California Institute of Technology

Bloodborne Pathogens Exposure Control Plan

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CHAPTER I: INTRODUCTION

The **California Institute of Technology (Caltech)** is committed to conducting work activities in a manner that promotes the safety and health of faculty, staff, students, and visitors and complies with all applicable occupational health and safety regulations. The following Exposure Control Plan (ECP) is provided to eliminate or minimize occupational exposure to Bloodborne Pathogens in accordance with OSHA Standard 29 CFR 1910.1030. The California Code of Regulations, Title 8, Section 5139, Bloodborne Pathogen Standard applies to all Caltech personnel who have occupational exposures to blood or other potentially infectious material. Because research activities in Caltech laboratories, as well as activities supporting the research effort and student life, may expose Caltech employees to microorganisms which cause disease to humans, this plan is designed to eliminate or reduce occupational exposures. This plan sets forth procedures, control measures, and equipment designed to eliminate or minimize risk from exposure to the Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Human Immunodeficiency Virus (HIV), and other Bloodborne Pathogens.

The ECP is a key document to assist Caltech members in implementing and ensuring compliance with the Standard. This ECP includes:

- Program administration
- Determination of exposure
- Implementation of various methods of exposure control, including:
    - Universal precautions
    - Engineering and workplace controls
    - Personal Protective Equipment
    - Housekeeping
- Hepatitis B vaccination program
- Post-exposure management
- Communication of hazards and training
- Record keeping

CHAPTER II: PROGRAM ADMINISTRATION

The Caltech Environment, Health, and Safety (EHS) Office and the Institute Biosafety Officer (BSO) are responsible for implementation of the ECP. The Caltech EHS Office and BSO will maintain, review, and update the ECP at least annually, and whenever necessary to include new or modified tasks and procedures. Contact Info: safety@caltech.edu; 626-395-6727 (x6727).

Those employees who have occupational exposure to blood or other potential infectious materials (OPIM) must comply with the procedures and work practices outlined in the ECP.

Each Caltech Division, Department and Laboratory will provide and maintain all necessary personal protective equipment (PPE), engineering controls (e.g. sharps containers, annually certified Biosafety Cabinet), labels and biohazardous waste containers as required by the Standard. Caltech Divisions, Departments and Laboratories will ensure adequate supplies of the aforementioned equipment are readily available in the appropriate size. Contact your direct Supervisor for more information.

The EHS Office and BSO will be responsible for training, documentation of training, and making the written ECP available to Caltech personnel as well as OSHA and NIOSH representatives. Contact info: safety@caltech.edu; 626-395-6727 (x6727).

CHAPTER III: EXPOSURE DETERMINATION

Caltech is an academic institution focusing on research and education for chemical, engineering, and biological science. Therefore, there is not at Caltech a specific job classification in which all employees have occupational exposure to BBP. For exposure determination, employees are sorted in two main categories: employees engaged in research activity in research laboratory settings, such as professors, research technicians, post-doctoral fellows, or PhD candidates; and employees involved in the support of research activities and student life who will have sporadic access to laboratory settings, such as custodial staff; and security staff or Student Health & Counseling Center staff, who might provide first-aid and/or medical care to Caltech personnel.

For all groups, exposure determination is made by performing distinct risk assessments by EHS safety engineers or by the BSO.

A. EXPOSURE DETERMINATION FOR RESEARCH GROUPS

Exposure determination and risk assessment for employees within research groups is performed in part by the Institutional Biosafety Committee (IBC). The IBC, with the support of the Institute Biosafety Officer (BSO), reviews and approves research activities involving the use of human blood and other potential infectious materials – as defined by OSHA. All employees registered on an IBC protocol using these materials are then considered at risk for potential exposure to Bloodborne Pathogens.

The following are examples of job classifications and activities and/or procedures that will qualify the employee for the potential of occupational exposure.

Please note that as research activities and procedures are always evolving, this list is not exhaustive and the IBC does on-going assessment to keep abreast with the exposure risks for employees in the laboratories (http://ibc.caltech.edu/).

Job Title	Tasks/Procedures (Examples)
Professor	Work with infectious HIV
Research Technician	Extract immune cells from human blood
Post-doctoral Fellow	Culture human cells
Graduate Student	Extract DNA from human tissues

B. EXPOSURE DETERMINATION FOR SUPPORT GROUPS

Exposure determination and risk assessment for employees in support groups is performed by their Supervisor or by the department head, with the assistance of EHS safety engineers and/or the BSO.

The following is a list of job classifications in which some employees have a potential for occupational exposure. Included is a list of tasks and procedures in which occupational exposure may occur for these individuals.

Job Title	Department	Task/Procedures
Nurses and other medical personnel	Caltech Student Health & Counseling Center	Primary medical care for Caltech Students
Athletic trainers	Athletic Center	Provide first-aid and routine treatment of athletic wounds
First Responders	Facility – Security	Provide first-aid and coordinate emergency response on campus
	GPS – Field Study	Provide first-aid in the field
Blood clean-up technicians	Facility – Campus Custodians	Clean-up emergency scene when blood is present on campus
Blood clean-up technicians	Facility – Student Housing Custodians	Clean-up emergency scene when blood is present in Student Housing
Spill response team member	Facility - EHS	Clean-up spills of blood or OPIM

CHAPTER IV: METHODS OF IMPLEMENTATION AND CONTROL

A. UNIVERSAL PRECAUTIONS

All Employees will utilize universal precautions. Universal precautions is an approach to infection control to treat all human blood, human body fluids, and other potentially infectious materials as if they were known to be infectious for HIV, HBV, and other Bloodborne Pathogens.

B. EXPOSURE CONTROL PLAN

Employees covered by the Bloodborne Pathogens standard receive an explanation of this ECP during their initial training session. It will also be reviewed during their annual refresher training. All employees can review this plan anytime during their work shifts by contacting the EHS Office. If requested, we will provide an employee with a hardcopy of the ECP within 15 business days of the request.

C. ENGINEERING CONTROLS AND WORK PRACTICES

Work practice controls and engineering controls will be used to prevent or minimize exposure to Bloodborne Pathogens.

The specific work practices and engineering controls used are listed below:

1. Work Practices

- Hand washing
  - Personnel must wash their hands immediately or as soon as possible after working with or being potential exposed to blood or other potentially infectious materials.
- Eating, drinking, applying cosmetics or lip balm, smoking, or handling contact lenses is strictly prohibited in clinical or biological research areas for all personnel; this includes all wet laboratories space operating at Biosafety Level 1 and above.
- Storage of food for human consumption in clinic or laboratory refrigerators, including cold rooms, is not permitted.
- Personal items are prohibited to be stored in areas where potentially infectious materials are present. All personal items should be kept in offices or desk areas and not on the laboratory bench tops.
- Procedures involving blood and other potentially infectious materials should only be conducted by

properly trained personnel and in a manner which minimizes splashing, spraying, aerosolizing, and/or generation of droplets of potentially infectious materials.
- Mouth pipetting or suctioning is strictly prohibited.
- Specimens of blood or other potentially infectious materials are to be placed in leak-proof primary containers during collection, handling, processing, and storage. For transport, absorbent material and a secondary leak-proof container should be added, as well as proper labelling.
- Equipment must be routinely maintained according to a maintenance schedule (Certification of Biological Safety Cabinet) and routinely decontaminated.
- Equipment must be decontaminated before servicing or shipping.
- Broken glassware should never be picked up by hand.
    - Always use tongs or a brush with dustpan when handling broken glassware.
- The use of needles, syringes, razor blades, and other sharps is to be minimized whenever possible. After use, syringe-needle units must be disposed in a dedicated sharps container, at the point-of-use, without removing, bending or recapping the needles.

2. Engineering Controls

Biological Safety Cabinet

Research activities are to be performed in Biological Safety Cabinets whenever there is a high potential of splashing or aerosol release of human material.

Biological Safety Cabinets are to be checked by laboratory personnel for proper functioning each time they are used. All laboratory personnel are to be trained on how to properly operate in a Biological Safety Cabinet.

Biological Safety cabinets must be certified annually according to the National Sanitation Foundation / American National Standards Institute (NSF/ANSI) 49 standard, when a cabinet is newly installed or moved, and the inspection record should be posted on the cabinet (certification sticker).

Needles and Non-Needle Sharps

When convenient or appropriate the use of sharps should be eliminated or minimized. If sharps have to be used, the following precautions will be implemented:

- Needles and other sharps will not be bent, recapped, removed, sheared, or purposely broken.
- Never recap needles using two hands. If a needle must absolutely be recapped, use a one-handed method or a mechanical device, e.g. forceps or hemostats.
- Contaminated sharps must be placed in puncture resistant sharps containers, labeled with the biohazard sign.
    - Never overfill biohazardous sharps containers. When the container is 2/3 full as indicated by the “full line” on the container, close it, and open a ticket with the EHS office for pick-up.
- Sharps with engineered sharps injury protection should be used when working with human material unless engineered sharps injury protection is not available. Note: To determine if there is a viable device with engineered sharps injury protection available, a minimum of two vendors must be researched to determine market availability.
- Blades and other cutting tools should be engineered with safe and self-retracting blades whenever possible.

For employees within the research groups, Caltech identifies the need for changes in engineering controls and work practices through regular EHS and BSO inspections of laboratory space. Laboratories handling human derived material or other potentially infectious material will operate at Biosafety Level 2 in accordance with the *Biosafety in Microbiological and Biomedical Laboratories* (BMBL) 5th Edition,

published by the US Dept. of Health and Human Services.

New procedures or products are evaluated in consultation with the IBC and the Institute Biosafety Officer.

For employees within the support groups, Caltech identifies the need for changes in engineering controls and work practices through regular EHS inspections. New procedures or products are evaluated by Safety Engineers at EHS and the Institute Biosafety Officer.

For the medical personnel (nurses and medical assistants) at the Student Health & Counseling Center, changes in engineering controls and equipment is assessed under their Infection Control Program.

3. Personal Protectives Equipment (PPE)

PPE is provided to Caltech employees at the appropriate size and at no cost to them. Training in the use of the appropriate PPE for specific tasks or procedures is provided by their Supervisors, by the EHS Office, or by the Institute Biosafety Officer, depending on the task at hand and the training requirement.

The type of PPE available to employees are as follow:

- Nitrile gloves
- Latex gloves
- Safety glasses
- Safety goggles
- Face masks
- Face shields
- N95 respirators
- Lab coats
- Disposable gowns

PPE is located in each research laboratories (BSL2 designated areas) or patient room at the Student Health & Counseling Center. PPE is also available in an on-site EHS storage unit. Exact locations for specific PPE may be obtained through lab supervisors, EHS personnel, or employee Supervisors.

All employees using PPE must observe the following precautions:

- Wear appropriate gloves when it is reasonably anticipated that there may be hand contact with blood or OPIM, and when handling or touching contaminated or potentially contaminated items or surfaces.
- Never wash or decontaminate disposable gloves for reuse.
- Utility gloves may be decontaminated for reuse if their integrity is not compromised; discard utility gloves if they show signs of cracking, peeling, tearing, puncturing, or deterioration.
- Wear appropriate face and eye protection when splashes, sprays, splatters, or droplets of blood or OPIM pose a hazard to the eye, nose, or mouth.
- Remove PPE immediately after it becomes contaminated and before leaving the work area.
    - Used PPE should be discarded in biohazard/biomedical red bin&red bag waste containers.
- Always wash hands immediately or as soon as feasible after removing gloves and other PPE.

Personnel engaged in research activity with live HIV should also don and doff specialized PPE according to the laboratory SOP as reviewed and approved by the IBC and the BSO.

4. Waste Management and Housekeeping

Regulated waste is to be placed in containers which are closable, constructed to contain all contents and prevent leakage, appropriately labeled or color-coded, and closed prior to removal to prevent spillage or protrusion of contents during handling.

- Bloodborne Pathogens or BSL2 solid waste is placed in a red bin lined with red bags, labeled with the universal biohazard symbol (bags must have the ASTM markings as required by California Department of Public Health). These containers should not be used for sharps or other materials that can easily puncture the plastic liner.
- Sharps (needles and non-needle, e.g. any object which could readily puncture or cut the skin of an individual when encountered) are discarded in dedicated biohazard sharp containers, which are closeable, puncture-resistant, and leak proof. Each department is responsible to supply the appropriate sharp containers.

All contaminated items are to be discarded immediately or as soon as possible in their appropriate containers, at the point of use.

Containers (bins and pans) are to be cleaned and decontaminated as soon as feasible after visible contamination. A solution of 10% bleach is an appropriate disinfectant for surfaces and containers. Clinical settings can also use EPA-registered disinfectant.

Broken glassware that may be contaminated is only to be picked up using mechanical means, such as a brush and dustpan.
Lab coats should be laundered on a regular basis. Each department is responsible for the organization of the laundry service to be used. If a lab coat is visibly contaminated with human blood or OPIM, it is highly recommended to discard it in the biohazardous solid waste container.

Work practices should include regular, beginning of the day and end of the day surface decontamination for patient rooms/treatment areas and research open benches and biosafety cabinets used to handle human derived material. Appropriate disinfectant such as a solution of 10% bleach or Accelerate Hydrogen Peroxide solution should be used. Clinical settings can also use EPA-registered disinfectant.
A portable (table-top) steam sterilizers is used in the Student Health & Counseling Center for the sterilization of small instruments, such as forceps, scissors, used in minimally to none invasive procedures. The ability of the sterilizer to reach physical parameters necessary to achieve sterilization should be monitored by mechanical, chemical, and biological indicators.
Cleaning tools used in blood emergency scene clean-up by support groups are to be decontaminated chemically (10% bleach) after use. In case of heavy contamination it is highly recommended to discard the tools in the biohazardous waste container of the appropriate size.

5. Labels

The following labeling methods are used at Caltech:

- Laboratory doors are labeled with biohazard signs indicating the use of human blood or OPIM inside the laboratory space. Labels should include access and emergency contact information.
- Waste containers (red bin and sharps containers) have a biohazard label.
- Labeling method for the Student Health & Counseling Center are described in their Infection Control Program.

EHS is responsible for ensuring that warning labels are affixed and/or red bags are used as required for regulated waste. Employees are to notify EHS (626-395-6727 or x6727) if they discover regulated waste containers, refrigerators containing human blood or OPIM, contaminated equipment, etc., without the proper labels or liners.

CHAPTER V: HEPATITIS B VACCINATION

EHS and the Institute Biosafety Officer will provide training to Caltech employees on hepatitis B vaccinations, addressing safety, benefits, efficacy, methods of administration, and availability of the vaccine. The hepatitis B vaccination series is available at no cost after initial employee training and within 10 days of initial assignment to all Caltech employees identified in the exposure determination section of this document.

Vaccination is encouraged unless: 1) documentation exists that the employee has previously received the series; 2) antibody testing reveals that the employee is immune; or 3) medical evaluation shows that vaccination is contraindicated.

However, if an employee declines the vaccination, the employee must sign a declination form. Employees who decline may request and obtain the vaccination at a later date during their employment and still at no cost. Documentation of refusal of the vaccination is kept on file at the EHS Office.

Vaccination will be performed by Caltech Occupational Health Provider: the Huntington Medical Foundation at the Pasadena Community Urgent Care (PCUC) located at 3160 E. Del Mar Blvd, Pasadena – (626) 271-2400. Vaccination records are kept as confidential patient information by Huntington Medical under HIPAA regulations.

CHAPTER VI: POST-EXPOSURE MANAGEMENT

Caltech operates under an Injury and Illness Prevention Program and the EHS Office investigates and follows up on incidents and accidents in conjunction with all necessary reporting and follow-up requirements. Please see the Injury and Illness Prevention Program for more information.

Caltech ensures that the health care provider responsible for the occupational health program for employees are properly informed about research and support activity taking place at Caltech as it relates to potential Bloodborne Pathogens exposure, Hepatitis B vaccination program, post-exposure evaluation, and follow-up.

A. POST-EXPOSURE RESPONSE

Personnel accidentally exposed via ingestion, skin puncture, or obvious inhalation of an infectious agent should receive or self-perform appropriate first-aid. Personnel are trained on the following first-aid procedures:

For a Needlestick or a Cut with a Contaminated Sharp

- Immediately wash the area with soap and water
- Wash the area with appropriate disinfectant (alcohol wipes, iodine pads, hydrogen peroxide)

For a Splash in the Eye

- Immediately flush the eye with temperate water from the nearest monthly-checked eyewash station for 15 minutes. If an eyewash station is not available, use temperate water from the faucet or an emergency eye saline solution for 15 minutes
- Hold the eyelid open to ensure effective rinsing

For Contamination on the Body

- Remove contaminated clothing, shoes, jewelry, etc.

- Immediately flood exposed skin with water and wash with soap and water. If a safety shower is not available use the faucet

B. OBTAINING MEDICAL ATTENTION AND REPORTING INSTRUCTIONS

Immediately following first-aid procedures, any individual receiving an exposure or potential exposure to biohazardous material will be advised to seek medical attention for the determination of available treatment and follow-up by the Occupational Health Care Physician, adhering to the following procedure:

Call security at x5000 or 626-395-5000 and indicate the nature of the incident.

1. Security will call 911 if paramedics are necessary
2. If employee is not able to drive her/himself to the clinic, Security will arrange for a taxi and provide employee with a voucher for payment

OCCUPATIONAL HEALTH CLINICS

During work hours report to one of the following Occupational Health Clinics contracted by Caltech

- **Pasadena Community Urgent Care** 9:00 AM – 9:00 PM 3160 E. Del Mar Blvd. phone: 626-271-2400

- **St. George's Medical Clinic** 8:30 AM – 6:00 PM 1750 E. Colorado Blvd. phone: 626-440-0097

After 9 PM and before 8:30 AM, report to **Huntington Memorial Hospital Emergency Room** located at 711 S. Fairmount Ave, Pasadena.

In addition, all injuries, accidents, and exposures should be reported to the employee's Supervisor and the Caltech EHS Office 626-395-6727 or x6727.

Research Laboratories that use HIV or HIV derived-virus containing greater than ½ the HIV viral genome must post the HIV Exposure Response Procedure in the laboratory. Personnel exposed or potentially exposed to HIV or HIV pseudovirus will follow the posted procedures.

C. PROCEDURES FOR EVALUATING THE CICUMSTANCES SURROUNDING AN EXPOSURE INCIDENT

EHS and/or the Institute Biosafety Officer will review the circumstances of all exposure incidents to determine:

- Engineering controls in use at the time
- Work Practices followed
- Description of the devise used (type/brand)
- PPE or clothing used at the time
- Location of the incident
- Procedure being performed when incident occurred
- Employee's training

EHS will record all percutaneous injuries from contaminated sharps in a Cal/OSHA Log 300 Form.

CHAPTER VII: EMPLOYEE TRAINING

All Caltech employees who have potential occupational exposure to Bloodborne Pathogens receive initial and annual training conducted by the Institute Biosafety Officer (in person or online).

All Caltech employees who have occupational exposure to Bloodborne Pathogens receive training on the epidemiology, symptoms, and transmission of Bloodborne Pathogens diseases. In addition, the training program covers, at a minimum, the following elements:

- An explanation of the OSHA Bloodborne Pathogens standard.
- An explanation of the ECP and how to obtain a copy.
- An explanation of methods to recognize tasks and other activities that may involve exposure to blood and OPIM, including what constitutes an exposure incident.
- An explanation of the use and limitations of engineering controls, work practices, and PPE.
- An explanation of the types, uses, location, removal, handling, decontamination, and disposal of PPE.
- An explanation of the basis for PPE selection.
- Information on the Hepatitis B vaccine, including information on its efficacy, safety, methods of administration, the benefits of being vaccinated, and that the vaccine will be offered free of charge.
- Information on the appropriate actions to take and persons to contact in an emergency involving blood or OPIM.
- An explanation of the procedures to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.
- Information on the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident.
- An explanation of the signs and labels and/or color coding required by the Standard and used at Caltech.
- An opportunity for interactive questions and answers with the person conducting the training session.

Training materials are available at the EHS Office.
For personnel providing first-aid and emergency coordination on Campus or in the field, part of the Bloodborne Pathogens training is covered annually during the First-Responder training provided by the Institute Health Advocate Program Instructor.

CHAPTER VIII: RECORD KEEPING

A. TRAINING RECORDS

Training records are completed for each employee upon completion of training. These documents are kept for at least three years in the EHS Office.

The training records include:

- The date of training
- The names, Caltech ID number, and Division/Department of the person attending the training

Employee training records are provided upon request to the employee or the employee's authorized representative within 15 working days. Such requests should be addressed to the EHS Office at safety.training@Caltech.edu.

B. MEDICAL RECORDS

Medical records are maintained for each employee with occupational exposure in accordance with section 3204 “Access to Employee Exposure and Medical Records”. Huntington Medical occupational health care provider is responsible for maintenance of the required medical records. These confidential records are kept for at least the duration of employment plus 30 years.

Employee medical records are provided upon request of the employee or to anyone having written consent from the employee within 15 working days. Such requests should be sent to Huntington Medical Foundation.

C. OSHA RECORDKEEPING

Exposure incidents are evaluated by the EHS Office using the Cal/OSHA Log 300 Form to determine if the case meets OSHA’s Recordkeeping Requirements (Title 8 Sections 14300-14300.48). All recorded incidents include, at least:

- Date of the injury
- Department/work area where the injury occurred
- Description/explanation on how the injury occurred

This log is reviewed as part of the annual program evaluation and maintained for at least five years from the date the exposure incident occurred.

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