



**Oregon State
University**

Bloodborne Pathogen Program Exposure Control Plan

Applicability

This program applies to all activities which might place workers in contact with the following material derived from human sources: blood, unfixed tissues or primary cell cultures, cell strains or lines, semen, vaginal secretions or the following body fluids: cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids. It does not apply to exposure to human saliva, tears, urine, or sweat, unless blood is also present. The program does not apply to animals unless the animal is known to be or suspected of harboring human bloodborne pathogens.

For the following divisions or departments at OSU, employees covered by this program:

- **Athletic Department** – all athletic trainers
- **Student Health Services** – all professional staff
- **Facility Services** – employees who may be at risk of being exposed, as determined by supervisors
- **Custodians** – if contracted employees, the employer is expected to provide training and meet the other requirements of this plan
- **Environmental Health & Safety** – personnel handling biohazards or infectious wastes
- **Academic Colleges** – research involving bloodborne pathogens, blood, cells, tissues or body fluids as specified above
- **University Housing and Dining Services** – custodial staff; dining staff who may contact blood or body fluids in the context of injuries occurring in dining areas
- **Department of Recreational Sports** – employees who may contact blood or body fluids in the context of injuries occurring in recreational facilities

Note: Employees of any units not mentioned above are subject to this program if they are exposed to the materials described in the first paragraph of this section above.

Unit Specific Safety Plans

Each OSU unit, department, or laboratory to which this plan applies shall develop a specific safety plan which accomplishes the following:

- 1) Identify tasks which could potentially place employees in contact with bloodborne pathogens.
- 2) Prioritize the hazardous tasks according to the potential for exposure to pathogens during the activity. Ranking should be based on the likelihood of infectious agents being present, the specific manipulations that might place workers at risk for transmission (for example, using sharps), and the quantities or concentration of potentially infectious materials being used.
- 3) Develop standard operating procedures (SOPs) for hazardous tasks or activities. SOPs must be written and followed with the goal of minimizing the risk of worker exposure during the performance of the tasks.
- 4) If sharps are used for tasks involving infectious substances, a written sharps injury prevention program must be developed, elements of which must include:
 - restricting the use of needles and other sharp instruments for use only during tasks when there is no acceptable alternative
 - monitoring trends in hazardous activities within the unit
 - documentation of the evaluation and adoption of safety engineered alternatives for traditional sharp instruments and hollow-bore needles; such evaluations must be at least annually
 - training workers in the safe use and disposal of sharps
 - modifying work practices that pose a sharps injury hazard to make them safer
 - promoting sharps safety awareness in the unit
 - establishing procedures for reporting and follow-up of sharps-related injuries
 - evaluating the effectiveness of prevention efforts and providing feedback on performance
- 5) Ensure that all workers are made aware of the specific hazards of the tasks and trained in the standard operating procedures before engaging in hazardous tasks or activities.

It is the responsibility of the unit administrators or directors to ensure that all employees under their direction have a sufficient knowledge base to allow them to safely conduct the activities within their responsibilities. For research activities, it is the principle investigator's responsibility to monitor those individuals under their supervision to ensure strict compliance with laboratory safety procedures; where necessary, the supervisor must take appropriate corrective action in the event of non-compliance. Corrective action might include reprimand, mandated additional training, reassignment to non-hazardous tasks, or dismissal. The action taken would depend on the severity of the infraction, and whether there is a documented pattern of habitual disregard on the part of the employee.

Engineering Controls

Each unit must evaluate and adopt equipment, supplies, or other technology that reduce the potential for exposures. Adoption of safety engineered equipment and supplies by each unit should be commensurate with the risks for exposure for the affected personnel within that unit.

Engineering control measures include the following:

1) **Safety Needles and Related Devices.** Safety products designed to reduce the risk of percutaneous injuries must be used during blood collection or manipulation of blood, tissues or pathogen cultures. If needles must be used, self-sheathing needles or needle-less devices should be used for blood collection or percutaneous injections. If other types of sharps are used, such as scalpels, safer alternatives should be explored. The following are examples of safety-engineered alternatives:

- shielded, self-blunting or retracting needles
- plastic vacuum / specimen tubes resistant to breakage
- retracting lancets
- rounded-tip, retracting or shielded scalpel blades
- disposable scalpels or quick-release scalpel blade handles
- vacuum blood tube devices for safe stopper removal

2) **Plasticware.** Eliminate the use of glass vessels, test tubes, pipets and other laboratory ware as much as possible. Where possible, substitute safer devices into all procedures in place of more hazard-prone ones.

3) **Capillary Tubes.** If capillary tubes are used for micro-hematocrit measurements, then the tubes must be of unbreakable plastic or glass coated with plastic to minimize the risk of broken tubes.

4) **Sharps disposal containers.** Sharps disposal containers must meet the following criteria:

- able to be tightly closed and puncture resistant
- leakproof on sides and bottom
- labeled with biohazard symbol and color-coded (red)
- easily accessible and located in the immediate vicinity of the area where sharp instruments are used

5) **Broken Glass Management.** Broken glassware should never be handled directly. Instead, it should be removed by mechanical means such as tongs, dustpan and broom. Broken glassware not contaminated with infectious materials should be discarded in appropriate hard-sided containers; contaminated broken glassware must be discarded in biohazard sharps containers.

6) **Biological Safety Cabinets.** A properly maintained and certified biological safety cabinet (BSC) must be used for research, teaching or diagnostic procedures involving bloodborne pathogens or potentially infectious materials when there is a likelihood of creating aerosols or droplets. Examples of manipulations that must be done in a BSC include:

- blending, chopping or tissue homogenization
- sonication
- necropsy of infected or potentially infected small animals

- intranasal inoculation of small animals
- opening of pressurized or vacuum vials of infectious materials
- opening of cultures of pathogenic microorganisms

Open flames are not permitted within the BSC because of damage incurred to the filters by flames and disruption of airflow patterns necessary for containment. If inoculating loops need to be used within the BSC, then disposable sterile loops or ceramic loop incinerator devices should be employed.

The BSC must be certified by a qualified technician at least annually. For technician contact information, contact EH&S Biosafety.

7) **Vacuum lines.** Vacuum lines in laboratories covered by this program must be protected with liquid disinfectant traps and high-efficiency particulate air (HEPA) filters or filters of equivalent or superior efficiency. The traps and filters must be checked routinely and maintained or replaced as necessary.

8) **Eye Wash Stations.** In work areas where occupational exposures to blood or other potentially infectious materials is possible, readily accessible eye wash stations must be present.

9) **Handwashing Sinks.** In areas where occupational exposures to blood or other potentially infectious materials is likely, handwashing sinks with hand soap must be available. If handwashing sinks are unfeasible, such as with fieldwork, then alcohol-based hand sanitizers may be used as a temporary measure until a handwashing facility can be used.

10) **Autoclaves.** Autoclaves should be available for decontamination wherever blood or other potentially infectious materials are used in a research or clinical setting. Autoclaves used for decontamination should be tested monthly to verify efficacy using the biological indicator *Geobacillus stearothermophilus*. For information about autoclave testing, or to enroll an autoclave in the testing program, contact EH&S Biosafety. There is no charge to the unit or investigator for testing an autoclave. If the availability of an autoclave is not feasible, such as at a remote facility or outdoor work site, infectious wastes can be placed in plastic bags and transported according to the requirements specified under the Work Practice Controls section of this program.

Work Practice Controls

1) **Standard Operating Procedures.** Administrators of affected units are required to develop standard operating procedures for hazardous tasks. In doing so, input should be solicited from those workers who are potentially exposed during these tasks. Employees are responsible for following departmental standard operating procedures in the conduct of all activities involving potential exposures to bloodborne pathogens. Guidance documents for tasks such as spill cleanup are available on the EH&S website.

2) **Hand-washing.** Frequent hand washing should be practiced whenever the hands become visibly contaminated with material, after the completion of work tasks involving the handling of potentially infectious materials, and after removing gloves. After leaving the work area, hands should be again washed before eating or handling contact lenses. The proper procedure for hand-washing is as follows:

- a. Open faucets to create a stream of running water, preferably warm water.
- b. Wet hands under running water, then use soap. Anti-bacterial soap is preferable.
- c. Lather well beyond the wrists. Work all surfaces thoroughly including the wrists, palms, back of the hands, fingers and under the fingernails. Rub hands together for at least 15-20 seconds.
- d. Rinse thoroughly with clean water. Be sure not to touch the side of the sink.
- e. Dry hands completely. If the sink is not equipped with hands – free faucet, cover the faucet handle with a paper towel when turning off the water to protect your clean hands from pathogens that might be present on the handle. Faucet handles should be routinely disinfected.

3) **General Practices.** Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in all work areas where there is a reasonable possibility of exposure to bloodborne pathogens or other potentially infectious materials. All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering and the production of droplets. No food or drink will be stored in refrigerators, freezers, shelves, cabinets within areas where infectious materials may be present. Garments, gloves or other personal protective equipment shall be removed and replaced immediately or as soon as feasible if they become contaminated with blood or other infectious materials. All personal protective equipment is removed before leaving the work area.

For research, teaching, or diagnostic laboratories handling potentially infectious materials, biosafety level two (BSL-2) practices will be used at all times, as described in the current edition of the publication *Biosafety in Microbiological and Biomedical Laboratories*. A warning sign with the universal biohazard symbol, name and contact information for the laboratory director or other responsible person, and the entrance requirements shall be posted at the door. The door shall remain closed at all times when work is in progress and locked when unoccupied. Complete information about the requirements for BSL-2 can be accessed at <http://ehs.oregonstate.edu> under “Biological Safety.”

4) **Opening of tubes and containers.** Pressurized or vacuum containers should be covered during opening, and when needles are removed from vials. Use of absorbent lab matting or gauze that has been soaked with alcohol or a disposable aerosol capture guard is effective. This method minimizes the possibility of aerosols being created during these manipulations. If the material in the container is infectious, such activities should be done within a biological safety cabinet.

5) **Absorbent Lab Matting.** The use of absorbent lab matting will help reduce splatters on lab benches and other work surfaces, such as within biological safety cabinets. Lab matting should

be changed frequently and whenever obvious spills of potentially infectious materials occur. Lab matting should always be discarded to the biohazard trash, even when not obviously contaminated.

6) **Transport of specimens.** Infectious substances and specimens should be transported within the work area or to other areas using leak-proof containers within a secondary container. Transport containers must be labeled with the universal biohazard symbol and be colored red-orange or predominantly so. Test tubes or other small samples should be transported within a rack placed within a secondary container (such as a modified tackle box or Tupperware container) labeled with a biohazard symbol. Capillary tubes should be transported in a solid-walled secondary container, for example a plastic snap or screw top tube. Transport of tubes, cultures, or other infectious materials to other areas within the work area should make use of trays or other secondary containers.

7) **Designation of work areas.** Certain work areas may be designated as “clean” or “dirty” to help minimize the possibility of inadvertent contamination. Infectious substances should only be opened or handled in “dirty” areas. In laboratories or similar facilities, if more than one biological safety cabinet is available, one may be designated as “dirty” and the others reserved for “clean” activities, at the discretion of the lab supervisor.

8) **Routine Cleaning and Disinfection.** Routine cleaning of work surfaces with disinfectant must be done after completion of each procedure and at the end of each work day, and additionally as necessary when spills occur. Disinfection and cleaning can be accomplished with a variety of agents, including any EPA – registered hard-surface disinfectant on List B or E of the EPA website (<http://www2.epa.gov/pesticide-registration/selected-epa-registered-disinfectants>). When using alcohol, use at 70% and leave in wet contact with surfaces for at least 15 minutes. When using bleach, dilute to 10% (v/v) with water and prepare fresh daily. A 5-minute contact time is sufficient. HIV and other enveloped viruses are inactivated by detergents at concentrations above the critical micelle concentration, so the inclusion of detergents in cleaning protocols should be considered. The presence of blood and other organic material can limit the effectiveness of any disinfectant, requiring higher concentrations and longer contact times to compensate.

Equipment should be checked routinely for contamination and appropriately decontaminated. Equipment which is to leave the work area for repair, calibration or discard must be decontaminated before removal.

Sweeping and mopping of work area floors should be regularly scheduled, and should be done at least once a week, more often if floors become contaminated with infectious materials (see spill cleanup below). Disinfectant such as bleach should be combined with an anionic detergent for mopping floors.

9) **Spill Cleanup.** Immediate decontamination should be done following spills of blood or other potentially infectious materials. Cleanup should involve the following steps:

- a. If broken glass is present, it must be picked up using tongs or other mechanical means; never pick up broken glass by hand, even with gloves on.
- b. Flood the spill with an appropriate disinfectant. Large volume spills of infectious material may be treated with an approximate one tenth volume of undiluted bleach to achieve a final 10% concentration. Smaller spills can be sprayed with disinfectant. Absorb the spill with paper towels or other absorbent materials.
- c. Carefully scrape up the absorbent materials and discard in the biohazard waste.
- d. Clean the area with soap and water.
- e. Decontaminate with an appropriate fresh disinfectant.

10) **Waste generation and disposal.** Sharps containers must be conveniently located near work areas. Contaminated sharps must be discarded immediately into closable, leak-proof, hard-sided containers that are red-orange and labeled with the universal biohazard symbol. Sharps are never recapped after use, nor are needles removed before discard. Sharps containers are removed for disposal before completely full and replaced with an empty container. To dispose of a full sharps container from most campus locations, fill out the on-line [Waste Disposal Request](#).

Infectious solid wastes, other than sharps, are to be collected into red or orange biohazard bags suitable for autoclaving. One or two layers of the biohazard bags used for collection should be placed inside a suitably sized leak-proof secondary container with a fitted lid and labeled with a biohazard symbol. When full but not overflowing, the bags should be tied off and labeled with the generator's name, then rendered non-infectious by autoclaving or incineration. *Never* attempt to manually compact solid infectious wastes.

All solid potentially infectious laboratory wastes (other than sharps) generated in research, teaching or diagnostic labs and animal rooms to which this program applies must be autoclaved before disposal. If the wastes are transported from the laboratory to an autoclaving facility, this must be done while still inside the closed, hard-sided secondary container. The bags should only be removed from the secondary container when they are placed in the autoclave or into a leak-proof tub in preparation for autoclaving. After autoclaving, decontaminated solid waste can be appropriately packaged for disposal as ordinary trash. Generally, this means that autoclaved biohazard bags should be placed within black plastic bags for disposal in trash dumpsters.

Liquid culture wastes of human pathogens must also be autoclaved, after which they may be discarded to the sanitary sewer. Blood and other body fluids may be poured down a drain followed by a water rinse, but this should not be done in a sink used for handwashing. Infectious tissues, human body parts and infected animal carcasses must be disposed of by incineration.

11) **Access.** Door to work areas where contact with blood or other potentially infectious materials is possible should remain closed when work is in progress, and locked when the area is

unoccupied.

Personal Protective Equipment (PPE)

1) **Gloves.** Gloves shall be provided to workers wherever there is a possibility of exposure. It is the supervisor's responsibility to ensure that workers wear gloves in all situations where hand contact with blood or other potentially infectious materials, mucous membranes, or non-intact skin is likely or anticipated. Gloves are required when handling or touching contaminated items or surfaces and for performing vascular access procedures. Gloves must be worn when handling clinical specimens, infected animals, cleaning spills, handling wastes or potentially contaminated equipment.

Gloves are not intended to prevent puncture wounds from needles or other sharps. However, a needle-stick through glove-protected skin is less likely to result in infection due to a "wiping" effect that may remove some infectious material from the external surfaces of the needle. This effect is magnified by increasing the number of layers of gloves, so two or more pair of gloves should be donned for tasks involving the use of needles.

Latex gloves are effective for the routine prevention of skin exposure to infectious materials. For individuals who have hypersensitivity to latex, alternative gloves must be provided. Other gloves, such as chain mail or Kevlar, resist punctures and protect against cuts due to scalpels or other sharp instruments. These should be considered in situations where sharps are used in conjunction with infectious materials. Nitrile gloves are more puncture resistant than latex or vinyl gloves, and are equivalent to latex for dexterity. Heavyweight utility dishwashing gloves should be used over latex gloves for heavy cleaning and instrument decontamination, but should be discarded if they develop leaks.

With the exception of chain mail, Kevlar, or heavyweight utility dishwashing gloves used for heavy cleaning, gloves must *never* be washed or disinfected for re-use. Detergents, alcohol or other disinfectants may compromise the ability of the glove to resist penetration by infectious substances. Gloves should be visibly checked every few minutes when working with infectious materials. They must be changed when visibly contaminated, torn or whenever tasks are completed. All layers of gloves should be removed before handling telephones, doorknobs or "clean" equipment.

Gloves should be removed for discard "inside out" to keep the "dirty" side inward. Hands must be washed with soap and warm water immediately after glove removal, or as soon as possible thereafter.

2) **Protective Clothing.** Lab coats, gowns, aprons, clinical jackets or other protective clothing must be worn in occupational exposure situations. When a potential for splashes or spray exists, solid front fluid-resistant gowns are necessary and other protective clothing must be added: hoods or caps, face protection (mask and protective eyewear or face shield) and disposable shoe covers. Lab coats, gowns or aprons must be removed prior to leaving the work area, and should be laundered on the premises or by a commercial vendor.

Disposable protective garments are an attractive option, and should be substituted in situations where no laundry facilities are available. Alternatively, lab coats may be bagged prior

to removal off-site for laundering.

3) **Eye / face protection.** Masks combined with eye protection devices such as safety glasses with side-splash protection or goggles must be worn in situations where splashes or spray of blood or other potentially infectious materials is anticipated.

Training

Training in task-specific standard operating procedures to minimize exposure is part of the safety plan that each unit is required to develop, and as such is the responsibility of the unit administration and individual supervisors. In addition, general didactic training is also required for all employees who are covered under this program. This training is available through the Environmental Health & Safety office, but may be provided by other qualified individuals. The following topics are covered:

(1) *Bloodborne pathogens.* A brief description of the major bloodborne pathogens, epidemiology, common routes of laboratory-acquired infection, signs of disease and available treatments is covered.

(2) *Standard precautions and controls.* A summary of the universal precautions is provided, along with descriptions of engineering controls, work practice controls and personal protective equipment appropriate for tasks in which exposures may occur.

(3) *Medical management.* The safety and efficacy of the hepatitis B vaccination is discussed, along with the requirement for vaccination or declination. The reporting and management of exposures with follow-up is discussed.

Training must be provided at the time of assignment to hazardous tasks and annually afterwards. Records of site-specific training shall be kept by the supervisor for staff under his/her direction. Records of training provided by EH&S are maintained by EH&S and available to employees, supervisors, and students via ONID login.

Medical Care and Exposure Management

Employees or potential employees in occupations where bloodborne pathogens may be present are encouraged to consult with their private physicians about any concerns they may have regarding the possible impact of their job responsibilities on their health. In particular, employees or potential employees who are apprehensive about receiving the hepatitis B vaccination, or who may have an underlying medical condition that could impact their risk of disease in the event of an exposure are encouraged to discuss these issues with a medical doctor.

1) **Hepatitis B vaccine.** All employees covered under this program shall be offered vaccination for the hepatitis B virus. The vaccine shall be offered within ten days of the time of assignment

to hazardous activities and at no charge to the employee. The vaccine will be administered by the Occupational Medicine, located at the OSU Student Health Services, which will maintain the associated medical records.

Employees who have previously received the hepatitis B vaccine series, or are contraindicated for medical reasons do not need to receive the vaccine. Employees have the option of declining the hepatitis B vaccine, and if they choose to do so they must sign a declination form, which will be maintained in the records. A copy of the blank declination form is attached as appendix A of this document. The hepatitis B vaccine shall be made available to anyone covered by this plan that initially decline the vaccine, but at a later date decide to accept the vaccination.

2) Post-Exposure Evaluation. Immediate action and subsequent follow-up documentation are required if an OSU employee is occupationally exposed; this means any eye, mouth, mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from work duties.

Immediate action:

- The exposed person should immediately wash the needlestick or cut with soap and water.
- If exposure is by splashes of infectious materials to the nose, mouth, or eyes, the affected area should be flushed extensively with water, saline or sterile irrigating solution.
- Medical attention should be sought as soon as possible.
- If exposure to infectious materials occurs during normal working hours, medical attention should be provided by any available facility, such as an urgent care clinic or occupational medicine clinic. If exposure occurs at other times, attention should be sought at the nearest hospital emergency room or after-hours clinic.

Follow-up:

- All exposures should be reported to the supervisor or laboratory principle investigator, who must document them.
- A Report of Accident/Illness must be filed with OSU Human Resources office.
- A Report of Accident form must be completed, and a copy of this should, if reasonably possible, be sent with the exposed individual to the attending physician.
- If the exposure involved a sharps injury, then also complete the Sharps Injury Log and forward to the OSU Biological Safety Officer. The form is available on the EH&S website.
- When an exposure occurs, the principle investigator or supervisor should report the exposure to the OSU Biological Safety Officer in Environmental Health & Safety. The BSO will complete an incident report which should contain as much of the following information as possible:
 - a. a description of the exposed person's duties as they relate to the exposure incident,
 - b. the route of exposure and detailed circumstances of the exposure,

- c. the infectious, or potentially infectious material to which the employee was exposed; blood, culture fluid, etc.
 - d. the hepatitis B vaccination status of the exposed individual
- The exposed employee will be offered follow-up medical attention provided by their personal physician or an attending physician, including:
 - a. a confidential medical evaluation.
 - b. baseline blood collection and HIV serologic testing. If the exposed employee initially consents to the blood collection but declines HIV testing, the sample shall be preserved for at least 90 days. The employee may elect to have the baseline sample tested within the 90 day period of preservation.
 - c. post-exposure prophylaxis with anti-retroviral drugs, when medically indicated, and following the current recommendations of the Centers for Disease Control and Prevention.
 - d. medical counseling.
 - e. medical evaluation of subsequent reported illnesses resulting from the exposure.

If the exposure was to blood and the presence of bloodborne pathogens in the source blood is unknown, reasonable efforts will be made to obtain consent from the source individual for testing to determine whether hepatitis B virus and HIV were present in the blood. The results of such testing will be made available to the exposed employee. If consent from the source individual is not obtained, a follow-up to the incident report should document that fact and ongoing medical monitoring of the exposed employee should be offered for a sufficient time to establish whether the exposed individual has become infected, as determined by the attending physician.

The physician conducting the post-exposure evaluation and follow-up will be provided with a copy of the exposure incident report, the results of the source individual's blood testing, if available, and all medical records relevant to the appropriate treatment of the employee (subject to consent for release by the employee). Within fifteen days of the completion of the post-exposure evaluation, the healthcare professional will prepare a written opinion limited to the information that the employee has (1) been informed of the results of the evaluation, and (2) been told about any medical conditions resulting from the exposure to the infectious materials which would require further evaluation or treatment. All other medical information shall remain confidential and will not be included in the written opinion. The medical professional's written opinion will be made available to the principle investigator, the exposed individual and a copy will be attached to the incident report and filed with the Biological Safety Officer.

Appendix A: Declination Form for Hepatitis B Virus Vaccine

Print and copy the following page; have employees who decline the vaccine sign and date the form which must be retained in the records of the principal investigator or other supervisor.



Hepatitis B Vaccination Declination Form

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 B 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.

Printed Name _____
 First Middle Initial Last

Signature _____

OSU ID Number _____ - _____ - _____

Date ____/____/_____