Environmental Health & Safety
UNIVERSITY OF COLORADO **BOULDER**

Bloodborne Pathogen Exposure Control Plan

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1. Purpose

University of Colorado Boulder's Environmental Health and Safety (EHS) has developed this Exposure Control Plan (ECP) 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 blood borne 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.

2. Definitions

Definition of Blood Borne Pathogens (BBP)

Bloodborne pathogens are 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) and

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

- 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.

3. Scope and Applicability

This ECP applies to all CU Boulder research activities involving biological agents. All faculty, staff, students, and visitors who work at CU Boulder or at CU Boulder facilities are included in the scope of this manual.

This Exposure Control Plan also applies to all CU personnel with occupational exposure to human materials, including body fluids or tissues, or other potentially infectious materials as defined by OSHA. Established cultured human cell lines are also included as potential blood borne pathogens, whether characterized to be free of contamination or not. Occupational Exposure is any reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of the employee's duties. For additional information on other blood borne pathogens, employees should consult their Principal Investigator (PI), Supervisor, or the EHS Biosafety Officer.

Additional requirements and training beyond this program may be required by the Institutional Biosafety Committee (IBC).

4. Authority and Responsibilities

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

- Provide annual training on BBP (BioRaft/SciShield or in-person).
- Provides oversight for the BBP Exposure Control Plan (ECP).
- Provide exposure determination criteria for BBP for specific job categories or classifications.
- Conduct an annual assessment of the ECP and update plan upon regulatory changes or as necessary.
- Provide Hepatitis B titers and vaccinations as determined appropriate by an Occupational Medicine Provider.

Principal Investigator/ Supervisor:

The PI and Employee supervisor must conduct an Exposure Determination to identify employees under his or her supervision who may be at risk. Upon identifying these employees, the supervisor must:

- Reduce potential risk by providing personal protective equipment (PPE) and clothing.
- Provide HBV vaccinations at no cost to the employee (available through the EHS Occupational Health Program).
- Ensure that training has been completed.
- Provide hands-on training
- Develop an effective written hazard communication.
- Ensure that engineering controls, such as biological safety cabinets or sharps containers are available.
- Develop safe work practices and procedures, as well as internal notification procedures to report.
- Post Worker's Compensation information in the laboratory or a workspace (https://www.cu.edu/risk/file-claim).

5. Program Elements

a. Exposure Risk Determination

Jobs within the work environment must be evaluated, and specific work tasks and procedures that may lead to occupational exposure to blood borne pathogens must be listed. Occupational exposure means any reasonably anticipated eye, skin, mucous membrane, or parenteral contact (i.e., needlestick) with blood or other potentially infectious materials. An example would be a lab technician who processes blood samples or other potentially infectious materials.

Job classifications where all have occupational exposure:

CU Boulder has determined that all researchers working directly with human materials/participants and personnel working in laboratories using human source materials have occupational exposure risks.

Job classifications where some may have exposure:

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

- Anyone working in a biological research lab setting including shared laboratory spaces. BBP may be used by other laboratories in the spaces and it is difficult to ensure they are using best practices.

- Anyone who cleans up blood or bodily fluids is at risk for exposure to BBP.

b. Engineering Controls and Work Practices

Standard microbiological 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. All potentially contaminated equipment and areas must be labeled with the Universal Biohazard Symbol.

Engineering controls include biological safety cabinets, mechanical pipettes, self- sheathing needles, enclosed containers, safety centrifuge cups, and other engineered solutions designed to minimize exposure to biological agents.

Biological safety cabinets 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.

Other Work Practices

Mouth pipetting: Mouth pipetting is prohibited.

No eating, 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 microorganisms. Non-laboratory personnel should not handle equipment that has been used with potential BBP's 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 symbol. All signs are available from EHS.

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

Specific procedures for the disposal of biological materials are available from EHS and can also be found in the CU Boulder Biosafety Manual. The IBC may specify additional requirements.

c. Housekeeping

Bench tops, counters and all other equipment used to work with blood and OPIM must be disinfected at the end of each workday, when work surfaces are contaminated, or after a spill. The CU Boulder Biosafety Manual provides additional guidance on these topics.

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 Resources section:

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

d. Personal Protective Equipment (PPE)

All blood borne 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 laboratory-specific Standard Operating Procedures (SOPs).

Gloves

Must be worn when it is anticipated that there may be hand contact with blood, potentially infectious materials, non-intact skin 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 devises 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.

e. 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 his or her job tasks or work setting continue to have the risk of potential exposure to bloodborne pathogens.

EHS Occupational Health will cover the cost of Hep B titers/vaccines if deemed necessary by the Occupational Medicine Provider. Contact ehsohs@colorado.edu for vaccine and risk assessment requests.

f. Post-exposure Procedures

Any person present in a CU laboratory 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. Incidents that occur at the University of Colorado Boulder that result in an exposure to any Risk Group 2 agent must be reported to the University Biosafety group. The Biosafety Officer shall inform the IBC of the incident and provide a copy of the report for review.

6. Training and Recordkeeping

a. Training

Each Principal Investigator or supervisor must ensure that they and all their employees with the potential for occupational exposure participate in a 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.

HIV/HBV/HCV research laboratories must ensure that their employees demonstrate proficiency in standard microbiological procedures prior to being allowed to work in the laboratory.

Training must include a comprehensive discussion of this 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

Records must be kept for all employee training sessions. Records of BBP training provided by EHS will be maintained and kept for 3 years from the date of the training in BioRaft/SciShield. Records must be kept of all employee exposures to infectious or potentially infectious materials while on the job.

c. Medical Records

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

7. 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

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