Occupational Health Programs Manual – Chapter 11

Bloodborne Pathogens and Biological Materials

Approved by:  QS/Chief, Safety and Health Division

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**Include all information for each revision. Do not remove old revision data. Add new rows to table when space runs out by pressing the tab key in the last row, far right column.**
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Chapter 11—Biological Materials

NOTE: The current version of this chapter is maintained and approved by the Safety and Health Division (SHeD). The last revision date of this chapter was September 2019. The current version is located on the Glenn Research Center intranet within the Business Management System (BMS) Library. Approved by the Chief, Safety and Health Division.

1.0 PURPOSE

1.1 The purpose of the Bloodborne Pathogens and Biological Materials chapter is to protect personnel from biohazards. The Bloodborne Pathogens Program has been merged with a biosafety component because bloodborne pathogens and biohazards are inherently linked by regulation.

1.2 The purpose of the Glenn Research Center (GRC) Bloodborne Pathogens Program is to prevent or minimize employee exposure to bloodborne pathogens from blood and other potentially infectious materials (OPIMs). This chapter identifies the employees at risk for occupational exposure to bloodborne pathogens and defines the elements of a bloodborne pathogen exposure determination and exposure control plan (EDECP), including engineering and work practice controls, personal protective clothing and equipment, medical surveillance, hepatitis B vaccination, signs, labels, and training.

1.3 The sections pertaining to biosafety are intended for the use of relevant regulatory authorities, laboratory supervisors, and laboratory workers, all of whom play key roles in the field of biosciences and in public health in general.

2.0 APPLICABILITY

2.1 This chapter applies to all civil servant and support service contractor employees assigned to GRC sites, construction contractors, outside researchers, students, and visitors. Support service contractors, outside researchers, construction contractors, and visitors’ employers are responsible for the health and safety of their employees and for hazard analysis, training, personal protective equipment (PPE), medical surveillance, and other requirements to ensure compliance with NASA policy. This chapter applies to all employees who have occupational exposure to blood or OPIMs of human origin. Occupational exposure is defined as reasonably anticipated skin, eye, mucous membrane, or other parenteral contact with blood or OPIM that may result from the performance of the employee’s duties. Note that bloodborne pathogens regulations do not apply to “Good Samaritan” acts performed voluntarily in an emergency situation.

2.2 This chapter also applies to all employees who work with or may be exposed to biohazards. GRC has adopted the recommendations of (1) Biosafety in Microbiological and Biomedical Laboratories (BMBL), a Centers for Disease Control and Prevention (CDC) publication; and (2) the National Institutes of Health’s (NIH)’s universal precautions for controlling biohazards in the workplace. The scope of these requirements is limited to direct work and handling of biological hazards. This includes, but is not limited to, nonmedical biological laboratory workers and animal handlers. These requirements do not apply to potential
or incidental exposure to biological hazards because of a complication to one’s normal industrial work (such as that performed by a plumber or custodian) or to clinical medical functions. Such aspects shall be covered under program- or project-specific plans and procedures.

2.3 In this chapter, all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The terms “may” or “can” denote discretionary privilege or permission, “should” denotes a good practice and is recommended but not required, “will” denotes expected outcome, and “are” or “is” denotes descriptive material.

3.0 BACKGROUND

3.1 Bloodborne Pathogens

Bloodborne pathogens are microorganisms such as viruses or bacteria that are carried in blood and can cause disease in people. Two examples of bloodborne pathogens are hepatitis B virus (HBV), which causes hepatitis B, a serious liver disease, and human immunodeficiency virus (HIV), which causes acquired immunodeficiency syndrome (AIDS). The Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard, 29 Code of Federal Regulations (CFR) 1910.1030, is designed to protect workers in health care and related occupations from the risk of exposure to bloodborne pathogens. The written Bloodborne Pathogens Program is essentially an EDECP that outlines the protective measures to eliminate or minimize employee exposure to blood or OPIM.

3.2 Biohazards

Biological hazards, or biohazards, are those infectious agents that present a risk of death, injury, or illness to employees.

4.0 POLICY AND MEASUREMENT/VERIFICATION

4.1 Policy

GRC’s safety and occupational health programs are intended to maintain and protect the health and safety of GRC employees and to promote employee wellness. The requirements within this chapter are based upon applicable laws and regulations; industry standards and guidelines; and Agency policy and its guidance regarding both bloodborne pathogens and biosafety, including the use of biological specimens in a laboratory setting. The Agency policy for bloodborne pathogens is NASA Procedural Requirement (NPR) 1800.1, Chapter 2.11, Bloodborne Pathogens, and Chapter 4.11, Biosafety. NPR 1800.1 also states that NASA centers shall comply with the OSHA standards promulgated under Section 6 of the Occupational Safety and Health Act of 1970.

4.2 Measurement and Verification

Compliance with the responsibilities and requirements of this chapter are measured and verified through the use of programmatic self-assessments, regulatory and Agency audits, and internal field inspections.
5.0 RESPONSIBILITIES

5.1 Occupational Health Branch Chief

The Occupational Health Branch (OHB) Chief shall ensure a qualified individual is identified as the Bloodborne Pathogens Program Lead to carry out the responsibilities outlined in this chapter. The qualified individual shall be identified by the organization tasked with the implementation of the Biological Materials portion of the Bloodborne Pathogens program.

5.2 Occupational Health Branch Bloodborne Pathogens Program Lead

The OHB Bloodborne Pathogens Program Lead shall

a. Annually review and approve bloodborne pathogens EDECPs and program to ensure continued effectiveness and compliance with 29 CFR 1910.1030

b. Conduct exposure determinations to identify employees with reasonably anticipated skin, eye, mucous membrane, or other parenteral contact with blood or OPIM

c. Provide initial and annual refresher bloodborne pathogens training for employees enrolled in the program

d. Advise and assist supervisors with the development of bloodborne pathogens EDECPs

e. Provide sharps containers for the disposal of needles for employee self-administration of medicine

f. Provide technical oversight for bloodborne pathogens cleanups and clearance criteria

g. Develop, implement, and review the Biological Materials portion of the Bloodborne Pathogens Program. The review will consist of verifying contents of this chapter and other biosafety documentation to ensure continued effectiveness and compliance and an audit of any corrective action plans and incidences. This can be done in conjunction with the annual biosafety training.

h. Periodically assess biological inventory currently in use at GRC and laboratory personnel compliance with standards

i. Verify initial and annual refresher biosafety training for employees enrolled in the program

j. Advise and assist supervisors and principal investigators with the development of biosafety documentation

5.3 Occupational Health Branch

Occupational Health Branch staff shall

a. Review and approve all biosafety plans for compliance with NPR 1800.1. This can be done in conjunction with the Institutional Biosafety Committee (IBC) at Johnson Space Center as needed.

b. Review and approve all proposed facility designs and equipment purchases for use with biohazardous agents before their procurements
c. Review and assess procedures that impart energy to a microbial suspension or produce aerosols

d. Review and assess the knowledge and experience of the intended user

e. Inspect and certify the safety of biological safety cabinets (BSCs) and other containment devices before use and at least annually thereafter, or more frequently if required by local authorities or recommended by the manufacturer to conform to the requirements of this chapter and NSF/ANSI Standard 49, Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

5.4 GRC Occupational Medical Services, Center Physician

The Physician shall

a. Provide medical consultation and HBV vaccination series to employees who anticipate occupational exposure to bloodborne pathogens

b. Provide occupational exposure incident evaluation and treatment and the necessary follow-up

c. Provide and complete forms required by 29 CFR 1910.1030, including the HBV vaccination declination and issuance of the written medical opinion letter

d. Provide for short-term storage of infectious or biohazard waste for Environmental Management Office (EMO) pickup

e. Record sharps injury and potential exposure incidents that have been reported to Occupational Medical Services in the NASA Mishap Information System (NMIS) for the OSHA sharps injury log. Sharps injuries are subject to OSHA 300 recording and recordkeeping regulations.

f. Design medical support services in consultation with representatives from SHeD and principal investigators

g. Approve all uses of Biosafety Level (BSL) 1 or 2 and Risk Group (RG) 1 or 2 agents and animals on a case-by-case basis before their presence on Center

h. Approve all uses of genetically modified agents or recombinant deoxyribonucleic acid (DNA) molecules on a case-by-case basis before their presence on Center

i. Ensure the medical clinic staff is cognizant of potential hazards encountered by personnel working with biohazards

j. Evaluate affected workers’ previous and ongoing medical conditions, current medications, allergies (e.g., medicines, animals, and other environmental proteins), and prior immunizations, and determine what medical services are needed to permit safe performance of the duties of the position

5.5 Environmental Management Office Waste Management Team

The EMO Waste Management Team shall
a. Provide and coordinate infectious, biohazard, and medical waste management support for GRC, ensuring that all potentially infectious materials are disposed of according to all Federal, state, and local Department of Transportation, OSHA, and Environmental Protection Agency (EPA) regulations.

b. Provide infectious, biohazard, and medical waste management procedures for Bloodborne Pathogens Program waste.

5.6 NASA Mishap Information System Site Administrator

The NMIS site administrator shall notify the OHB regarding sharps injuries and exposures to biological materials. Sharps injuries are initially recorded by Occupational Medical Services in NMIS for the OSHA sharps injury log.

5.7 Contracting Officer’s Representatives for Janitorial Contracts

The Contracting Officer’s Representatives (CORs) for Lewis Field and Plum Brook Station janitorial contracts shall facilitate contractor services for spill containment and cleanup of biologically contaminated areas.

5.8 Human Capital Development Division

The Human Capital Development Division shall maintain records for employees who have completed bloodborne pathogen/biosafety training and coordinate with the OHB Bloodborne Pathogens Program Lead to ensure that the System for Administration, Training, and Educational Resources for NASA (SATERN) bloodborne pathogens training/biosafety curriculum is current and activated to issue annual training reminders for civil servant employees.

5.9 Supervisors

Supervisors shall

a. Identify any positions, procedures, and new or revised job tasks that include occupational exposure to blood or OPIM.

b. Ensure that employees who may be expected to provide first aid or cardiopulmonary resuscitation (CPR) in an occupational emergency situation, such as designated emergency responders, are identified in the certification tracking database CERTRAK as employees who may be exposed to blood or OPIM.

c. Ensure that employees with reasonably anticipated occupational exposure to blood or OPIM receive initial and annual refresher bloodborne pathogens training.

d. Ensure that employees with reasonably anticipated occupational exposure to blood or OPIM are referred to Occupational Medical Services for HBV consultation and vaccination if necessary. (If the vaccine is declined, the employee must sign the HBV vaccination declination.)

e. Refer employees who need access to a sharps container for disposal of contaminated sharps used for onsite self-administration of medicine to the OHB Bloodborne Pathogens Program Lead.
f. Ensure that employees are knowledgeable about and have access to their job- or task-specific bloodborne pathogens EDECP(s)

g. Ensure that employees have the proper bloodborne pathogens cleanup equipment, including PPE, spill containment, biohazard labels, and bloodborne pathogens waste receptacles

h. Immediately refer all exposed employees to Occupational Medical Services for reporting and medical follow-up and inform supervisor

i. Ensure that bloodborne pathogens EDECPs are developed and submitted to the OHB Bloodborne Pathogens Program Lead for approval. EDECPs shall be reviewed, updated, and submitted for approval annually

5.10 Laboratory Managers

5.10.1 Documentation

Laboratory Managers shall

a. Submit the laboratory standard operating procedure, safety permit, or job hazard analysis for approval before work begins. Documents shall be submitted to allow sufficient time for review at GRC and, potentially, IBC review.

b. Conduct initial and annual inspections in concert with OHB of all laboratory spaces and ensure that quarterly self-inspections are performed within the laboratory; maintain records of inspections and corrections, as required, and ensure all corrective actions are completed and that annual Safety and Health audit findings are addressed and documented

c. Maintain written or electronic records of laboratory-specific training

5.10.2 Biological Materials

Laboratory Managers shall

a. Cooperate with OHB professionals to identify potential worksite biohazards and develop a risk assessment before working with biologically hazardous materials, agents, or animals, including mammalian tissues or cells

b. Develop laboratory standard operating procedures for research with biological materials

c. Consult the GRC Occupational Health Programs Manual, Chapter 14, Acquisition of Hazardous Chemicals, before ordering any biological materials

d. Coordinate with EMO’s Waste Management Team to ensure proper disposal of infectious or biohazard waste

e. Provide a description of the requirements, proposed tasks, and responsibilities of each position involving hazardous biological agents to the Center Physician to guide medical evaluations

f. Inform facilities personnel, OHB Bloodborne Pathogens Program Lead, other nonlaboratory personnel, and any outside contractors of potential lab-related hazards and how to mitigate these hazards when they are required to work in the laboratory environment
g. Maintain an updated biological material inventory for the laboratory

5.10.3 Laboratory Safety

Laboratory Managers shall

a. Know and comply with applicable health and safety rules and regulations, training and reporting requirements, and standard operating procedures associated with laboratory safety and ensure that GRC Safety Program requirements are being successfully implemented

b. Identify hazardous conditions or operations in the laboratory, determine safe procedures and controls (general and protocol specific), and implement and enforce standard safety procedures. When possible, hazards should be labeled to protect those working in the space.

c. Notify OHB point of contact as soon as possible should they become aware that workplace engineering controls (e.g., fume hoods) and safety equipment (e.g., emergency showers/eyewashes and fire extinguishers) become nonoperational

d. In the event of an emergency, guide workers in securing the laboratory and evacuating the premises

e. Promptly report laboratory accidents and injuries to OHB, Occupational Medical Services, and Security. Serious injuries shall be reported immediately.

5.10.4 Employee Oversight

Laboratory Managers shall

a. Ensure all laboratory personnel under their supervision are trained to work safely with hazardous materials

b. Ensure laboratory personnel under their supervision have access to all hazard information such as Safety Data Sheets and laboratory safety manuals

c. Ensure all appropriate PPE (e.g., lab coats, gloves, and eye protection) is provided, maintained, and worn

d. Provide operational support and oversight as needed to laboratory activities within the scope of the Laboratory Manager’s training and identified duties

5.11 Employees

Employees shall

a. Review on an annual basis, or whenever there is a revision, the bloodborne pathogens EDECP specific to their job and tasks

b. Conduct tasks and follow required bloodborne pathogens procedures, as noted in the job- or task-specific bloodborne pathogens EDECP, to prevent or minimize employee exposure and to ensure proper disposal of biohazard waste

c. Wear required PPE and understand its capabilities and limitations

d. Comply with training, vaccination, and medical surveillance requirements
e. Inform their immediate supervisor of an exposure incident and report immediately to Occupational Medical Services for exposure incident reporting and medical follow-up

f. Review and follow relevant laboratory safety manual(s) (e.g., online laboratory safety manual, standard operating procedures, biosafety, and radiation safety) as well as oral and written laboratory safety rules, regulations, and standard operating procedures required for the tasks assigned

g. Keep work areas safe and uncluttered

h. Review and understand the hazards of materials and processes in their research operations before conducting work

i. Use appropriate measures to control identified hazards, including consistent and proper use of engineering controls, PPE, and administrative controls

j. Obtain prior approval from the Laboratory Manager for the use of hazardous chemicals, biological agents, or radioactive materials

k. Promptly report accidents and unsafe conditions to the Laboratory Manager

l. Inform the Laboratory Manager of any work modifications ordered by a physician as a result of medical surveillance, occupational injury, or exposure

m. Utilize the buddy system while performing work at GRC


6.1 Authority Documents

6.1.1 In addition to complying with the Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard (29 CFR 1910.1030) and National Institute for Occupational Safety and Health (NIOSH) standards, GRC shall follow CDC regulations on bloodborne pathogens and infectious disease concerns outlined in the current version of the U.S. Department of Health and Human Services (HHS) Publication Number (CDC) 21-112, Biosafety in Microbiological and Biomedical Laboratories (BMBL).

6.1.2 The GRC Occupational Health Manual, Chapter 14, Acquisition of Hazardous Chemicals and Materials, details procedures for purchasing biological materials, and NPR 1800.1, Chapter 4.5, Reproductive and Developmental Health, details risks to reproductive health. Both of these chapters shall be consulted when working with biological materials.

6.2 Good Samaritan Acts

Good Samaritan acts, such as assisting a coworker with a nosebleed, are not considered to be occupational exposure and thus do not require the establishment of a bloodborne pathogens
EDECP. Only employees with reasonably anticipated skin, eye, mucous membrane, or other parenteral contact with blood or OPIM are included in the Bloodborne Pathogens Program.

6.3 Universal Precautions

“Universal precautions” is an approach to infection control in which all human blood and OPIM are treated as if known to be infectious for bloodborne pathogens. Employees shall adhere to universal precautions.

6.4 Experiments Involving Biological Material

6.4.1 Experiments involving biological material will be evaluated by OHB on a case-by-case basis. Some biologicals, such as certain plants, may have a biosafety concern associated with use, so an evaluation by OHB can help prevent possible hazards from transmitting to people. The OHB will utilize the IBC as required. GRC organizational involvement will then be determined regarding security, shipping, receiving, handling, and disposal of the research material.

6.4.2 Organisms arriving at GRC shall first enter at the Shipping and Receiving Facility, Building 152.

6.4.3 Upon completion of the experiment, all organisms shall be shipped to a receiving facility or waste management facility according to applicable laws and procedures. Specimens shall not be hand-carried out of the facility.

6.4.4 Disposal of wastes contaminated with biological agents and/or potentially infectious materials shall be handled in accordance with the EMO’s infectious, biological, and/or hazardous waste disposal procedures and policies.

6.4.5 After completion of work, OHB can provide a lab clearance form and verify the cleanliness of the lab surfaces and removal of equipment as needed.

6.5 Classification and Handling of Biohazards and Biological Materials

6.5.1 All biohazards or biological materials shall be classified as Biosafety Level (BSL) 1, 2, 3, or 4 and Risk Group (RG) 1, 2, 3, or 4.

6.5.2 Researchers shall never bring any BSL-1, BSL-2, RG-1, or RG-2 materials onsite without the prior approval of the OHB.

6.5.3 Work with prions, BSL-3 or BSL-4, and RG-3 or RG-4 agents is prohibited and shall not be conducted at GRC.

6.5.4 Employees shall follow the requirements in Table I, Biosafety Levels for Infectious Agents, for the biosafety level that matches the biohazard classification when working with any biohazardous material in a laboratory or other setting.

6.5.5 For purposes of these requirements, the hazards associated with Animal Biosafety Levels (ABSLs) and the BSLs described in the CDC publication BMBL are equivalent. All BSL requirements apply to ABSLs. Equivalent control measures shall be taken to protect workers from potential exposures to animal-borne biological agents.
6.5.6 The co-application of BSLs, ABSLs, and Risk Groups (RGs) shall be determined by a protocol-driven risk assessment, and the exposure controls adjusted accordingly.

6.6 Annual Program Review

OHB Bloodborne Pathogens Program Lead shall conduct an annual review of the Biological Materials portion of the Bloodborne Pathogens Program to include compliance assessment of biological inventory management, laboratory standard operating procedures, employee training requirements, and other applicable data.

6.7 Biosafety Levels for Infectious Agents (Table)

Table I presents facility biosafety levels for infectious agents. Shaded levels are prohibited at GRC and are shown for informational purposes only.

<table>
<thead>
<tr>
<th>Biosafety Level (BSL)</th>
<th>Agents</th>
<th>Practices</th>
<th>Primary Barriers and Safety Equipment</th>
<th>Facilities (Secondary Barriers)</th>
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<tbody>
<tr>
<td>1</td>
<td>Not known to consistently cause diseases in healthy adults</td>
<td>Standard microbiological practices</td>
<td>No primary barriers required Personal protective equipment (PPE): Laboratory coats, gloves, and face and eye protection, as needed</td>
<td>Laboratory bench and sink required</td>
</tr>
<tr>
<td>2</td>
<td>Agents associated with human disease</td>
<td>BSL-1 practice plus: Limited access and Biohazard warning signs posted “Sharps” precautions Biosafety manual defining any needed waste decontamination or medical surveillance policies</td>
<td>Primary barriers: Biological safety cabinets (BSCs) or other physical containment devices used for all manipulations of agents that cause splashes or for aerosols of infectious materials PPE: Laboratory coats, gloves, and face and eye protection, as needed</td>
<td>BSL-1 plus: Autoclave available</td>
</tr>
<tr>
<td>3</td>
<td>Indigenous or exotic agents that may cause serious or potentially lethal disease through the inhalation route of exposure</td>
<td>BSL-2 practice plus: Controlled access Decontamination of all waste Decontamination of laboratory clothing before laundering</td>
<td>Primary barriers: BSCs or other physical containment devices used for all open manipulations of agents PPE: Protective laboratory clothing, gloves, and face, eye, and respiratory protection, as needed</td>
<td>BSL-2 plus: Physical separation from access corridors; self-closing, double-door access with entry through airlock or anteroom; sink at exit Exhausted air not recirculated; negative airflow into laboratory</td>
</tr>
<tr>
<td>4</td>
<td>Dangerous/exotic agents that pose high individual risk of aerosol-transmitted laboratory infections that are frequently fatal, for which there are no vaccines or treatments Related agents with unknown risk of transmission</td>
<td>BSL-3 practices plus: Clothing change before entering Shower on exit All material decontaminated on exit from the facility</td>
<td>Primary barriers: All procedures conducted in Class III BSCs or Class I or II BSCs in combination with a full-body, air-supplied, positive-pressure suit</td>
<td>BSL-3 plus: Separate building or isolated zone Dedicated supply and exhaust, vacuum, and decontamination systems</td>
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6.8 Bloodborne Pathogens Exposure Determination (29 CFR 1910.1030(c) (2))

6.8.1 An exposure determination is required for each employee with potential occupational exposure to bloodborne pathogens or OPIM. These determinations require the listing of the job...
classifications and the tasks and procedures where occupational exposure occurs. The following civil servant jobs have been identified as having tasks with potential bloodborne pathogens exposure and are covered by this program:

a. GRC Mishap Interim Response Team Members—May come in contact with blood on a mishap scene
b. Center Operations Team (Special Agents and Emergency Manager)—May come in contact with blood on a mishap scene or during a response
c. Aircraft Operations Personnel—May provide preliminary cleanup of bodily fluids

6.8.2 The following support service contractor jobs have been identified as having tasks with potential exposure to bloodborne pathogens and are covered by their employers’ exposure determinations, found in the employer’s written EDECP:

a. Medical Services and Fitness Center Personnel—May come in contact with blood or OPIM
b. Waste Management Personnel whose tasks include transporting biohazard waste
c. Security Personnel and Emergency Management Support Personnel—May come in contact with blood on a mishap scene or during a response
d. Janitorial Personnel whose tasks include cleaning up blood or OPIM after an occupational or medical incident
e. Janitorial Personnel whose tasks include Occupational Medical Services housekeeping
f. Lewis Little Folks Personnel who administer first aid for children enrolled in daycare

6.9 Exposure Control Plan (29 CFR 1910.1030(c) (1))

6.9.1 An exposure control plan is required for each employee, or group of employees, with potential occupational exposure to bloodborne pathogens. The exposure control plan shall include the exposure determination, which identifies job classifications and, in some cases, tasks and procedures where employees are exposed to blood or OPIM; the procedures for evaluating the circumstances surrounding an exposure incident; methods of compliance; HBV vaccination and post-exposure follow up; communication of hazards to employees; and recordkeeping. This makes the plan an exposure determination exposure control plan (EDECP).

6.9.2 The EDECP shall be reviewed and updated at least annually and whenever necessary to reflect new or modified tasks and procedures which affect occupational exposure and to reflect new or revised employee positions with occupational exposure.

6.10 Bloodborne Pathogens Program Enrollment (29 CFR 1910.1030 and NPR 1800.1, 4.11)

6.10.1 Employees with reasonably anticipated skin, eye, mucous membrane, or other parenteral contact with blood or OPIM shall be enrolled in a bloodborne pathogens program.

6.10.2 Personnel working with biohazards such as human cells and tissues that are capable of transmitting disease shall be enrolled in a bloodborne pathogens program.
6.11 Training (29 CFR 1910.1030(g)(2))

6.11.1 Bloodborne Pathogens

The OHB Bloodborne Pathogens Program Lead shall provide initial and annual refresher bloodborne pathogens training to employees enrolled in the Bloodborne Pathogens Program. The training shall be provided within 10 days of an employee being assigned to job duties that have the potential for bloodborne pathogens exposure. Supervisors can track employee training, certifications, and proficiencies in CERTRAK (Certification Tracking Database). Training shall include the following elements:

a. Bloodborne Pathogens Program requirements
b. Epidemiology and symptoms of bloodborne diseases
c. Modes of transmission of bloodborne pathogens and methods to control transmission
d. Identification and recognition of tasks that may involve exposure to potentially infectious materials
e. Review of the job- or task-specific EDECP(s), including the use and limitations of safe work practices and engineering controls
f. Information on the types, proper use, location, removal, handling, and disposal of PPE
g. HBV vaccine requirements
h. Actions to take and persons to contact in an emergency involving blood or OPIM
i. Actions to take if an exposure incident occurs, including incident reporting and medical follow-up
j. Information on the post-exposure evaluation and follow-up that the employer is required to provide
k. Explanation of signs, labels, and color-coding requirements
l. Information on where to locate safety data sheets, manuals, and other documentation

6.11.2 Biosafety (NPR 1800.1, 4.11)

GRC researchers shall adhere to the following training requirements when using biohazardous agents:

6.11.2.1 Personnel using biohazardous agents, including BSL-1 or BSL-2 and RG-1 or RG-2, shall be trained and knowledgeable about the risks to which they may be occupationally exposed, the types of exposures that place their health at risk, and the nature and significance of such risks, as well as the appropriate first aid and follow-up for potential exposures. Workers shall read, understand, and follow the required practices and procedures and shall consult with safety or health professionals about risk assessment before use of those materials or organisms.

6.11.2.2 Refresher training shall be provided at least annually, at the time of any significant change in job responsibility, and following recognized and suspected exposures.
6.12 Medical Support Services

6.12.1 Consultations and Hepatitis B Virus Vaccinations (*29 CFR 1910.1030(f) and NPR 1800.1, 2.11*)

6.12.1.1 All employees enrolled in the GRC Bloodborne Pathogens Program shall receive a medical consultation and the HBV vaccination series, according to recommendations of the U.S. Public Health Service current at the time of the evaluation and procedure.

6.12.1.2 Vaccinations shall be provided, at no cost to the employee, after the employee has received initial bloodborne pathogens training and within 10 days of the initial assignment date, as required by OSHA.

6.12.1.3 If an employee with potential occupational exposure to bloodborne pathogens declines the HBV vaccination series, the employee shall be required to sign the HBV vaccination declination, which dismisses GRC and its employees from responsibility. The medical provider shall provide this waiver to the employee and maintain it in the employee’s medical records.

6.12.2 Employees Working in Laboratories With Biological Specimens (*NPR 1800.1, 4.11*)

6.12.2.1 Workers using biohazardous agents shall be fully informed of the available medical support services and encouraged to utilize them.

6.12.2.2 Workers who may be occupationally exposed to human pathogens in research settings shall receive a preplacement medical evaluation.

6.12.2.3 Medical support services for biohazards shall be based upon risk assessments and tailored to meet the organization’s needs.

6.12.2.4 Employees shall comply with medical review requirements.

6.12.2.5 Capabilities for providing medical support for workers shall be in place before work actually begins.

6.12.2.6 The medical provider shall be knowledgeable about the nature of potential health risks in the work environment and have access to expert consultation.

6.12.2.7 Medical support services for biomedical research facilities shall be evaluated at least annually.

6.12.2.8 Joint annual review of occupational injury and illness reports by healthcare providers, environmental health, and safety representatives shall be performed to assist in the revision of exposure prevention strategies to minimize biological health hazards that cannot be eliminated.

6.13 Personal Protective Equipment (*29 CFR 1910.1030(d]*)

6.13.1 Where the potential for exposure to bloodborne pathogens is a concern, employees shall wear PPE. Appropriate PPE prevents blood and OPIM from penetrating through employee work clothing to the skin, eyes, mouth, or mucous membranes. All PPE guidelines and requirements apply to work performed using biological specimens.
6.13.2 Employees shall remove contaminated PPE as soon as possible and before leaving the work area. Employees shall remove torn, punctured, or worn PPE immediately and shall wash the affected area thoroughly with soap and water. PPE shall be removed in a manner that does not create additional exposure. After removal, contaminated garments shall be kept inside out so that the contaminated surface faces inside. Contaminated PPE shall be discarded in an approved biohazard container.

6.14 Engineering and Work Practice Controls (29 CFR 1910.1020(d))


Universal precautions is an approach to infection control in which all human blood and OPIM of human origin are treated as if known to be infectious for bloodborne pathogens. Employees shall adhere to universal precautions.

6.14.2 Laboratory Design (NPR 8715.3, 3.9.2g and (CDC)21-1112)

Laboratory designs shall include additional considerations for biohazards resulting from the use or handling of biological materials such as infectious microorganisms, viruses, medical waste, or genetically engineered organisms.


All equipment and work surfaces that have been contaminated with blood or OPIMs shall be cleaned and decontaminated with an appropriate disinfectant. GRC janitorial contractors at Lewis Field and Plum Brook Station shall contain spills and clean up biologically contaminated areas at their respective facilities. The COR(s) for the janitorial contract services shall provide contract oversight. The OHB Bloodborne Pathogens Program Lead shall provide technical oversight for bloodborne pathogens and biohazardous cleanups and final clearance criteria.


6.14.4.1 Hand washing is a critical work practice for exposure control of blood and other biohazardous material. Immediately after working with potentially infectious substances, employees shall wash their hands and all other body parts that may have contacted potentially infectious material. If gloves have been worn, employees shall wash their hands immediately after removing the gloves. If hand-washing facilities are not available, antiseptic hand cleanser in conjunction with paper towels or antiseptic towelettes shall be used with the understanding that employees shall wash their hands as soon as possible.

6.14.4.2 Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses shall be prohibited in work areas where there is a reasonable likelihood of occupational exposure to blood or other biohazardous material. Employees shall not store food and drinks in refrigerators, freezers, shelves, or cabinets, or on countertops or benches where blood, biological materials, or OPIMs are present.

6.14.5.1 Employees, such as diabetics, using needles for the self-administration of medicine shall properly dispose of all biohazard sharps; the sharps shall be stored such that there is no potential for another individual to come into contact with the needle.

6.14.5.2 For the disposal of medicinal-use biohazard sharps, employees may use a puncture-proof container with a lid that is then taken home for disposal or employees may obtain an individual stock storage sharps container from the OHB Bloodborne Pathogens Program Lead. It should be noted that EMO’s Waste Management Team only provides assistance for the disposal of biohazard waste generated onsite and stored in GRC-provided biohazard waste containers. The Centers for Disease Control and Prevention and the Ohio Department of Health provide guidance for the disposal of domestic biohazard waste.

6.14.5.3 Full sharps containers originating at Lewis Field buildings shall be closed and secured before transport and then transported to Occupational Medical Services for temporary storage and subsequent Waste Management pickup. Individual sharps containers for Plum Brook Station employees are located in the Engineering Building in Room 105. Full sharps containers originating at Plum Brook Station shall be properly secured for disposal by the individual in accordance with disposal guidelines.

6.14.5.4 Biohazard-contaminated needles and other biohazard-contaminated sharps (other than those used by an individual for self-administration of medicine) shall not be bent, recapped, or removed unless no other alternative is feasible or a specific medical procedure requires the needle to be bent, recapped, or removed. If a contaminated needle does need to be bent, recapped, or removed, these operations must be done by a mechanical device designed specifically for the purpose.


Warning labels must be placed on all containers that contain potentially infectious material. These labels shall contain the biohazard symbol and the word “BIOHAZARD.” The labels shall be predominantly fluorescent orange or orange-red (see Figure 1). The labels must be affixed as close to the container as possible by string, wire, adhesive, or any other method that prevents the label from being easily removed. Red bags or red containers with the biohazard symbol and word printed on them can be substituted for the labels.

![Biohazard Label](image)

6.14.7.1 Equipment potentially contaminated with blood or OPIM shall be examined and before servicing, shipping, storage, or use shall be decontaminated as necessary. The Janitorial Services COR oversees housekeeping contract services. Employees with biohazard-contaminated equipment shall contact the Janitorial Services COR for equipment decontamination assistance. The OHB Bloodborne Pathogens Program Lead provides technical oversight for bloodborne pathogens and biohazardous cleanups and clearance criteria.

6.14.7.2 If disinfection is not feasible or possible, equipment shall have a readily observable label attached to it stating which portions remain contaminated. This information shall be conveyed to all affected employees, the servicing representative, and/or the manufacturer, as appropriate, before handling, servicing, or shipping so that appropriate precautions can be taken.


Laundry shall be bagged or containerized at the location where it was used and shall not be sorted or rinsed in the location of use. The bags or containers shall be labeled or color-coded in accordance with this program. Employees who have contact with contaminated laundry shall use protective gloves and other appropriate PPE.


6.14.9.1 Potentially infectious materials shall be disposed of in accordance with OHB procedures detailed in this chapter as well as in the Environmental Programs Manual. The EMO Waste Management Team provides support for biohazardous waste concerns.

6.14.9.2 All potentially infectious waste, including clothing contaminated with blood or OPIM, shall be placed in red biohazard waste containers or bags. If the outside of the biohazard container becomes contaminated, the container shall be placed inside a secondary container that can prevent leakage during handling, processing, storage, transport, or shipping. The outside (secondary) container shall be labeled or color-coded according to the requirements of this standard. The container for transport or shipping shall be labeled or color-coded according to this program and closed before being stored, transported, or shipped.

6.15 Bloodborne Pathogens or Other Potentially Infectious Material Exposure Incidents (29 CFR 1910.1030(f) and 29 CFR 1904.5)

6.15.1 An exposure incident occurs when blood or OPIM comes in direct contact with an employee’s eyes, mouth, or other mucous membranes, or non-intact skin, and when there is other parenteral contact. Non-intact skin includes skin with dermatitis, hangnails, cuts, abrasions, and chafing.

6.15.2 Any employee involved in an incident resulting in exposure to biohazardous material, blood, or OPIM shall immediately report the incident to Occupational Medical Services and their supervisor. Occupational Medical Services shall provide a post-exposure evaluation, incident reporting in NMIS, and follow-up documentation.
6.16 Bloodborne Pathogens Post-Exposure Evaluation and Follow-up

(29 CFR 1910.1030(f))

6.16.1 Civil servants shall be provided with a confidential medical evaluation and follow-up. The NMIS report shall document the route of exposure, circumstances under which the exposure occurred, and the source individual.

6.16.2 Contractor personnel shall have an initial evaluation at GRC’s onsite Occupational Medical Services, whose personnel will generate the necessary reports. Contractors shall be assisted in determining the process for further evaluation and treatment by an outside facility as required by their medical program.

6.16.3 The OHB Bloodborne Pathogens Program Lead or the contractor health and safety representative, with medical provider assistance, shall facilitate access to the following documentation to be provided to the licensed healthcare professional evaluating an employee after an exposure incident:

a. A copy of OSHA’s Bloodborne Pathogens Regulation 29 CFR 1910.1030
b. A description of the exposed employee’s duties as they relate to the exposure incident
c. Documentation of the route(s) of exposure and the circumstances under which exposure occurred
d. Results of the source individual’s blood testing, if available
e. All medical records relevant to the appropriate treatment of the employee, including vaccination status; the employer is responsible for maintaining these records

6.16.4 Occupational Medical Services shall obtain a copy of the evaluating physician’s written opinion and provide it to the exposed individual within 15 days of the completion of the evaluation. The post-exposure evaluation shall only include information regarding relevant medical conditions that require further evaluation or treatment.

6.17 Annual Update of Exposure Control Plan (29 CFR 1910.1030(c)(1)(iv)

6.17.1 Bloodborne Pathogens Program EDECPs shall be reevaluated every year to ensure they are effective and in compliance with all applicable regulations, as required by OSHA. Contractors are responsible for providing, upon request, the OHB Bloodborne Pathogens Program Lead with the most recent version of their bloodborne pathogens program and EDECPs.

6.17.2 The OHB verification procedure to ensure compliance with program requirements shall be a review of the most recent EDECP. The most recent EDECP is kept by the supervisor.
7.0 RECORDS (29 CFR 1910.1030(h))

a. Training records.—Maintained in SATERN by Human Capitol Development Division.

b. Bloodborne pathogens written program.—Maintained on OHB server, IH (Industrial Hygienist) Bloodborne folder.

c. Exposure determinations (hazard analysis).—Maintained by supervisors and documented in EDECP.

d. Exposure control plans.—Maintained by supervisors and documented in EDECP.

e. Exposure Determination and Exposure Control Plan (EDECP).—Maintained by supervisor.

f. Medical evaluations.—Maintained by Occupational Medical Services and kept for the duration of an employee’s employment plus 30 years.

g. Biohazard waste manifests.—Maintained by Environmental Management Office.

h. NMIS Reports.—Maintained by NMIS site administrator.

8.0 REFERENCES

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APPENDIX A.—DEFINITIONS

Animal biosafety level (ABSL).—Designation for biosafety levels for research involving animals

Blood.—Human blood, human blood components, and products made from human blood.

Bloodborne pathogens.—Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Biosafety in Microbiological and Biomedical Laboratories (BMBL).—CDC publication outlining laboratory safety.

Biological safety cabinets (BSCs).—Enclosed cabinets for conducting biological research.

Biosafety levels (BSLs).—Containment precautions for the isolation of biological organisms.


Contaminated.—Presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

Contracting officer’s representative (COR).—Government official appointed in writing by the contracting officer who provides technical direction, clarification, and guidance concerning the contract specifications and statement of work.

Decontamination.—Use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they can no longer transmit infectious particles, and the surface or item is rendered safe for handling, use, or disposal.

Engineering controls.—Controls that isolate or remove the bloodborne pathogens hazard from the workplace. Examples of engineering controls include sharps disposal containers and self-sheathing needles.

Exposure determination and exposure control plan (EDECP).—Plan consisting of job tasks that may result in exposure to a bloodborne pathogens exposure and steps for mitigation of those hazards, as well as necessary medical follow-up information.

Exposure incident.—Specific eye, mouth, other mucous membrane, non-intact skin, or other parenteral contact with blood or other potentially infectious materials that results from the performance of an employee’s duties.

Good Samaritan.—Individual who provides first aid, rescue breathing, or cardiopulmonary resuscitation (CPR) for a coworker but whose job does not require him or her to perform such acts.

Hand-washing facility.—Facility providing an adequate supply of running potable water, soap, and single-use towels or hot-air drying machines.

Hepatitis B virus (HBV).—A serious, communicable disease affecting the liver.
Human immunodeficiency virus (HIV).—the virus that causes acquired immunodeficiency syndrome (AIDS).

Institutional Biosafety Committee (IBC).—A review committee that provides technical oversight to proposed biological experiments.

Licensed healthcare professional.—Person whose legally permitted scope of practice allows him or her to independently perform the activities required by 29 CFR 1910.1030, paragraph (f), Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-Up.

Occupational exposure.—Reasonably anticipated skin, eye, mucous membrane, or other parenteral contact with human blood or other potentially infectious materials that may result from the performance of an employee’s duties.

Occupational Safety and Health Administration (OSHA).—Agency of the U.S. Government under the Department of Labor tasked with the responsibility of ensuring safety at work and a healthful work environment. OSHA's mission is to prevent work-related injuries, illnesses, and deaths.

Other potentially infectious materials (OPIM).—Human body fluids such as synovial fluid, pericardial fluid, peritoneal fluid, and any bodily fluid that is visibly contaminated with blood; and all body fluids in situations where it is difficult or impossible to differentiate between body fluids.

Parenteral.—Entering the body through some other way besides the digestive tract, such as through the mucous membranes, by piercing, or through the skin by events such as needle sticks, human bites, cuts, and abrasions.

Personal Protective Equipment (PPE).—Specialized clothing or equipment worn by an employee for protection against a hazard. Examples include gloves, goggles, face shields, and coveralls.

Risk Group (RG).—Describes the relative hazard posed by infectious agents or toxins in the laboratory.

Sharps.—Needles or other sharp objects.

Sharps with engineered sharps injury protections.—Non-needle sharp or a needle device used for medicinal purposes that has a built-in safety feature or mechanism that effectively reduces the risk of an exposure incident.

Source individual.—Individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to an employee.

Universal precautions.—Approach to infection control that treats all human blood and certain human body fluids as if known to be infectious for the human immunodeficiency virus, hepatitis B virus, or other bloodborne pathogens.

Work practice controls.—Controls that reduce the likelihood of exposure by specifying how a task is performed. An example is prohibiting the recapping of needles by a two-handed technique.
APPENDIX B.—ACRONYMS

ABSL  Animal biosafety level
BMBL  Biosafety in Microbiological and Biomedical Laboratories
BSC  Biological safety cabinets
BSL  Biosafety level
CDC  Centers for Disease Control and Prevention
CERTRAK  Certification Tracking Database
CFR  Code of Federal Regulations
COR  Contracting Officer’s Representative
EDECP  Exposure determination and exposure control plan
EMO  Environmental Management Office
GRC  Glenn Research Center
HBV  Hepatitis B virus
HHS  Health and Human Services
HIV  Human immunodeficiency virus
IBC  Institutional Biosafety Committee
NIH  National Institutes of Health
NIOSH  National Institute for Occupational Safety and Health
NMIS  NASA Mishap Information System
NPR  NASA Procedural Requirement
OHB  Occupational Health Branch
OPIM  Other potentially infectious materials
OSHA  Occupational Safety and Health Administration
PPE  Personal protective equipment
RG  Risk group
SATERN  System for Administration, Training, and Educational Resources for NASA
SHeD  Safety and Health Division