910.1030

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=10051

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I. BLOODBORNE PATHOGENS 101

What are bloodborne pathogens?

Bloodborne pathogens are pathogenic microorganisms present in human blood and are capable of causing disease in humans. These pathogens may be present in other potentially infectious materials (OPIM) such as: body fluids, tissues, and organs from infected persons, and commonly used laboratory cell lines.

What are the most common types of bloodborne pathogens?

Hepatitis B Viral Infection is caused by the *Hepatitis B Virus* (HBV). Of all bloodborne pathogens, *HBV* poses the greatest risk for infection among health care providers and laboratory researchers because it can be easily transmitted through needle sticks and other types of percutaneous exposures. The virus causes inflammation of the liver and can lead to serious and occasionally fatal disease. An effective vaccine is available and should be offered to workers who may be exposed.

Hepatitis C Viral Infection is caused by the *Hepatitis C Virus* (HCV). *HCV* also poses a risk for infection among health care providers and laboratory researchers because it is transmitted through needle sticks and other types of percutaneous exposures. Similar to *HBV*, the virus causes inflammation of the liver and can lead to serious and occasionally fatal disease. Specific diagnostic tests for *HCV* have only become available recently. Although there is no vaccine available to prevent *HCV*, administration of interferons as treatment has been used in some cases as with chronic *HBV* conditions.

Acquired Immunodeficiency Syndrome (AIDS) is a disease caused by *Human Immunodeficiency Virus* (HIV). *HIV* is a retrovirus which suppresses the immune system leaving the infected individual vulnerable to opportunistic infections and cancer. These infections become increasingly severe and eventually lead to death. No cure for *HIV* has been found. Drug prophylaxis such as AZT is available, although its efficacy is debated within the medical community. Protease inhibiting drugs have slowly become a part of the treatment process and seem to hold some promise according to some medical experts.

In addition to *HIV*, *HBV*, and *HCV*, other viruses, bacteria and parasites may also be present in blood, human body fluids, or tissues. Some of them are:

| <u>DISEASE</u> | <u>CAUSATIVE AGENT</u> |
|---------------------------------|-------------------------------------|
| SIV Infection | Simian Immunodeficiency Virus |
| Malaria | <i>Plasmodium</i> species |
| Syphilis | <i>Treponema pallidum</i> |
| Babesiosis | <i>Babesia microti</i> |
| Brucellosis | <i>Brucella</i> species |
| Leptospirosis | <i>Leptospira interrogans</i> |
| Viral Encephalitis | Arboviruses |
| Creutzfeldt-Jakob Disease (CJD) | Prion |
| Viral Hemorrhagic Fevers | Ebola, Marburg, Lassa fever viruses |

The bacterial and parasitic diseases listed above are treatable with antibiotics or other therapy. There are no specific, effective treatments for the viral diseases.

Where are bloodborne pathogens found?

Bloodborne pathogens may be present in blood, body fluids, tissues, and other potentially infectious materials (OPIM). Other potentially infectious materials include:

- *Semen*
- *Vaginal secretions*
- *Cerebrospinal fluid*
- *Synovial fluid*
- *Peritoneal fluids*
- *Pericardial fluids*
- *Pleural fluid*
- *Amniotic fluid*
- *Saliva in dental procedures*
- *Body fluids visibly contaminated with blood or in situations where it is impossible to differentiate fluids*

Some materials handled by laboratory researchers are also classified as potentially infectious materials. These materials should be handled in the same manner as human blood or body fluids. They include the following:

- *Cell lines or tissue cultures*
- *Culture media or other solutions*
- *Primary human cell and tissue cultures*
- *Human T-lymphocyte cultures*
- *Blood and tissues from experimental animals that have been infected*
- *Animals that have been experimentally infected*

How are bloodborne pathogens transmitted in the laboratories?

Bloodborne pathogens can be transmitted if infectious material comes in contact with your blood and body fluids. Laboratory exposures often occur through needle sticks, direct contact of materials on a non-intact skin, or splashes to the eyes, mouth, and nose.

II. SCOPE AND APPLICATION OF THE OSHA BBP STANDARD

Who is covered by the OSHA BBP Standard?

Anyone who has a reasonable chance of encountering human blood, body fluids and other potentially infectious materials while performing their normal job duties is covered by the standard.

Who is at risk?

The first step in protecting workers from bloodborne pathogens is to determine who needs protection. The standard requires that an employee's risk of exposure to bloodborne diseases be made based on their normal job responsibilities or performance of tasks where exposure may likely be encountered. Workers at risk are identified based on their *Job Classifications* (e.g., phlebotomist, nurse, or physician) or the *Tasks and Procedures* associated with the work they perform (e.g., laboratory researcher handling blood, technician in charge of washing contaminated glass wares, etc..)

How is Risk Determination accomplished?

Appendix 1 lists examples of *Job Classifications* and *Tasks and Procedures* in which workers are at risk of occupational exposure to bloodborne pathogens. Appendix 1 also provides forms for listing workers with occupational risk at your work site. These forms can also be used with new employees to discuss their risk of contact with bloodborne pathogens.

In addition, Appendix 6A, Hepatitis B Vaccination Offer Form, is also provided to assist in determining who is covered by the standard and record employee vaccinations. Each employee with potential exposure must complete this form. Additional forms are available through the Department Administrators, Office of Human Resources, UHS at 275 Longwood Avenue, and the Biosafety Office.

III. METHODS OF COMPLIANCE

This section is intended as a guide to the general compliance requirements of the OSHA Bloodborne Pathogens Standard. Additional specific methods need to be drawn up by the Principal Investigator or by the Employee Supervisor for each work site or activity. Further guidance is available through the Biosafety Office 432-1720. The OSHA Bloodborne Pathogens Standard, included as [Appendix 8](#), is also a useful guide to developing safe laboratory procedures.

How can I be protected from exposure?

The Centers for Disease Control developed the concept of *Universal Precautions* to help prevent the spread of infectious diseases in the workplace. *Universal Precautions* assumes that **all** blood, body fluids, and tissues are infectious for *HIV*, *HBV*, and other bloodborne diseases. Because no test method can offer complete assurance for the absence of all bloodborne pathogens, *Universal Precautions* must always be observed when handling blood and other materials collected from any source.

Certain work practices are necessary to conform to *Universal Precautions*. These are:

A. WORK PRACTICES

Work practices are methods and procedures followed by employees to protect themselves from exposure. The following *Work Practices* are derived from the OSHA standard. [Appendix 2](#) can be used to detail site-specific work practices for your work area.

Hand washing

The number one defense against infection is clean hands. Hands should be washed with soap and running water after removing the gloves and before leaving the work area. If a sink is not available, hands should be cleaned with disinfectant wipes and washed with soap and water as soon as a sink becomes available. Overly vigorous hand washing is not recommended, as it may cause skin breaks and chapped hands.

Sharps & Containers

The use of syringes and needles, glass Pasteur pipettes, and other sharps such as scalpels, razors, and suture needles should be minimized. Used sharps and contaminated broken glassware must be disposed into sharps containers as soon as possible. The sharps containers shall be labeled with the universal biohazard symbol, and shall be puncture-resistant, leak-proof, and closable for transport. Containers must be located where sharps can be disposed of immediately after use.

Used needles should not be recapped or removed by hand. If recapping needles is necessary for a specific procedure, use forceps, hemostats, or a one-handed technique. Reusable sharps must be handled in a manner that reduces the risk of cuts during decontamination and cleaning. Wear heavy utility gloves and reach into the decontamination pans with tongs to prevent hand injuries.

Work Area Restrictions

Eating, drinking, smoking, applying cosmetics, and handling contact lenses are prohibited in areas where blood and other potentially infectious materials are handled or stored. Food and drinks must not be kept in freezers, refrigerators, and other places used to handle or store other potentially infectious materials. Areas where blood and other potentially infectious materials are stored or worked with must be posted to make persons entering the area aware of the potential hazards present. Mouth pipetting practices shall not be allowed.

Specimen Handling
& Transport

Specimens and other materials to be transported between work sites should be placed in a secondary container that is leak-proof and labeled with the universal Biohazard symbol. Labels are available through the Biosafety Office. Portable "six-pack" coolers are typical for this use.

Containers for shipping specimens must meet the Department of Transportation and United States Postal Service requirements. International shipping may require permits or authorization from the United States Department of Agriculture or Centers for Disease Control. Contact the Biosafety Office at 432-1720 for more information.

Contaminated
Equipment

Equipment used to store or handle blood and other potentially infectious materials shall be labeled with the biohazard symbol. It must be cleaned and decontaminated before being serviced, repaired, or transported from the work area. Any parts of the equipment that cannot be decontaminated should be labeled with the biohazard symbol and the information communicated to all affected people.

Personal Protective
Equipment

Personal Protective Equipment (PPE) refers to devices or apparel that helps protect workers from injuries. Selection of appropriate PPE should be made based on the specific hazard or anticipated exposures that may be incurred. It must be provided to all employees whose work puts them at risk and should be readily available when needed. The employer provides for the cost of obtaining, maintaining, replacing and disposing of personal protective equipment.

What are some examples of Personal Protective Equipment?

Some common examples of PPE that are used in the workplace are:

- i. Gloves Disposable gloves should be worn when there is possible contact with blood and other potentially infectious materials. They should be replaced when they are cut, damaged, or when they are visibly contaminated. Double gloving is recommended when working with high concentrations of pathogenic microorganisms. Heavy rubber gloves may be needed when decontaminating equipment or cleaning spills. Utility gloves may be decontaminated and reused but must be discarded when cracked or torn.
- ii. Safety Safety glasses with temple and side protection prevent direct Glasses splashes to the eyes. Goggles or face shields provide better protection when working with materials or performing procedures which may cause splashes and spraying.
- iii. Lab Coats Lab coats protect skin surfaces and street clothing from contamination. Disposable water-resistant gowns should be used when working with materials which may splash or platter. Contaminated gowns should be removed and replaced as soon as possible.

Housekeeping

Benchtops, counters, and all other equipment used to work with blood and other potentially infectious materials must be disinfected at the end of the work day, when work surfaces are overtly contaminated, or after a spill.

Commonly used disinfectants include 10% household bleach or 70-75% ethanol. Other suitable disinfectants are listed in [Appendix 4](#). The Biosafety Office can provide additional information.

Work surfaces and equipment may be covered to prevent contamination with infectious materials. Protective coverings should be removed and replaced at the end of the work, after a spill, or when they are overtly contaminated. Coverings must be discarded as biological waste.

Spills

Spills must be cleaned up immediately. Use personal protective apparel available in your work area. Absorb liquid material with paper towels or other absorbent materials to prevent from spreading. Use tongs or a similar device to pick up broken glassware or sharps, and dispose them in a sharps container. Sharps must never be handled with bare hands.

Disinfect the spill area with 10% bleach or other appropriate disinfectants and let it stand for a few minutes (15-20 minutes if 10% is used). This allows the disinfectant time to kill the organisms present. If you need advice or assistance, you can call the Biosafety Office at 432-1720.

Regulated Waste

Harvard University and the Commonwealth of Massachusetts Department of Public Health require that medical waste be segregated from general waste and disposed of in a manner that protects the waste handlers, the general public, and the environment. Materials that come in contact with blood or other potentially infectious materials should be collected into biohazard bags, autoclaved and disposed into medical waste burn boxes for incineration. Although the State allows liquid blood to be poured down the drain, laboratories should first decontaminate the materials by bleaching or autoclaving before sink disposal.

Sharps are discarded of in special puncture-resistant, leak-proof sharps containers. These containers should be replaced once they are 2/3 full. Appendix 2B is useful in identifying the areas where these containers are stored and used.

Labeling

Waste containers, equipment, storage freezers, and other materials that come in contact with blood and potentially infectious materials must be labeled with the biohazard warning label. The label must incorporate the universal biohazard sign and a predominant florescent orange or orange-red background with contrasting lettering and symbol.



UNIVERSAL BIOHAZARD SYMBOL

Laundry

Workers should replace laboratory gowns or coats regularly and when they become contaminated. Contaminated laundry that can be reused should be placed in leak-proof bags labeled with the biohazard symbol or color-coded red before transporting for decontamination or cleaning.

HIV/HBV Research
Laboratory and
Production Facility

Guidelines and procedures for laboratories conducting research on *HIV* or *HBV* are detailed in paragraph e of the Bloodborne Pathogen Standard. The Centers for Disease Control and the National Institutes of Health also publish guidelines. Appendix 7 contains excerpts from these guidelines. Principal Investigators should contact the Biosafety Office for assistance in setting up an *HIV* or *HBV* research facility.

B. ENGINEERING CONTROLS

Engineering Controls refer to equipment and laboratory design that either eliminates the hazard from the work area or isolates the worker from it. They should be maintained on a regular basis to ensure their effectiveness. *Engineering Controls* used in your work area and their maintenance records should be recorded in [Appendix 3](#).

Examples of *Engineering Controls* used in the work area to prevent worker exposure are:

Biological Safety Cabinets

Commonly referred to as "*tissue culture hoods*," these provide protection from aerosols. Class II biosafety cabinets not only protect the person using them, but also protect the work from contamination. They should be inspected and recertified annually and whenever moved.

Mechanical Pipettors

Mechanical pipetting devices and other pipetting aids should be used instead of mouth pipetting.

Self-sheathing Needles

Self-sheathing needles are recommended for procedures that require recapping.

Sharps Containers

Rigid, hard-sided, leak-proof, and puncture-resistant containers are used to dispose of sharps. These containers are labeled with the biohazard symbol and should be in the immediate area where sharps are handled.

Splash Guards

Procedures that may generate splatters (e.g. opening specimen tubes) can be safely done behind a transparent shield or in the biosafety cabinet.

IV. MEDICAL SURVEILLANCE PROGRAM

The OSHA standard requires employers to establish procedures that assure medical attention is available in the event of an occupational exposure to bloodborne pathogens. This is not a "surveillance" program per se. Serum levels are not monitored for any viruses or other pathogens. Rather, it is a medical support program consisting of two aspects, Hepatitis B vaccination and post-exposure medical assistance.

A. Hepatitis B Vaccine

Who needs to get vaccinated?

All workers at risk of job related exposure to bloodborne pathogens must be offered vaccination against HBV. Vaccine is available and administered by the Harvard University Health Services at no cost to the employee. Follow-up immunizations and boosters, if recommended by the United States Public Health Services in the future, will also be offered to employees at no cost.

Is the HBV vaccine safe?

The first HBV vaccines were derived from pooled human plasma and had associated health hazards. A new vaccine, in use since 1986, is made from a yeast based recombinant DNA system. This vaccine has been documented to be 90% effective and immunity lasts approximately 7-10 years.

Are there any side effects of the vaccine?

Side effects and other reactions to the vaccine varies between different individuals. The most common reactions are: mild temperature, and soreness or slight swelling around the vaccinated area. Individuals with allergies to yeast or thimerosal preservative should consult the administering health care professional.

When should the vaccine be administered?

Newly hired employees with risk of occupational exposure to bloodborne pathogens must be offered the HBV vaccine within ten days of being appointed the position or immediately after the training.

What happens if I don't want the vaccination?

As with any medical treatment, the decision to take the vaccination is yours. If you decline the vaccine, you must sign a waiver statement. If at a later date you change your mind and decide to obtain the vaccine, it will be available to you at no cost. [Appendix 6B](#) is the *HBV Declination Statement Form*. This form **must** be completed by each employee who declines the vaccination.

How do I get the vaccine?

After completing the *Occupational Exposure to Bloodborne Pathogens Form* in [Appendix 6A](#) with your supervisor or department administrator, call the UHS immunization desk (432-1370) to make an appointment. The HBV vaccination is a series of three injections. It is the employee's responsibility to set up and keep the appointments. You must bring the completed and signed request for vaccination with you to the first appointment.

B. Exposure Incident

How do laboratory exposures occur?

Exposures to bloodborne pathogens most often occur through:

- Needle sticks and lacerations or punctures with contaminated sharps;
- contamination or exposure to a non-intact skin; and
- direct splashes to the mouth, eyes, and nose.

What do I do if I have an exposure?

- Wash the affected area with soap and running water.
- If possible, force-bleed the injured area.
- Cover the injury with sterile gauze or clean material.
- Report the incident immediately to the Principal Investigator or Employee Supervisor.
- Proceed to the Harvard University Health Services for immediate treatment. *

Whom do I call? Where do I go for treatment of injuries?

| |
|---|
| HARVARD LONGWOOD CAMPUS |
| Medical Area Health Service, 275 Longwood Avenue, Tel. No. 432-1370 |
| AFTER WORK HOURS, WEEKENDS |
| University Health Services, Holyoke Center, Tel. No. 495-5711 |
| * In case of a severe injury, report immediately to <u>Brigham & Women's Hospital Emergency Room</u> . Call 432-1212 for emergency transportation to the hospital. |

C. Post-Exposure Evaluation and Follow-Up

What happens after an exposure?

The first priority is the health and well-being of the affected worker. Call Harvard University Health Services (UHS). They will immediately conduct an evaluation of the incident and recommend appropriate follow-up care. If possible, the source patient or material will be tested for *HIV* and/or *HBV* and the results will be made available to you and your health care provider. All treatment is provided by licensed health care providers. Test results and other medical records are confidential.

What if my health insurance is not through UHS or HUGH/P?

You should still report to UHS for initial exposure evaluation. UHS will provide any immediate care needed and then refer you to your personal health care provider. For work-related exposure incidents, UHS will continue your care. UHS will transfer records and consult with your primary health care provider if you move your follow-up care. Be sure to complete and submit a Harvard University Accident Report to activate Worker's Compensation for any costs incurred at your health care provider.

What is the University Work-Related HIV Benefit Plan?

The Plan Sponsor has developed a benefit plan to provide financial assistance to eligible persons who become infected with the HIV as a result of a work-related incident. The Benefits Department should be contacted at 495-2757 for more information about the plan.

What are my responsibilities as a Principal Investigator or Employee Supervisor?

The circumstances surrounding the injury or exposure should be investigated immediately by the supervisor. Information on the incident, source material, and employees' vaccination status should be provided to UHS and/or the employee's health care provider. Site-specific procedures should be reevaluated and revised as necessary to prevent recurrences of similar incidents. The Biosafety Office is available to assist you with this.

V. INFORMATION, TRAINING AND RECORD KEEPING

A. Labels and Signs

Special labels which incorporate the *Universal Biohazard Symbol* warn people that blood and other potentially infectious materials are present in an area. Appropriate labels have a predominant fluorescent orange or orange-red background with lettering and symbols in contrasting color.

What needs to be labeled?

Any equipment and instruments which may become contaminated with blood and other potentially infectious materials should be labeled. Examples of these materials include:

1. Containers of contaminated waste.
2. Refrigerators and freezers where blood or other potentially infectious materials are stored.
3. Incubators used for primary cell cultures.
4. Centrifuges and biosafety cabinets when containing blood or other potentially infectious materials.
5. Containers used to store, transport or ship blood and other potentially infectious materials. Labels are not required on individual containers of blood or other potentially infectious materials if they are placed in labeled secondary, leak-proof, containers.

HIV and *HBV* research laboratories and production facilities are required to have biohazard warning signs at all entrances. Door signs and stickers are available through the Biosafety Office.

B. Training

Everyone working with blood and other potentially infectious materials needs to be trained. Training should be given before the employee starts working with blood and other potentially infectious materials. Covered employees should be retrained annually. The training must be conducted by persons who are knowledgeable in the OSHA *Bloodborne Pathogens Standard*. Materials to be discussed are specified by the standard (Appendix 8, paragraph g section 2).

Schools and Departments are responsible for the training. The Biosafety Office can provide training or assist you in setting up your own training.

C. Record Keeping

As with most OSHA regulations, the *Bloodborne Pathogens Standard* requires record keeping. Schools, Departments, Principal Investigators, or supervisors should maintain all relevant records.

Training Records

All training records must be kept for three years from the date of the training and should include the following:

- a. Training Date.
- b. Summary of the training contents.
- c. Names and qualifications of the trainer(s).
- d. Names and job titles of the individuals who attended the training.

The Biosafety Office maintains records of training sessions it conducts. Copies will be sent to the department.

Medical Records

All medical records must be kept confidential and maintained for the duration of the employment plus 30 years. Medical records should contain the following information:

- a. Employee name and social security number.
- b. Hepatitis B vaccination status including vaccination dates and medical records relevant to the employee's vaccination status.
- c. Results and relevant opinions and results of post-exposure evaluations, examinations, medical testing and follow up procedures.

The Harvard University Health Services maintains medical records of employees that received their services.

Availability and Transfer of Records

All medical and training records will be made available to the Director of the National Institute for Occupational Safety and Health, the Assistant Secretary of Labor for Occupational Safety and Health, and their designated representatives upon their request. Training records will be available to employees or employee representatives upon their request. Medical records can be obtained by the employee or by a representative with the employee's written consent.

VI. RESPONSIBILITIES

A. Schools, Department, Principal Investigator or Employee Supervisor

Develop, implement, and review policies and procedures that will reduce or minimize the risk of occupational exposure for employees and will comply with the requirements of the standard.

Develop, implement and annual review policies and procedures that will identify employees at risk and assure that the following are provided to each employee at risk:

1. Information and training about the hazards associated with their work, Universal Precautions, and other methods of compliance as specified in the standard.
2. Personal protective equipment that is appropriate for the hazards involved in the work and is readily accessible.
3. An offer to receive the Hepatitis B vaccination and boosters (if recommended) at no cost to the employee.
4. Information and procedures for reporting exposure incidents, treatment, post exposure evaluation, and follow up.

B. Employee

Participate in training and education programs that provide information about the epidemiology and transmission of bloodborne pathogens and prevention of occupational exposures.

Adoption of the *Universal Precautions* and compliance with other employee requirements as outlined in the standard and the site-specific plans.

C. Environmental Health & Safety Department

EH&S will assist Schools, Departments, Principal Investigators, and Supervisors with site-specific compliance efforts, including:

1. Development and presentation of training and education programs.
2. Assistance in development of written site-specific Exposure Control Plans.
3. Assistance in monitoring University status of compliance with the components of the standard.
4. Assistance in accident investigations upon request.
5. Liaison with University Health Services upon request.
6. Resource for current information and assistance to each site.

APPENDIX 1

RISK DETERMINATION

Some of the tasks or procedures performed by the employees that present potential exposures to bloodborne pathogens are listed below:

1. Handling human blood or blood components (e.g. plasma, serum).
2. Handling unfixed human organs or tissues
3. Culturing primary human cells and established cell lines.
4. Working with cell cultures or other preparations known to contain HBV or HIV.
5. Handling Other Potentially Infectious Materials.*
6. Working with human-derived materials that may be visibly contaminated with blood (e.g. urine, saliva)
7. Using human blood products such as proteins or research kits containing human serum.
8. Performing research with or handling research animals infected with human cells or bloodborne pathogens and caring for these animals.
9. Removing wastes or processing contaminated glassware known to contain the materials listed above.

Please fill out the forms on the next two pages:

- A. In *Table A*, list the Job Classifications of employees that are at risk. Under each classification, fill in the name, date of employment, and the date of termination for each employee if applicable.

EXAMPLE:

Research Associate or Assistant in HIV or HBV Research Laboratories
Dentist
Nurse
Doctor
Emergency First Aid Provider

- B. In *Table B*, list Job Classifications and corresponding Tasks at your work site where employees are at risk to exposure because of some duties they perform. Under each classification, fill in the name, job title, date of employment, and date of termination for each employee if applicable.

EXAMPLE:

| <u>Job Classification</u> | <u>Tasks Performed</u> |
|---------------------------|---|
| Laboratory Technician | <i>Handle or wash contaminated glassware</i> |
| Animal Care Technician | <i>Handle experimental animals that shed bloodborne pathogens</i> |
| Plumbers | <i>Assigned to fix contaminated plumbing lines</i> |

* Other Potentially Infectious Materials include: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, unfixed human tissue or organs, animals and tissues of animals known to be infected with HIV or HBV, and all other body fluids in situations where it is difficult or impossible to differentiate between body fluids.

**RISK DETERMINATION
TABLE A**

Job classifications of employees who are exposed to blood and other potentially infectious materials:

| JOB TITLE: | | |
|-------------------|--------------|---------------------|
| EMPLOYEE NAME | DATE OF HIRE | DATE OF TERMINATION |
| | | |
| JOB TITLE: | | |
| EMPLOYEE NAME | DATE OF HIRE | DATE OF TERMINATION |
| | | |
| JOB TITLE: | | |
| EMPLOYEE NAME | DATE OF HIRE | DATE OF TERMINATION |
| | | |

RISK DETERMINATION

TABLE B

Job classifications of employees exposed to blood and other potentially infectious materials due to **Tasks** they perform:

| | | |
|---|--------------|---------------------|
| JOB TITLE: _____ Tasks that present risk to the employees in this classification: 1. 2. 3. 4. | | |
| EMPLOYEE NAME | DATE OF HIRE | DATE OF TERMINATION |
| | | |
| JOB TITLE: _____ Tasks that present risk to the employees in this classification: 1. 2. 3. 4. | | |
| EMPLOYEE NAME | DATE OF HIRE | DATE OF TERMINATION |
| | | |
| JOB TITLE: _____ Tasks that present risk to the employees in this classification: 1. 2. 3. 4. | | |
| EMPLOYEE NAME | DATE OF HIRE | DATE OF TERMINATION |
| | | |

APPENDIX 2

SITE SPECIFIC WORK PRACTICES

The following sections have been set up to describe and document the work practice controls used in the work area.

The Principal Investigator, Employee Supervisor, or other responsible individual should complete all applicable sections.

APPENDIX 2:

APPENDIX 2A: Sink, Eye Wash and Safety Shower Locations

APPENDIX 2B: Sharps: Protocols for reusable sharps

APPENDIX 2C: Work Area Restrictions

APPENDIX 2D: Personal Protective Equipment

APPENDIX 2E: Spill Kit Contents and Locations

APPENDIX 2F: Spill Procedures

APPENDIX 2A

WORK PRACTICES CONTROLS – Sink, Eyewashes & Safety Showers

| |
|--|
| Sinks for handwashing are located in: |
| (Indicate building and room number) |
| Eyewashes are located in: |
| (Indicate building and room number) |
| The safety shower is located in: |
| (Indicate building and room number) |

APPENDIX 2B

WORK PRACTICES CONTROLS – *Reusable Sharps*

The following non-disposable sharps are used at this work site:

(Indicate building and room number)

The following procedures require the use of non-disposable sharps:

Sharps that need to be decontaminated for cleaning and reuse are treated in the following manner:

APPENDIX 2C

WORK PRACTICES CONTROLS – *Work Site Restrictions*

| List all the hazardous biological materials handled in the work area: | | |
|--|---------------------|-------------------|
| Hazardous Biological Material(s) | Date of Initial Use | Date Discontinued |
| | | |
| List entry restrictions to the facility: | | |
| (i.e. vaccinations, training, etc.) | | |
| List areas where food and drinks are allowed: | | |
| (Indicate building and room number. Please identify area use if possible, i.e. office, lounge, etc.) | | |

APPENDIX 2D

WORK PRACTICES CONTROLS – *Personal Protective Equipment*

| |
|---|
| Protective Clothing |
| Laboratory coats or gowns should be worn when working with blood or other potentially infectious materials. The following tasks or procedures require the use of protective clothing: |
| |
| List the disposal, decontamination, or laundry procedures for all used or contaminated protective clothing: |
| |
| Eye Protection |
| The following procedures may generate splashing, splattering, or sprays and necessitate eye and face protection: |
| |
| Gloves |
| Gloves are required when handling blood or other potentially infectious materials. Gloves in this work area are: |
| (Indicate manufacturer and type) |
| |
| The following tasks and procedures require the use of utility gloves or other specialty gloves: |
| |

APPENDIX 2E

WORK PRACTICE CONTROLS – *Spill Kits*

Spill Kits should be available where blood or other potentially infectious materials are handled or stored.

SPILL KIT CONTENTS:

- a. Household bleach or other appropriate chemical disinfectants
- b. Paper towels or other absorbent
- c. Disposable latex gloves (e.g. Platex gloves)
- d. Forceps or tongs
- e. Autoclave bags or biohazard red bags
- f. Spray bottle (to prepare working dilution of disinfectant)
- g. Rigid, leak-proof container for sharps

List additional materials that are included in the spill kit and the suppliers:

| |
|--|
| |
|--|

List of spill kit location(s):

| Building & Room | Date Replenished | Date Inspected |
|-----------------|------------------|----------------|
| | | |
| | | |
| | | |
| | | |
| | | |

APPENDIX 2F

WORK PRACTICES CONTROLS – *Spill Procedures*

Spills of biological materials should be cleaned up as soon as possible. The following procedures are recommended for biological spills in the laboratory. Additional clean up procedures may be found in the Harvard University *Biosafety Training Guide*, available from the Biosafety Office.

Guidelines for spills in the laboratory:

- a. Notify the supervisor and other employees about the spill.
- b. Evacuate the area if necessary. Wait for approximately 30 minutes for aerosols to settle before going back into the spill area.
- c. Call Environmental Health & Safety, Biosafety Office if you need assistance at 432-1720 (495-5560 during nights and weekends).
- d. Wear protective clothing: lab coats, disposable gloves, goggles or face shield.
- e. Ring the spill using disposable paper towels.
- f. Apply working disinfectant solution (10% bleach is generally used) on the liquid spill. Work from the outer reaches of the spill towards the center. Allow appropriate contact time (approximately 20 – 30 minutes if 10% bleach is used) to disinfect the spilled material.
- g. Absorb the spill with paper towels. Again, work from the outer reaches of the spill towards the center. Clean area using fresh towels soaked in disinfectant.
- h. Discard all non-sharps solid wastes into an autoclave bag or biohazard red bag. Discard all sharps including broken glass into sharps containers.
- i. Wash your hands with soap and water immediately after removing your gloves.

| List additional or special procedures to clean up spills in the work area: |
|---|
| |

APPENDIX 3

SITE SPECIFIC ENGINEERING CONTROLS

The following sections have been set up for use at each work site to describe engineering protection controls in use.

The Principal Investigator, Employee Supervisor, or other persons responsible should complete all applicable sections. Additional sections should be added for each work site as needed.

APPENDIX 3:

APPENDIX 3A: Biological Safety Cabinets

APPENDIX 3B: Sharps Containers

APPENDIX 3C: Re-sheathing Needles

APPENDIX 3A

ENGINEERING CONTROLS – *Biosafety Cabinets*

LOCATION OF BIOSAFETY CABINET

BUILDING: _____

ROOM NUMBER: _____

CONTACT PERSON: _____

TELEPHONE NUMBER: _____

BIOSAFETY CABINET DESCRIPTION

| | |
|-----------------------------|--|
| MANUFACTURER | |
| MODEL | |
| CLASS | |
| SERIAL NUMBER | |
| RECERTIFICATION DATE | |

The Principal Investigator or Employee Supervisor must complete an Engineering Control Form for **EACH** Biosafety Cabinet used in the work area.

APENDIX 3B

ENGINEERING CONTROLS – *Sharps Containers*

LOCATION OF SHARPS CONTAINERS

BUILDING: _____

ROOM(S): _____

CONTACT PERSON: _____ TELEPHONE NUMBER: _____

Sharp containers are available through:

(Name of supplier, i.e. EH&S, Baxter, Fisher, etc.)

Sharps containers are disposed by:

(i.e. custodial, etc.)

Waste treatment or disposal procedure:

AUTOCLAVED (Y/N): _____ TEMPERATURE: _____ PRESSURE: _____

CHEMICALLY DISINFECTED (Y/N): ___ CHEMICAL USED: _____ CONCENTRATION: _____

DISPOSED INTO BURN BOXES (Y/N): _____

OTHERS (EXPLAIN): _____

APPENDIX 3C

ENGINEERING CONTROLS – *Recapping of Needles*

Needles should be recapped or removed from syringes during the following procedures:

When recapping of needles becomes necessary, specially manufactured self-sheathing needles are used:

(Indicate company & model)

The following additional safety methods and / or devices are used to avoid injury:

APPENDIX 4

CHEMICAL DISINFECTANTS

| DISINFECTANT | WORKING SOLUTION | GENERAL USE |
|---|----------------------------------|---|
| Bleach | 10% | Disinfects work areas, floors, walls, glassware. Good general all around disinfectant. Disinfects liquid cultures for disposal. |
| Quaternary Ammonia (Commercial Grade) | 10 – 100 ppm | Disinfects floors, work surfaces, glassware |
| Phenolics (Commercial Grade) | 2.8 – 3.0 % Active Ingredient | Disinfects instruments, and work surfaces. |
| Glutaraldehyde | 2 – 3 % | Disinfects instruments, including endoscopic tubes. |
| Isopropyl Alcohol | 70 – 85 % | Disinfects work surfaces, equipment; antiseptic and non-corrosive. |
| Ethyl Alcohol | 70 – 85 % | Disinfects work surfaces, equipment; antiseptic, low toxicity, and non-corrosive. |
| Iodophor | 75 – 150 ppm | Disinfects instruments and surfaces, non-corrosive. |

Other effective chemical disinfectants may be available for use against biological materials. Contact the biosafety Office for information on other chemical disinfectants.

APPENDIX 6

**OCCUPATIONAL EXPOSURE TO BLOODBORNE PATHOGENS FORM
&
HBV VACCINE DECLINATION STATEMENT FORM**

Employees who are at risk of exposure to bloodborne pathogens must complete the *Occupational Exposure to Bloodborne Pathogens Form Appendix 6A*. Workers who wish to decline Hepatitis B vaccination must complete a *HBV Vaccine Declination Statement Form Appendix 6B*. These forms are written records that the employer has offered Hepatitis B vaccination to all affected employees. Employees who decline to be vaccinated may acquire the vaccine at a later date should they change their mind.

The Employee Supervisor or Department Administrator should ensure that the forms are completed and copies be kept in the departmental files.

APPENDIX 6: Hepatitis B Vaccination Offer Harvard Longwood South Campus (HMS, HSDM, HSPH)

Hepatitis B Vaccination Offer
Harvard Longwood South Campus (HMS, HSDM, HSPH)
Harvard University Occupational Exposure to Bloodborne Pathogens

Please complete this form if you may come in contact with human blood or other potentially infectious human materials or HIV or Hepatitis B cultures in the normal course of your job duties.

Part A: Hepatitis B Vaccination Criteria and Acceptance/Declination Form

As required by the OSHA Bloodborne Pathogen Standard (BBP), Harvard will make available at no charge the Hepatitis B vaccine series to all Harvard employees who have potential occupational exposure to human blood and other potentially infectious material as defined in the OSHA BBP Standard unless the employee has (a) previously received the complete hepatitis B vaccination series, or (b) antibody testing has revealed that the employee is immune, or (c) the vaccine is contraindicated for medical reasons. Employees have the right to accept or decline the vaccine.

Please read Part B Training Points for Employees Offered the Hepatitis B Vaccine and then check the appropriate boxes below.

“I state that I have read the Hepatitis B vaccine information in Part B below. I acknowledge that I am required to complete Bloodborne Pathogens Training.

Please check any of these boxes that apply and complete the blank:

- On or about _____ (date), I received the complete Hepatitis B vaccination series;
- On or about _____ (date), I received information that antibody testing has revealed that I am already immune to Hepatitis B;
- On or about _____ (date), I received information that the Hepatitis B vaccine is contraindicated for medical reasons.

Please note: You can schedule to have a blood test at UHS to determine your immunity. If the test does not confirm your immunity, you can reconsider your options for vaccination.

If none of the above boxes were checked, Harvard University will offer me the Hepatitis B vaccine at no cost. I choose the following:”

1. “I accept the offer to be vaccinated and agree to complete the vaccination series. I will schedule an appointment with Harvard University Health Services (UHS) by calling 617-432-1370 (Longwood) or 617- 495-5182 (Cambridge).” NOTE: Bring a copy of this page to the appointment with UHS.
2. I decline to accept vaccination at this time. “I understand that due to my occupational exposure to blood or other potentially infectious materials, I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.” (*OSHA Bloodborne Pathogen Standard, CFR 1910.1030*)

Employee Signature: _____ Date: _____

Employee Name _____ Harvard ID Number _____

Job Title _____ School/Dept _____

Supervisor’s or Principal Investigator’s Name _____

33-digit billing code for UHS _____

Provide a copy of this form to your Supervisor, Laboratory Manager, or Safety Coordinator.

Hepatitis B Vaccination Offer

Harvard Longwood South Campus (HMS, HSDM, HSPH)

Section III, Part B: *Training Points for Employees Offered the Hepatitis B Vaccine*

No Cost to Employee

- Offered to the employee at no cost. The employee may initially turn down the offer to be vaccinated, but can request vaccination at a later date, without cost, if s/he is still at risk from an occupational exposure.
- Employees who do not wish to be vaccinated must read and sign the Vaccine Declination Statement included on this form.

Vaccine Efficacy, Safety, Benefits

(Source: WHO Fact sheet N°204 Revised August 2008 Hepatitis B)

- The complete vaccine series induces protective antibody levels in more than 95% of infants, children and young adults. After age 40, protection following the primary vaccination series drops below 90%. At 60 years old, protective antibody levels are achieved in only 65 to 75% of those vaccinated. Protection lasts at least 20 years and should be lifelong.
- The vaccine has an outstanding record of safety and effectiveness. Since 1982, over one billion doses of hepatitis B vaccine have been used worldwide. In many countries where 8% to 15% of children used to become chronically infected with HBV, vaccination has reduced the rate of chronic infection to less than 1% among immunized children.
- A vaccine against hepatitis B has been available since 1982. Hepatitis B vaccine is 95% effective in preventing HBV infection and its chronic consequences, and is the first vaccine against a major human cancer.

HEPATITIS B VACCINE: WHAT YOU NEED TO KNOW

Source: Department of Health and Human Services, Centers for Disease Control and Prevention Vaccine Information Statement (Interim) Hepatitis B (7/18/07)

1. What is hepatitis B?

Hepatitis B is a serious disease that affects the liver. It is caused by the hepatitis B virus (HBV). HBV can cause:

Acute (short-term) illness. This can lead to:

- loss of appetite
- diarrhea and vomiting
- tiredness
- jaundice (yellow skin or eyes)
- pain in muscles, joints, and stomach

Acute illness is more common among adults. Children who become infected usually do not have acute illness.

Chronic (long-term) infection. Some people go on to develop chronic HBV infection. This can be very serious, and often leads to:

- liver damage (cirrhosis)
- liver cancer
- death

Chronic infection is more common among infants and children than among adults. People who are infected can spread HBV to others, even if they don't appear sick.

- In 2005, about 51,000 people became infected with hepatitis B.
- About 1.25 million people in the United States have chronic HBV infection.
- Each year about 3,000 to 5,000 people die from cirrhosis or liver cancer caused by HBV.

Hepatitis B Vaccination Offer

Harvard Longwood South Campus (HMS, HSDM, HSPH)

Hepatitis B virus is spread through contact with the blood or other body fluids of an infected person. A person can become infected by:

- contact with a mother's blood and body fluids at the time of birth;
- contact with blood and body fluids through breaks in the skin such as bites, cuts, or sores;
- contact with objects that could have blood or body fluids on them such as toothbrushes or razors;
- having unprotected sex with an infected person;
- sharing needles when injecting drugs;
- being stuck with a used needle on the job.

2. Hepatitis B vaccine: Why get vaccinated?

Hepatitis B vaccine can prevent hepatitis B, and the serious consequences of HBV infection, including liver cancer and cirrhosis.

Routine hepatitis B vaccination of U.S. children began in 1991. Since then, the reported incidence of acute hepatitis B among children and adolescents has dropped by more than 95% – and by 75% in all age groups.

Hepatitis B vaccine is made from a part of the hepatitis B virus. It cannot cause HBV infection. Hepatitis B vaccine is usually given as an injection by needle in **a series of 3 or 4 shots**. This vaccine series gives long-term protection from HBV infection, possibly lifelong.

3. Who should get hepatitis B vaccine and when?

Children and Adolescents

- All children should get their first dose of hepatitis B vaccine **at birth** and should have completed the vaccine series by 6-18 months of age.
- Children and adolescents through 18 years of age who did not get the vaccine when they were younger should also be vaccinated.

Adults

- All unvaccinated adults **at risk for HBV infection** should be vaccinated. This includes:
 - people with jobs that expose them to human blood,
 - people who travel to countries where hepatitis B is common,
 - household contacts of people infected with HBV,
 - sex partners of people infected with HBV,
 - men who have sex with men,
 - people who inject street drugs,
 - people with more than one sex partner,
 - people with chronic liver or kidney disease,
 - residents and staff in institutions for the developmentally disabled,
 - kidney dialysis patients,
 - people with HIV infection.

- Anyone else who wants to be protected from HBV infection may be vaccinated.

4. Who should NOT get hepatitis B vaccine?

- Anyone with a life-threatening allergy to **baker's yeast**, or to **any other component of the vaccine**, should not get hepatitis B vaccine. Tell your provider if you have any severe allergies.
- Anyone who has had a life-threatening allergic reaction to a **previous dose of hepatitis B vaccine** should not get another dose.
- Anyone who is **moderately or severely ill** when a dose of vaccine is scheduled should probably wait until they recover before getting the vaccine.

Your provider can give you more information about these precautions.

Hepatitis B Vaccination Offer

Harvard Longwood South Campus (HMS, HSDM, HSPH)

Pregnant women who need protection from HBV infection may be vaccinated.

5. Hepatitis B vaccine risks

Hepatitis B is a very safe vaccine. Most people do not have any problems with it.

The following **mild problems** have been reported:

- Soreness where the shot was given (up to about 1 person in 4).
- Temperature of 99.9°F or higher (up to about 1 person in 15).

Severe problems are extremely rare. Severe allergic reactions are believed to occur about once in 1.1 million doses.

A vaccine, like any medicine, **could** cause a serious reaction. But the risk of a vaccine causing serious harm, or death, is extremely small. More than 100 million people have gotten hepatitis B vaccine in the United States.

6. What if there is a moderate or severe reaction?

What should I look for?

- Any unusual condition, such as a high fever or behavior changes. Signs of a serious allergic reaction can include difficulty breathing, hoarseness or wheezing, hives, paleness, weakness, a fast heart beat or dizziness.

What should I do?

- **Call** a doctor, or get the person to a doctor right away.
- **Tell** your doctor what happened, the date and time it happened, and when the vaccination was given.
- **Ask** your doctor, nurse, or health department to report the reaction by filing a Vaccine Adverse Event Reporting System (VAERS) form.

Or you can file this report through the VAERS web site at www.vaers.hhs.gov, or by calling 1-800-822-7967. *VAERS does not provide medical advice.*

7. The National Vaccine Injury Compensation Program

In the event that you or your child has a serious reaction to a vaccine, a federal program has been created to help pay for the care of those who have been harmed.

For details about the National Vaccine Injury Compensation Program, call 1-800-338-2382 or visit their website at www.hrsa.gov/vaccinecompensation.

8. How can I learn more?

- Ask your doctor or nurse. They can give you the vaccine package insert or suggest other sources of information.
- Call your local or state health department.
- Contact the Centers for Disease Control and Prevention (CDC):

Call **1-800-232-4636**

websites: www.cdc.gov/ncidod/diseases/hepatitis; www.cdc.gov/vaccines;
www.cdc.gov/travel

Please return to page 1, Part A: Hepatitis B Vaccination Criteria and Acceptance/Declination and complete the form.

APPENDIX 7

OSHA Recommended Practices and Procedures for HIV/HBV Research and Production Facilities

Laboratories conducting research on Human Immunodeficiency Virus (HIV) or Hepatitis B Virus (HBV) and facilities engaged in the production, culture, and concentration HIV and HBV should perform such functions in compliance with the recommendations put forth in the CDC and NIH guidelines; policies and recommendations of the Institutional Biosafety Committee, and the designated Safety Officers; and other applicable federal, state or local standards and regulations.

Principal Investigators or employee supervisors should ensure that compliance with the additional requirements for work in HIV/HBV research laboratories are followed:

a.) Training:

Employees working in HIV or HBV research or production facilities shall receive the following training in addition to the training outlined in the standard:

- i. Employees who have no previous experience in handling human pathogens shall initially train with non-infectious materials and progress to activities involving HIV or HBV as proficiency is gained.
- ii. Employees shall be trained to ensure that they are proficient in procedures and knowledgeable with the hazards specific to the facility.
- iii. Training shall be documented and shall be done annually.

b.) Special Work Practices:

Employees in HBV or HIV research or production facilities shall observe following recommended practices in addition to site-specific procedures implemented by the facility:

- i. Laboratory doors shall be kept closed when work with HIV and HBV are in progress.
- ii. Contaminated materials are to be placed in a durable, leak-proof labeled or color-coded container that is covered before transfer from work area before decontamination.
- iii. Access to the area shall be limited to authorized persons. Written policies and procedures shall be established. Only persons who have been advised of potential biohazard, who meet specific entry requirements, and who comply with all entry and exit procedures shall be allowed to enter the work areas.
- iv. A hazard warning sign incorporating the *Universal Biohazard Symbol* shall be posted on all access doors when potentially infectious materials or infected animals are present in the work area.
- v. All activities involving other potentially infectious materials shall be conducted in biological safety cabinets or other physical-containment devices within the containment module. No work with these other potentially infectious materials shall be conducted on the open bench.
- vi. Laboratory coats, gowns, smocks, uniforms, or other appropriate protective clothing shall be used in the work area and animal rooms. Protective clothing shall not be worn outside of the work area and shall be decontaminated before being laundered.
- vii. Special care should be taken to avoid skin contact with potentially infectious materials. Gloves shall be worn when handling infected animals and when making hand contact with other potentially infectious materials is unavoidable.
- viii. All waste from work areas and animal rooms shall be incinerated or decontaminated by a method such as autoclaving to effectively destroy bloodborne pathogens.
- ix. Vacuum lines shall be protected with liquid disinfectant traps and HEPA (High Efficiency Particulate Air) filters or filters of equivalent or superior efficiency and which are checked routinely and maintained or replaced as necessary.
- x. Hypodermic needles and syringes shall be used only for parenteral and aspiration of fluids from laboratories from laboratory animals and diaphragm bottles. Only needle-locking syringes or disposable syringe-needle units shall be used for injection or aspiration of other potentially infectious materials. Extreme caution shall be used when handling needles and syringes. Needles shall not be bent, sheared, replaced in the sheath or guard, or

removed from the syringe following use. The needle and the syringe shall be promptly placed in a puncture resistant container and autoclaved or decontaminated autoclaved or decontaminated before reuse or disposal.

xi. All spills shall be immediately contained and cleaned up by appropriate professional staff or others properly trained and equipped to work with potentially concentrated infectious materials.

xii. A spill or accident that results in an exposure incident shall be immediately reported to the laboratory director or other responsible person.

xiii. A biosafety manual shall be prepared or adopted and reviewed and updated at least annually and or as often as necessary. Personnel shall be advised of the potential hazards, required to read instructions on practices and procedures, and required to follow them

c.) Containment Equipment:

i. Certified biological safety cabinets (Class I, II, or III) and appropriate combination of personal protection or physical containment devices (protective clothing, respirators, centrifuge safety cups, sealed centrifuge rotors, and containment caging for animals) shall be used for all activities with other potentially infectious materials that pose a threat of exposure to droplets, splashes, spills or aerosols.

ii. Biological safety cabinets shall be certified when installed, whenever they are moved, and at least annually.

d.) Specific Requirements for HIV and HBV Research Laboratories:

i. Each laboratory shall contain a facility for hand washing and an eye wash facility which is readily available within the work area.

ii. An autoclave shall be available and used for decontamination of regulated waste.

e.) Specific Recommendations for HIV and HBV Production Facilities:

i. The work areas shall be separated from areas that are open to unrestricted traffic flow within the building. Passage through two sets of doors is a basic requirement for entry into the work area from access corridors or other contiguous areas.

ii. The surfaces of doors, walls, floors, and ceilings in the work area shall be water resistant for ease in cleaning and decontamination. Penetrations in these surfaces shall be sealed or capable of being sealed for decontamination.

iii. Each work area shall contain a sink for washing hands and an eye wash facility. The sink shall be foot, elbow, or automatically operated and shall be located near the exit door of the work area.

iv. Access doors to the work area or containment module shall be self-closing.

v. An autoclave for decontamination of regulated waste shall be available within or as near as possible to the work area.

vi. A ducted exhaust-air ventilation system shall be provided. This system shall create directional airflow that draws air into the work area through the entry area. The exhaust air shall not be recirculated to any other area of the building, shall be discharged to the outside, and shall be dispersed away from occupied areas and air intakes. The proper direction of airflow shall be verified.

Additional recommendations for work area practices and restrictions may be found in Biosafety in Microbiological and Biomedical Laboratories, 3rd edition, CDC/NIH, May 1993. Copies are available at the Environmental Health and Safety, Biosafety Office.