NIH Policy Manual

3035 - Working Safely with Potentially Hazardous Biological Materials

Issuing Office: OD/OM/ORS/SR/DOHS **Phone:** (301) 496-2960

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Transmittal Notice

1. **Explanation of Material Transmitted:** This chapter was partially revised and includes updates to the requirements for inventory of potentially hazardous biological materials at the NIH, specifically inventory now included in the PI Dashboard registration system. A new definition was incorporated for "potentially hazardous biological materials" to help clarify the policy.
2. **Filing Instructions:**

   Remove: Manual Chapter 3035, dated 04/04/14
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PLEASE NOTE: For information on:

- Content of this chapter, contact the issuing office listed above.
- NIH Policy Manual, contact the Division of Management Support, OMA, at (301) 496-4606 or enter this URL: https://oma.od.nih.gov/DMS/Pages/Manual-Chapters.aspx.

A. Purpose

This chapter establishes the National Institutes of Health (NIH) policy governing the storage of and conduct of work with potentially hazardous biological materials in the research environment. This includes work with recombinant and synthetic nucleic acids, toxins, human, animal and plant pathogens requiring Biosafety Level 2 (BSL-2) and higher and Select Agents as defined in 42 CFR 73, Select Agents and Toxins. This chapter also establishes policy for maintaining, archiving and storing potentially hazardous biological specimens or samples.

B. Scope

This policy applies to all registered laboratories operating at level BSL-1 or higher at the NIH. The policy covers biological materials that are potentially hazardous. All visiting scientists, summer research associates, trainees, fellows, special volunteers and summer students must comply with this policy.

C. Background

The safe handling and storage of potentially hazardous biological materials in the biomedical research setting has been and will continue to be of concern. The emergence of the human immunodeficiency virus (HIV) prompted public awareness and enhanced the need for guidelines relative to the handling of potentially infectious materials. The Centers for Disease Control and Prevention (CDC)/NIH publication, *Biosafety in Microbiological and Biomedical Laboratories* (BMBL, current edition), serves as the primary resource guide on biological safety issues. It describes biosafety levels for work with infectious agents and infected animals, risk assessment criteria, and biological agent summary statements.

The Occupational Safety and Health Administration (OSHA) promulgated 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens (Standard). This Standard applies to research laboratories in addition to clinical areas and outlines the requirements for working with human blood, body fluids, tissues, and other potentially infectious materials. The Standard provides regulatory guidance concerning facility requirements, safe work practices, medical surveillance, personal protection, first aid procedures, and worker training. In addition, it provides standards for packaging and handling of materials containing bloodborne pathogens during transport to protect both, employees and the public.

The U.S. Department of Transportation (DOT) identifies infectious substances as Hazardous Materials. These materials are regulated during transport (49 CFR 171-178). Once these materials are placed into transport via air, either domestically or internationally, they are governed by the United Nations International Civil Aviation Organization (ICAO) whose guidance is implemented through the International Air Transport Association (IATA) Dangerous Goods Regulations.

The NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (*NIH Guidelines*) issued by the Office of Biotechnology Activities (OBA), detail safety practices and containment procedures for basic and clinical research involving recombinant or synthetic nucleic acid molecules. All research involving recombinant or synthetic nucleic acid molecules conducted at or funded by NIH, must comply with the *NIH Guidelines*.

The CDC and U.S. Department of Agriculture (USDA) implemented regulations that govern the possession, use and transfer of certain biological agents and toxins, defined as select agents (42 CFR 73, 7 CFR Part 331, and 9 CFR 121). NIH facilities that apply to possess, use, or transfer these agents must demonstrate the capabilities for handling select agents in accordance with the appropriate biosafety level. These facilities are subject to periodic CDC and USDA inspections. Additional concerns about the potential use of certain biological agents for terrorism purposes caused the U.S. Congress to enact Public Law 104-132, The Antiterrorism and Effective Death Penalty Act of 1996. Section 511 of the Act required the Secretary of Health and Human Services to regulate the transfer of select agents. This NIH Policy Manual Chapter does not pertain to biological materials that are not potentially hazardous (may be handled at Biosafety Level 1 or lower).

D. Policy

The policy of the NIH is to ensure that all biomedical research involving potentially hazardous biological materials (such as biological toxins, including venoms and poisons, recombinant and synthetic nucleic acid molecules, and human pathogens classified at BSL-2 and higher), is conducted in a manner that will protect research personnel, support staff, the public, and the environment. Further, this policy ensures that potentially hazardous biological materials are identified and stored in a safe and secure manner, and that research materials are not abandoned or stored indefinitely, without adequate justification, at the NIH. The DOHS is responsible for implementing biological safety policies at the NIH.

All work with potentially hazardous biological materials will be conducted in compliance with the CDC/NIH publication *Biosafety in Microbiological and Biomedical Laboratories* (BMBL, current edition) and the *NIH Guidelines.* The policy for working with bloodborne pathogens in research laboratories is set forth in the *NIH Exposure Control Program for Non-Hospital Personnel*. Copies of these documents may be obtained from the Office of Research Services (ORS), Division of Occupational Health and Safety (DOHS), Publications page.

It is a requirement of the NIH Biorisk Management Program that Principal Investigators (PIs) register work creating, manipulating, or using recombinant or synthetic nucleic acid molecules covered under the *NIH Guidelines* with the NIH Institutional Biosafety Committee (IBC). This is done by submitting a recombinant DNA registration document (RD). Work involving potentially infectious human, plant or animal materials and human pathogens, human and non-human primate blood, tissues, and body fluids, including primary human cell cultures requires the submission of a pathogen registration document (PRD). Both RD and PRD registrations require that investigators address potential safety concerns regarding the research to be conducted and answer important questions regarding the 'dual-use' nature of the research. PIs must regularly assess their research activities to determine if new research findings or activities impact the potential dual-use status of the work. Copies of USDA or other permits for work with human, animal or plant pathogens must be provided to the Biorisk Management Program, DOHS.

The RD and PRD registration and associated dual use screening is completed online using PI Dashboard, which is accessible through the Principal Investigator Resource page. DOHS safety specialists, assigned to each Institute or Center (IC), are available to assist PIs in processing these registrations and completing annual reviews of research. An electronic process for annual review and reconsideration of the dual use questions can be completed using the PI Dashboard.

For Select Agent-associated registrations, investigators should contact the NIH Biological Safety Officer (BSO), DOHS; or a representative of the NIH Select Agent Program (SAP), DOHS to discuss the proposed work, and receive additional instructions for protocol submission and review by the IBC. As required by law, investigators performing research with any Select Agent or Toxin must contact the NIH Responsible Official (RO) or Alternate Responsible Officials (AROs), DOHS at (301) 496-2960 for assistance.

All potentially hazardous biological materials must be inventoried prior to long-term storage in any freezer, refrigerator, cold room, or other location. This requirement applies to all NIH federal facilities and all NIH contractor or subcontractor facilities. Inventories are maintained as part of all PRD and RD registrations and must be updated at least annually in the PI Dashboard system. ICs must develop policies that assure that unneeded or unwanted materials are not abandoned by research personnel. Annual inventory updates are required.

Employee training is an important component in the safe conduct of work with biological agents and recombinant nucleic acid materials. Mandatory training is provided by DOHS to help supervisors fulfill basic laboratory safety orientation and training requirements. Requirements, course information and schedules are available on the DOHS Safety and Health Training page. Supervisors are responsible for providing site-specific safety training and ensuring that annual retraining of their employees is completed. Supervisor access to training completion data is given upon request; and includes an employee training tracking tool. E-mail any questions regarding the website to ORSSafetyTraining@mail.nih.gov. Supervisors are also responsible for ensuring that their employees are advised of the potential hazards associated with biological materials and are knowledgeable in appropriate laboratory safety practices and procedures, proper use of laboratory equipment, and any personal protective equipment (PPE) that may be necessary or required. This policy pertains to all visiting scientists, summer research associates, trainees, fellows, special volunteers and summer students.

Laboratories in which work is performed at BSL-2 and higher must be posted with proper signage. The proper biosafety sign is obtained from the DOHS-assigned IC safety specialist. The sign must indicate the assigned biosafety level, biological material(s) in use, special procedures or precautions for entry, PPE, immunizations (if any), name of the PI, and both, work and emergency contact information.

DOHS staff must survey all registered laboratories prior to posting biosafety signage indicating biosafety level, and at least annually thereafter, to ensure that the facility is operating properly and that appropriate practices and procedures are employed.

All registered laboratories operating at level BSL-2 or higher must have a Biosafety Manual, which must be reviewed annually by the PI and all associated research personnel.

Principal Investigators (PIs) must secure all potentially infectious materials appropriately and disinfect surfaces prior to allowing support personnel, such as maintenance employees, to enter the laboratory. All laboratory components (sinks, countertops, etc.) and equipment scheduled for repair or servicing must be thoroughly decontaminated by research personnel prior to initiation of the maintenance or repair work. In a BSL-3 laboratory, a staff member familiar with the operation of the laboratory must be present during normal working hours whenever maintenance or repair work is being conducted.

In the event of an after-hours emergency in a BSL-3 laboratory, non-laboratory personnel must contact the PI prior to entry. The emergency contact information posted on the biosafety sign on the laboratory door must be kept current to facilitate emergency response.

All NIH personnel must comply with the NIH Manual 1340-1, Permits for Import or Export of Biological Materials, when shipping hazardous biological materials. All infectious or hazardous materials must be shipped using the services of the NIH Office of Logistics and Acquisition Operations (OLAO), Freight Forwarding Team at 301-496-5921. See the NIH Manual 26101-42-F Shipping Policies and Procedures.

The DOHS provides training on shipping biological materials; registration may be initiated on the DOHS Safety and Health Training page.

The transport (on or off campus) of select agents is subject to prior approval by the NIH Select Agent Program, which implements Federal Law as explained in Section B. Background (above), and the CDC or USDA, Animal and Plant Health Inspection Service (APHIS). Contact a NIH SAP ARO at DOHS at (301) 496-2960 for approval and further assistance. Individuals who discover an unregistered select agent(s) or toxin(s) must immediately secure the material(s) to prevent unauthorized access and report the discovery to the Select Agent Program.

Anyone at the NIH wishing to personally transport material via air must have the hazardous material packaged by a trained shipper, following International Air Transport Association (IATA) packaging regulations. The hazardous material must be declared prior to shipment. NIH employees **may not** transport hazardous materials in a privately owned vehicle; a government vehicle must be used. All applicable packaging requirements of the Department of Transportation regulations found in 49 CFR Parts 171-178 must be followed.

1. The movement of infectious or potentially infectious materials within an NIH site or building requires packaging designed to reduce or eliminate potential spillage and leakage. Packaging must include a primary container within a watertight, unbreakable secondary container. There must be enough absorbent between the primary and secondary container to absorb all liquids in the primary container in the event of breakage of the primary container. Information on shipping biological materials can be found on the DOHS Safety Training page.

E. Responsibilities

The Office of Research Services (ORS), through the Division of Occupational Health and Safety (DOHS) has overall responsibility for biological safety at NIH. The promotion of safe working practices is the responsibility of each member of the NIH Community. PIs must ensure their employees are properly trained and advised in the conduct of safe practices within the laboratory. Employees are expected to perform their work in a safe manner, and ensure they do not place themselves or others at risk of injury or illness due to unsafe practices. In the performance of all job duties, all employees should ensure their work exhibits the best safety practices.

1. **Director, NIH:**
   Through DOHS and the Deputy Director for Intramural Research (DDIR), provides executive leadership in the development and implementation of biological safety

policies, standards and procedures applicable to the NIH. The DOHS provides staff necessary to effectively administer a comprehensive occupational safety and health program.

2. **Deputy Director for Intramural Research (DDIR):**
   The DDIR is the principal liaison with the NIH intramural research community regarding safety and health matters. The DDIR receives safety policies approved by ORS and communicates them to the IC Scientific Directors. Further, the DDIR raises safety concerns to ORS as they are brought to the DDIR's attention from the intramural research community.
3. **Designated Agency Safety and Health Official (DASHO):**
   The Institutional Official responsible for management and administration of the NIH occupational safety and health program. This authority is delegated to the ORS Director, NIH.
4. **Institute and Center (IC) Scientific Directors:**
   Scientific Directors are responsible for ensuring full compliance with this policy within the IC and promoting safety in all work areas. The Scientific Director is also responsible for development and implementation of policies that assure that unneeded or unwanted biological materials are not abandoned by research personnel and that inventories of these materials are current. SDs must appoint a responsible and accountable individual to oversee any common areas where potentially hazardous biological materials are stored (e.g., cold rooms, equipment rooms, etc.).
5. **NIH Biological Safety Officer (BSO):**
   The NIH BSO performs the duties of the Biological Safety Officer as specified in the NIH Guidelines and this chapter, and serves as the executive secretary for the NIH Institutional Biosafety Committee (IBC).
6. **NIH Institutional Biological Safety Committee (IBC):**
   The NIH IBC assists the DDIR and the Director, NIH, in providing biosafety oversight and policy development required for compliance with applicable safety laws and regulations. The IBC provides technical advice, assistance, and management-level support to the DOHS, SR, ORS, and to the NIH Biosafety Officer (BSO) in matters regarding biosafety and performs all IBC functions as specified in the *NIH Guidelines* and its charter. The NIH BSO performs the duties of the Biological Safety Officer as specified in the *NIH Guidelines*, and serves as the executive secretary for the NIH IBC.
7. **Office of Research Services (ORS):**
   ORS is the primary operational component in developing and implementing NIH-wide biorisk management programs through the DOHS. This is accomplished through provision of guidance, consultation, training, and relevant Occupational Medical Service programs.
8. **The Director, Division of Occupational Health and Safety (DOHS), SR, ORS and designees:**
   The Director, DOHS is responsible for development, implementation, and management of programs for reducing risks associated with potentially hazardous biological materials, including compliance with Select Agent regulations.
9. **NIH Responsible Official (RO) and Alternate Responsible Officials (AROs):**
   These individuals are responsible for managing the daily operations of the NIH Select

Agent Program.

10. **Supervisors (all levels throughout NIH) must:**

    a. Promote safety in the work area under their jurisdiction.
    b. Ensure that personnel correctly use necessary and prescribed personnel protective equipment while conducting work in laboratories or while in the proximity of laboratory operations utilizing potentially hazardous materials.
    c. Register all work with human, animal or plant pathogens and work with recombinant or synthetic nucleic acid molecules that are subject to the *NIH Guidelines* with the NIH IBC as described herein.
    d. Ensure that annual review and update of potentially hazardous biological material inventories occurs and must assure that the inventories are kept up to date and accurate and that no materials are abandoned.
    e. Review work practices, comply with and enforce all applicable occupational safety and health standards, rules, regulations and orders by competent authority pertaining to the activities under their jurisdiction.
    f. Ensure and verify that employees are trained in safe practices and methods of job performance and for assuring that subordinates demonstrate competency in performing assigned work.
    g. Assure that all visitors and support services personnel are appropriately informed about potential hazards present and any special precautions required to prevent exposure to these potential hazards.
    h. Acquire the knowledge and information needed to recognize and control hazardous conditions in the workplace.
    i. Select and use standard operating procedures that reduce the potential for injury or illness to the lowest practicable level.
    j. Report all research related accidents, injuries and illnesses which occur involving areas and personnel for which they are responsible
    k. Obtain assistance from the appropriate DOHS personnel regarding interpretation and application of guidelines, standards, codes, regulations, or rules.

11. **Employees must:**

    Comply with all occupational safety and health standards, rules, regulations, orders, and safe operating procedures applicable to the NIH and promptly advise the supervisor regarding all work related accidents resulting in personal injury, illness, and/or property damage. Promptly report to supervisor, appropriate occupational safety and health personnel, and/or IC Safety and Health Committee Members any unsafe or unhealthful conditions in the work environment. All employees are responsible for ensuring a safe and secure work environment by complying with safety, health and security standards, rules, regulations, orders, practices, and procedures of NIH. Employees are responsible for using prescribed personal protective equipment (PPE) during performance of work and while in the proximity of the conduct of work with potentially hazardous materials. Employees are expected to perform their work in a safe manner and ensure they do not place themselves or others at risk of injury or illness due to unsafe practices. In the performance of all job duties, all employees must ensure their work exhibits the best safety practices and that they have been trained to perform the work safely.

F. References

References and copies of registration forms are available from the DOHS website. OSHA references are available on the OSHA website.

1. Select Agents and Toxins. Centers for Disease Control and Prevention (42 CFR 73); Federal Register, December 13, 2002 (67 FR 76886): National Select Agent Registry
2. Biosafety in Microbiological and Biomedical Laboratories - Centers for Disease Control and Prevention/National Institutes of Health. The current edition is available at the DOHS Publications page.
3. NIH Exposure Control Plan for Non-Hospital Personnel, prepared in compliance with 29 CFR 1910.1030. Current published version available at the DOHS Publications page.
4. NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules, current Edition from the Federal Register, as amended (*NIH Guidelines*).
5. Occupational Exposure to Bloodborne Pathogens. Occupational Safety and Health Administration Standard 29 CFR 1910.1030, 66 FR 5325 January 18. 2001.
6. Animals and Plant Products, U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), Title 9, Parts 101-123.
7. International Air Transport Association (IATA) Dangerous Goods Regulations.
8. NIH Delegations of Authority, Program: General, No. 46 – Designated Agency Safety and Health Official (DASHO)
9. NIH Manual 1340-1, Permits for Import and Export of Biological Materials.
10. NIH Manual 26101-42-F, Shipping Policies and Procedures.
11. NIH Manual 1743, Keeping and Destroying Records.

Appendix 1-Definitions

1. **Human Pathogens** – Human Pathogens are agents (such as viruses, bacteria, prions, or fungi) that cause disease in humans.
2. **Select Agents** – Select Agents are bio-agents which have been declared by the U.S. Department of Health and Human Services (HHS) or by the U.S. Department of Agriculture (USDA) to have the "potential to pose a severe threat to public health and safety". These bio-agents are divided into three broad categories: (1) HHS select agents and toxins (affecting humans); (2) USDA select agents and toxins (affecting agriculture); and (3) Overlap select agents and toxins (affecting both).
3. **Toxins** - A toxin is a poisonous substance produced within living cells or organisms. Toxins can be small molecules, peptides, or proteins that are capable of causing disease.
4. **Biosafety Levels** - A biosafety level is the level of the biocontainment precautions required to work with dangerous biological agents in an enclosed facility. The levels of containment range from the lowest biosafety level 1 (BSL-1) to the highest at level 4 (BSL-4). In the United States, the Centers for Disease Control and Prevention (CDC) have specified the requirements for each of these levels.
5. **Bloodborne Pathogens** – Bloodborne pathogens are infectious agents that can be spread through contamination by blood. Common examples are HIV, hepatitis B,

hepatitis C, and viral hemorrhagic fevers.

6. **NIH Guidelines** - NIH Guidelines for Research involving Recombinant or Synthetic Nucleic Acid Molecules; Federal Register, current edition.
7. **NIH Institutional Biosafety Committee (IBC)** - The NIH Institutional Biosafety Committee reports to the Director, NIH or his or her designee in matters pertaining to the control of biological hazards. The NIH IBC is the primary reviewing and biosafety approval body for all proposed research associated with the intramural use of microbiological agents and recombinant or synthetic research subject to the *NIH Guidelines*. The IBC also serves as an advisory body to the Division of Occupational Health and Safety (DOHS), ORS.
8. **NIH Select Agent Program (NIH SAP)** – The DOHS program personnel including the Responsible Official (RO), Alternate Responsible Officials (AROs) and other support personnel in charge of complying with federal regulations (42 CFR 73, 7 CFR Part 331, and 9 CFR 121).
9. **Potentially Hazardous Biological Material** – General term used to describe recombinant and synthetic nucleic acids, toxins, human, animal and plant pathogens requiring BSL-2 and higher and Select Agents that could cause disease in humans.