University of Colorado Boulder

Bloodborne Pathogen Program

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1. Purpose

This document contains the Bloodborne Pathogen Program for the University of Colorado Boulder (CU Boulder). This program was developed and written by the Environmental Health & Safety Department (EHS) and is considered the campus standard for protecting faculty, staff, and students from exposure to bloodborne pathogens. University of Colorado Boulder's Environmental Health and Safety (EHS) has developed this program to provide a safe and healthy work environment by striving to minimize or eliminate occupational exposure to bloodborne pathogens. The Occupational Health and Safety Administration (OSHA) oversees the Bloodborne Pathogens Standard (29 CFR 1910.1030). Its purpose is to promote safe work practices and to ensure that all workers are protected from exposure to bloodborne pathogens and requires employers to minimize the risk of exposure to bloodborne pathogens that are found in blood and other potentially infectious materials.

CU Boulder is a NIH funded institution and follows OSHA standards as best practice. Individual departments may choose to create a department or college-specific Bloodborne Pathogen Program to help address specific hazards. If an individualized program is developed, this EHS program should be used as a guide and outline of minimum requirements. EHS can be used as a resource for guidance and training.

2. Definitions

Bloodborne pathogens (BBP): pathogenic microorganisms present in human blood, capable of causing disease in humans. These pathogens include, but are not limited to:

- Hepatitis B virus (HBV),
- Human immunodeficiency virus (HIV),
- Hepatitis C virus (HCV)

Engineering controls: controls that protect workers by removing hazardous conditions or by placing a barrier between the worker and the hazard.

Exposure control plan (ECP): written document that details BBR risks for specific job duties and how those risks will be mitigated.

Occupational Exposure: reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Other potentially infectious materials (OPIM): materials that may harbor bloodborne pathogens including:

- Human bodily fluids, as defined by OSHA
- Human tissues, organs, cells, or cell lines
- Extracted human teeth and saliva in dental procedures
- Cultures of bloodborne pathogens
- Blood or tissue from experimentally infected or humanized animals.

Universal Precautions: an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

3. Scope and Applicability

The purpose of this Bloodborne Pathogen Program is to establish the minimum requirements at CU Boulder for the appropriate training, methods and procedures to minimize the potential for occupational exposures to BBP and OPIM. This program applies to all CU Boulder research activities involving biological agents and any faculty, staff or students, with the potential for occupational exposure to bloodborne pathogens or other potentially infectious materials. Established cultured human cell lines are also included as potential bloodborne pathogens, whether characterized to be free of contamination or not.

4. Exposure Risk Determination

Employee job duties must be evaluated and documented. Specific work processes that may lead to occupational exposure to bloodborne pathogens must be identified. Occupational exposure means any reasonably anticipated eye, skin, mucous membrane, or parenteral contact (i.e., needlestick) with blood or other potentially infectious materials. Examples would be a lab technician who processes blood samples or an EHS employee that cleans up blood on a sidewalk.

Job classifications where all have occupational exposure:

CU Boulder has determined that <u>all</u> researchers working directly with human materials and personnel working in laboratories using human source materials have occupational exposure risks and must comply with this program

Job classifications where some may have exposure:

Additionally, job classifications in which <u>some</u> workers may have a potential for occupational exposure include:

- Anyone working in a biological research lab. Many of CU Boulder's laboratories are shared spaces. Though one lab in the space may not work directly with human materials or OPIM, the other lab may and therefore there may be an exposure risk. Based on this potential for exposure, anyone working in a biological research lab must comply with this program.

- Anyone who is likely to encounter or is responsible for cleaning up blood or bodily fluids is at risk for exposure to BBP and must comply with this program.

The employer must prepare a written list of tasks and procedures performed by workers that could result in an exposure and outline work methods, control strategies, PPE or engineering controls to minimize potential for exposure. EHS has a template for this (Appendix B).

5. Roles and Responsibilities

Environmental Health and Safety (EHS**)**:

- Provide annual training on BBP (BioRaft/SciShield or in-person).
- Provides oversight for the BBP Program
- Provide exposure determination criteria for BBP for specific job categories or classifications.
- Conduct an annual assessment of the BBP Program and update plan upon regulatory changes or as necessary.

Principal Investigator/ Supervisor:

- Develop an effective written site-specific Exposure Control Plan (see template in Appendix B).
- Identify processes which may result in exposure and communicate risks to employees
- Ensure that engineering controls, such as biological safety cabinets or sharps containers are available.
- Identify and ensure the use of work practice controls.
- Reduce potential risk by providing personal protective equipment (PPE).
- Provide HBV vaccinations at no cost to the employee.
- Ensure that training has been completed.
- Provide hands-on, job specific training.
- Develop safe work practices and procedures, as well as internal notification procedures to report.
- Post University Risk Management's Worker Compensation information in the laboratory or a workspace (https://www.cu.edu/risk/file-claim).

Employee:

- Complete annual BBP training.
- Always use universal precautions (treat biological materials as if known to be infectious).
- Adhere to job specific Exposure Control Plan.
- Use appropriate engineering controls and wear appropriate PPE.
- Communicate HBV vaccine status to employer.
- Report incidents and near misses to both Supervisor and University Risk Management.

6. Exposure Control

a. Research and Laboratory Operations

The following sections outline the requirements for all faculty, staff and students working in laboratory and research operations which have been identified as having the potential for exposure to BBP. Anyone who meets these requirements must adhere to this program, complete annual training and always use universal precautions. Standard microbiological laboratory safety practices such as frequent glove changing and hand washing, restricting sharps handling and establishing safe procedures for disposal, work area restrictions including limited access, specimen handling and transit, posting and labeling, and frequent decontamination must be followed to prevent exposure.

Engineering controls: Biological safety cabinets (BSCs), mechanical pipettes, self-sheathing needles, enclosed containers, safety centrifuge cups, and other engineered solutions designed to minimize exposure to biological agents. BSCs are the most important safety equipment for protection of personnel in the laboratory environment, and most will also provide product protection. Workers must be trained on the proper use of such equipment and the equipment must be regularly inspected and maintained. See the CU Boulder Biosafety Manual for more information.

No eating or drinking: Eating, drinking, smoking, and applying cosmetics or lip balm, and handling contact lenses are not permitted in work areas. Food and drink are not to be carried through, placed, or stored in areas (refrigerators, microwaves, etc.) where potential BBP are kept or may be present.

Needles, sharps, and broken glass: Used needles and other sharps are not to be sheared, bent, broken, recapped, or re-sheathed by hand. Used needles are not to be removed from disposable syringes. Disposable sharps must not be reused. **All needles, contaminated or not**, **must be disposed of in a puncture-resistant hard sided, labeled sharps container**. Any broken glassware must not be directly handled with a gloved or bare hand. Use a mechanical tool (tongs, dustpan, and broom) to collect the pieces. Contaminated broken glass must be placed in a puncture-resistant hard sided container and disposed of as biohazardous waste. Uncontaminated (disinfected) broken glass can be put in a puncture-resistant hard sided container, labeled ‘broken glass’ and placed in the municipal trash.

Minimization of aerosols: All procedures must be performed carefully to minimize the creation of aerosols. Biological safety cabinets or other physical containment devices must be used whenever possible while performing operations capable of creating aerosols, including but not limited to:

- centrifugation
- blending
- homogenization
- opening pressurized containers, including vacuum sealed test tubes
- If a biological safety cabinet cannot be used, the most effective means of minimizing exposure to aerosols is to contain them by using closed containers (centrifuge tubes,

sealed centrifuge rotors, capped test tubes, etc.). The CU Boulder IBC may specify additional requirements.

Disinfection of work area and spill cleanups: Blood and blood products shall be handled in an area that can be readily decontaminated. The work area must be disinfected before and after handling blood. Non-laboratory personnel should not handle equipment that has been used with potential BBPs until it has been decontaminated. All spills must be cleaned up immediately and disinfected with a germicide by appropriate decontamination procedures determined by the laboratory supervisor. The laboratory supervisor or other laboratory personnel must immediately report laboratory accidents.

Labeling: CU Boulder additionally requires that laboratories post a Biohazard Lab entry sign on their lab doors when Risk Group 2 agents (including human blood and cell lines) are stored and used in the space. All human tissue, body fluid, or other potentially infectious materials must be stored in a container labeled with a biohazard symbol. Refrigerators, freezers, incubators, or other pieces of equipment where potentially infectious materials are stored or handled must also be labeled with the biohazard symbols. Biohazard stickers are available at EHS. All potentially contaminated equipment and areas must be labeled with the Universal Biohazard Symbol.

Limited Access: Access to a laboratory is limited or restricted by the laboratory supervisor. When work with blood or blood products is being performed, non-laboratory personnel (maintenance, administrative personnel) and non-CU Boulder personnel should be discouraged from entering. If they must enter a facility, the hazards of the work being performed must be fully explained. Custodians and Facilities Management personnel may be unfamiliar with the potential hazards present in the laboratory and must be fully instructed and carefully supervised by the laboratory supervisor when working in areas where human blood and blood products are handled. Areas where maintenance work is to be performed must be evaluated and decontaminated as necessary prior to starting the work.

Transportation on Campus: Specimens of blood or other potentially infectious materials shall be placed in a primary container that prevents leakage (capped test tube, centrifuge tube, etc.) during collection, handling, and storage. If specimens are transported through hallways, the primary containers must be placed in a secondary container with absorbent material that is leak proof, shatterproof, and gasket sealed. Additional information is available in the CU Boulder Biosafety Manual.

Shipping of Samples: Specimens of blood or other potentially infectious materials that will be shipped to or from CU Boulder must be clearly identified as human/NHP blood or blood products. The material shall be placed in a sealed primary container, a leak proof secondary container, and proper outer packaging that comply with the current DOT/IATA shipping regulations.

Personnel involved with shipping of biohazardous agents or potential BBPs must have documented training prior to shipping. Contact EHS for more detailed guidelines and training on shipping samples or specimens.

Biological Waste Disposal: Disposal of potentially hazardous biological materials shall be performed with appropriate consideration for the personnel involved in the handling of laboratory waste, as well as the requirements of the Colorado Department of Public Health and Environment. The following types of waste are identified and defined as infectious or physically dangerous medical or biological waste, and are subject to the requirements of 6 CCR 1007-2 (section 13):

- Blood and blood products:
- Human anatomical parts, organs, tissues and body fluids
- Human or animal specimens or infectious cultures,
- Contaminated animal carcasses, body parts and bedding
- Sharps, including hypodermic needles and syringes, Pasteur pipettes, broken medical glassware, scalpel blades, disposable razors, and suture
- Cultures and stocks of infectious agents
- Wastes from the production of bacteria, viruses, or the use of spores, discarded live and attenuated vaccines, and culture dishes and devices used to transfer, inoculate, and mix cultures

Regulated waste is placed in containers which are closable, constructed to contain all contents and prevent leakage, appropriately labeled with a hazardous waste label, and closed/locked prior to removal to prevent spillage or protrusion of contents during handling.

The procedure for handling sharps disposal containers, other regulated waste, biological waste is outlined in the Biological Laboratory Waste Management – Disposal Policy and Procedure found at the CU Boulder EHS website.

b. Facilities Operations

Various staff members on campus have the potential to encounter bodily fluids which may present a BBP exposure risk. Employees who are responsible for cleaning up blood spills or other bodily fluids must adhere to this program, complete annual training and always use universal precautions. Always gather information on incident before going to the site (spill size, other materials involved, sharps present, broken glass, etc.) to ensure appropriate equipment, supplies, and PPE are taken. Assess the scene before entering and bring caution tape and/or cones to prevent others from entering the scene.

Never pick up broken glass by hand. Use tongs, forceps, or broom and dustpan.

Follow EHS Guidelines on Blood Spill Cleanup.

Sharps Containers in Restrooms on Campus: Departments/Facilities that provide sharps containers in restrooms on campus must set up disposal by commercial vendors. EHS can

provide a list of local vendors that are permitted to dispose of sharps containers. Contact ehsbio@colorado.edu.

c. Personal Protective Equipment (PPE)

All bloodborne pathogens are presumed to be infectious and appropriate PPE, such as gloves, safety eyewear, and lab coats must be worn when handling blood or other potentially infectious materials as outlined in the OSHA Bloodborne Pathogen Standard. All PPE must be used, maintained, and disposed of as specified in the CU Boulder Biosafety Manual and Standard Operating Procedures (SOPs).

Gloves

Must be worn when it is anticipated that there may be hand contact with blood or potentially infectious materials and/or when touching potentially contaminated surfaces. Wash hands immediately or as soon as feasible after removal of gloves or other PPE. Soap and water are always preferable.

Eye protection

Eye protection such as safety glasses with side shields, face shields, or goggles must be used whenever there is potential for splash, spray, splatter of potentially infectious material into eyes, nose, or mouth.

Body protection

Lab coats, gowns, aprons, and other protective garments may be required based upon the task and the degree of exposure anticipated.

Masks

Masks must be used whenever there is potential for splash, spray, or splatter of potentially infectious material into the nose or mouth.

Additional protective equipment, including particle respirators may be required based on the department/lab-specific exposure determination.

d. Vaccination for Hep B

Under the OSHA Bloodborne Pathogen Standard, the hepatitis B vaccine must be offered to all employees at risk within 10 days of starting their work assignment.

Employees must be informed of the vaccine's benefits and risks, and if they choose not to receive it, they should sign a declination form (Appendix A). An employee who declines the vaccine may at any time choose to have the vaccine if their job tasks or work setting continue to have the risk of potential exposure to bloodborne pathogens.

e. Post-exposure Procedures

Any CU employee exposed or potentially exposed to an infectious agent should seek guidance from a Designated Medical Provider (DMP) as soon as possible. Additionally, they should report this incident to their supervisor and to University Risk Management (URM) by filing an injury claim on the URM website.

Any CU Boulder employee who has an incident involving potential exposure to an infectious agent is offered ***immediate*** access to a medical evaluation from the CU Boulder Worker's Compensation Designated Medical Providers or the Boulder Community Foothills Hospital Emergency Department as efficacy of post-exposure medication for HIV may be less effective if the initiation of treatment is delayed. There is currently a memorandum of understanding (MOU) in place with the Emergency Department of Foothills Hospital in Boulder for evaluation and treatment of HIV exposures. It is recommended that evaluation and treatment start no later than 72 hours after exposure has occurred. Hepatitis B vaccines may also be given after an exposure.

Incidents that occur in laboratories at University of Colorado Boulder that result in an exposure to any biohazardous agent must be reported to EHS. The Biosafety Officer shall inform the Institutional Biosafety Committee (IBC) of the incident.

7. Training and Recordkeeping

a. Training

Any staff member or group of employees identified as having potential for exposure to bloodborne pathogens or other potentially infectious materials must comply with this program and complete annual BBP training. Supervisors are responsible for ensuring employees participate in the training program provided by EHS at no cost to the employee during working hours. Training must be given upon initial assignment, and on an annual basis thereafter, or whenever modification of an existing job description may affect the employee's potential for occupational exposure. All facilities operations staff members are provided BBP training as part of the Annual Core Training Program.

Supervisors must ensure that their employees demonstrate proficiency in standard microbiological safety procedures prior to being allowed to work in the laboratory with human-derived materials.

Training must include a comprehensive discussion of the OSHA standard, including epidemiology, symptoms and transmission of bloodborne diseases; the Exposure Control Plan; the uses, limitations of, and procedures for using Personal Protective Equipment (PPE); a discussion of the HBV vaccination (including the benefits of vaccination and efficacy of the vaccine in preventing disease); emergency procedures involving blood exposure or contamination and post-exposure follow- up procedures; hazard communication; and a question-and-answer discussion opportunity.

b. Recordkeeping

Supervisors must keep records of all in-person training that is provided for their employees. Records of BBP or Core training is provided and tracked by EHS. Supervisors or a department designee should keep HepB vaccine declination forms for the duration of the employee's employment plus 30 years (per OSHA).

c. Medical Records

Records of immunization will be maintained by the health care provider for the duration of the employment plus 30 years. University Risk Management will maintain records of reported exposure. These records must be provided to the employee or the employee's authorized representative upon written request.

8. References

https://www.osha.gov/bloodborne-pathogens/standards

https://www.colorado.edu/ehs/sites/default/files/attached-files/biosafety_manual_university_of_colorado_boulder.pdf

https://www.colorado.edu/ehs/resources/biological-laboratory-waste-management-disposal-policy-procedure

https://www.colorado.edu/ehs/sites/default/files/attached-files/cu_ehs_guidance_document_-_broken_glass_and_pipette_disposal.pdf

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Appendix A:

Hepatitis B Vaccine Letter of Declination

I understand that due to my occupational exposure to human blood, bodily fluids or other

potentially infectious materials, I may be at risk of exposure to the Hepatitis B virus (HBV) and, consequently, to Hepatitis B infection.

I have been offered the HBV vaccine, at no charge to me, but I decline to receive the vaccine at this time.

I understand that by declining this vaccine, I continue to be at risk of exposure to and infection with HBV.

While I continue to have occupational exposure to human blood, bodily fluids, or other potentially infectious materials, I have the option to request and receive the HBV vaccination series at any time.

_____ _____

Employee Name (printed) Employee ID

_____ _____

Employee Signature (electronic accepted) Date

Appendix B:

BBP Exposure Control Plan Template

1. **Purpose**
   University of Colorado Boulder's Environmental Health and Safety (EHS) has developed this Exposure Control Plan (ECP) template to help research laboratories and departments outline their assessments of bloodborne pathogen risks to their employees. Its goal is to provide a safe and healthy work environment by striving to minimize or eliminate occupational exposure to bloodborne pathogens.

2. **Roles and Responsibilities**
   a. **Supervisor / Principal Investigator**
      i. The supervisor / principal investigator is responsible for identifying employees who need to be in the BBP program and has ultimate responsibility for ensuring that safety rules and requirements of the BBP Program are followed. They must complete the written ECP and train employees on it. They must provide hands-on site-specific training and ensure annual EHS BBP training is completed. They must also provide HBV vaccinations and personal protective equipment at no cost to the employee.

   b. **Employee**
      i. The employee is responsible for following this site-specific ECP. All practices must be adhered to, including wearing required PPE. The employee is responsible to ask questions if needed and to make suggestions to the PI/supervisor for safer work practices and procedures.

   c. **Environmental Health & Safety (EHS)**
      i. EHS provides oversight for the BBP Program and can assist with exposure determination. EHS also provides annual training on SciShield or in-person.

3. **Exposure Determination:**

Supervisor / Principal Investigator:
Date of Preparation:
Dates of Review / Revision:

Designated employees that may come into contact with human/primate blood or other potentially infectious materials (OPIM):

Job Classifications / Titles:

Job Classifications / Titles:
(e.g.) Research Assistant, Custodian, EHS Emergency Responder

Tasks/Procedures with exposure potential:

Job Classification:	Task / Procedure:
e.g. Research Assistant	e.g. Handling, transporting, or disposing of blood, blood products, human cell lines, or tissue samples.

4. Compliance Methods:

Universal precautions will be observed at our laboratory/facility to prevent contact with blood or OPIM. All blood or OPIM will be considered infectious regardless of the perceived status of the source individual.

Engineering and Work Practice Controls:

Engineering and work practice controls will be utilized to eliminate or minimize exposure to employees at this facility. Where occupational exposure remains after institution of these controls, personal protective equipment shall also be utilized. The following engineering controls will be utilized:

Task / Procedure:	Engineering Controls
e.g. Handling blood	e.g. Biosafety Cabinet

The following work practice controls will be utilized:

Work Practice Controls:
Hand hygiene requirements
Sharps safety
Transporting and shipping biohazardous materials
Cleaning schedules

Personal Protective Equipment:

All bloodborne pathogens are presumed to be infectious and appropriate PPE, such as gloves, safety eyewear, and lab coats must be worn when handling blood or other potentially infectious materials as outlined in the OSHA Bloodborne Pathogen Standard. All PPE must be used, maintained, and disposed appropriately. To be effective, PPE must prevent blood or OPIM from soaking through to the user's clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membrane under normal conditions of use and for the duration of time for which the PPE will be used.

Task / Procedure:	Personal Protective Equipment
e.g. handling blood	e.g. lab coat, gloves, safety goggles

Housekeeping:

Employees must decontaminate working surfaces and equipment with an appropriate disinfectant after completing procedures involving blood or OPIM. All equipment, environmental surfaces and work surfaces shall be decontaminated immediately or as soon as feasible after contamination.

Area/Surface/Equipment:	Approved Disinfectant:
e.g. lab bench	e.g. 10% bleach solution

Disposal of Contaminated Items:

Contaminated Item:	Decontamination/Disposal Method:
e.g. used containers from blood collection	e.g. autoclave and picked up by EHS

Labels and Signs:

Biohazard labels are the most obvious warnings of possible exposure to bloodborne pathogens. Warning labels must be affixed to containers of biohazardous waste, refrigerators and freezers containing blood or OPIM, and other containers used to store, transport, mail, or ship blood or OPIM. CU Boulder additionally requires that laboratories post a Biohazard Lab entry sign on their lab doors when Risk Group 2 agents (including human blood and cell lines) are stored and used in the space. Some biohazard labels are available at EHS.

5. Hepatitis B Vaccination

All employees who have potential exposure to blood or other potentially infectious materials will be offered the Hepatitis B vaccine, at no cost to the employee. The vaccine should be offered within 10 working days of their initial assignment to work involving the potential for occupational exposure to blood or other potentially infectious materials. If an employee chooses not to get the vaccine, a declination can be signed (Appendix A of BBP Program).

Name	Date offered vaccine	Vaccine dates:	Declination date:
name	date	dates	date

6. Training:

All employees identified as having potential for exposure to bloodborne pathogens or other potentially infectious materials must comply with the BBP program and complete annual BBP training. Supervisors are responsible for ensuring employees participate in the training program provided by EHS during working hours. Training on the ECP must be given by the supervisor upon initial assignment, and on an annual basis thereafter, or whenever modification of an existing job description may affect the employee's potential for occupational exposure. The employee must be given the opportunity to ask questions.

Name	EHS Provided Training (annual)	Job Specific Training (annual)	Trainer
name	date	date	name

7. Post-Exposure Plan:

Any CU employee exposed or potentially exposed to an infectious agent should seek guidance from a Designated Medical Provider (DMP) as soon as possible. Additionally, they should report this incident to their supervisor and to University Risk Management (URM) by filing an injury claim on the URM website: https://www.cu.edu/risk.

Incidents that occur in laboratories at University of Colorado Boulder that result in an exposure to any biohazardous agent must be reported to EHS.