

BIOSAFETY TRAINING

(For assistance, please contact EHS at (402) 472-4925, or visit our web site at <http://ehs.unl.edu/>)

Scope

This SOP applies to all work at UNL that is subject to the **UNL Biosafety Guidelines**. The content of this SOP is based on training requirements established by the following standards:

- *NIH Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines)*, National Institutes of Health
- *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, Centers for Disease Control and National Institutes of Health
- *Bloodborne Pathogens Standard, 29 CFR 1910.1030*, Occupational Safety and Health Administration

This information can be used by Principal Investigators (PIs) to develop a compliant training plan for workers under their supervision. This SOP is primarily intended for laboratory operations conducted under biosafety containment levels 1 and 2. Additional and specific training requirements apply to work with select agents and/or work conducted at biosafety containment level 3, which are beyond the scope of this SOP. Consult with the UNL Biosafety Officer for guidance on training applicable in these special circumstances.

Training Frequency

Training must be conducted at the following frequency:

- Prior to initial assignment to work with biological agents
- Annually thereafter (refresher training, which consists of review of the laboratory-specific biosafety manual; See Section titled "Lab Specific Training")
- When procedures or policy changes occur or new hazards are introduced that render previous training incomplete or obsolete
- When observations of the employee's skills or knowledge indicate that prior training was insufficient or not retained
- When deemed necessary by the IBC or Biosafety Officer

NIH Guidelines and Recombinant DNA Research Training

When recombinant DNA is used in the lab, all workers must be aware of the requirements of the NIH Guidelines and their responsibilities under the NIH Guidelines. All lab workers and PIs must complete the **NIH Guidelines for Research Involving Recombinant DNA Molecules** training module, available at: <http://ehs.unl.edu/onlinetraining/#NIHGuidelines>, prior to beginning work with recombinant DNA. This is in addition to the training described below for BSL-1 and BSL-2 laboratories. The EHS SOP, **Recombinant DNA - IBC and Other Review Requirements**, provides a reference table for common types of research covered by the NIH Guidelines.

General Biosafety Training (BSL-1 Labs)

The web-based training module Biosafety Basics is available at: <http://ehs.unl.edu/onlinetraining/#BSL>

Following is a list of topics covered by this training. Resources available to support the training topics are indicated. PIs must assemble all supporting materials in a laboratory specific biosafety manual that is reviewed by and readily available to all workers. See EHS SOP, **Preparing a Laboratory Biosafety Manual**. The lab-specific training items listed in the next section will need to be addressed by the PI or designated trainer in the lab.

1. Standard and special microbiological practices. The EHS SOP, **Standard and Special Microbiological Practices** can be used as a basis, but PIs (or their designees) must ensure that trainees demonstrate hands-on proficiency. Additional supporting EHS SOPs are also available, such as but not limited to: **Avoiding the Production of Biological Aerosols, Autoclave Operation and Performance Testing, Biosafety Cabinets**, etc.
2. Aseptic techniques, as appropriate to the specific procedures conducted in the laboratory.
3. Laboratory specific practices and techniques selected and prescribed by the PI in accordance with the NIH Guidelines, Section IV-B-7 (particularly those that are designed to minimize potential for exposure or release).
4. Procedures to be followed in the event of a spill and/or known or suspected occupational exposure. The following EHS SOPs provide relevant information.
 - **On the Job Injuries**
 - **Incident Reporting – National Institutes of Health (NIH) Guidance**

- ***Spill and Exposure Response for Biohazardous Materials (Including Recombinant Nucleic Acids).***
5. Location, proper use, limitations, care, and maintenance of prescribed Personal Protective Equipment (PPE), including, as applicable, laboratory coats, gowns, or other outerwear; various types of gloves available and the tasks for which they provide protection; safe use and limitations of eye and face protection. This should include consideration of biological and chemical hazards.
 6. Disinfection and decontamination agents, methods, and frequencies. This information is generally detailed in the protocol that is reviewed by the IBC. However, it is suggested to include Material Safety Data Sheets for specific chemical disinfectants and specific disinfection procedures, as appropriate.
 7. Security provisions and requirements. General considerations are discussed in the EHS SOP, ***Security Advice for Biosafety Laboratories***. Training should include laboratory-specific security policies and procedures, as applicable.

Biosafety Training for BSL-2 Labs

Online training for BSL-2 lab workers is available at:

<http://ehs.unl.edu/onlinetraining/#BSL2>.

All PIs and laboratory staff working under BSL-2 containment conditions must complete this training prior to conducting work that requires BSL-2 containment. All of the topics listed above in General Biosafety Training are covered in this training module, but the lab-specific items listed below will need to be addressed by the PI or designated trainer in the lab.

Lab-specific Training (All Labs)

Following is a list of topics to include in lab-specific training. Written materials to support this training are to be included in the laboratory biosafety manual. The biosafety manual is to be reviewed by all laboratory staff at least annually and the review documented as annual refresher training.

1. Potential hazards posed by the agent in use, as well as personal health conditions that may impact an individual's susceptibility to infection. This information is generally captured in the risk assessment conducted in support of the protocol, which is reviewed by the Institutional Biosafety Committee (IBC). A copy of the approved protocol must be included in the laboratory-specific biosafety manual. Agent hazard information for some human pathogens can be found at the following web site: Public Health Agency of Canada - <http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php>.

2. Instruction on the specific medical qualification, testing, or surveillance that is required as a condition of the IBC's approval of the protocol, and the basis/reasoning for such requirements. This information is generally captured in the protocol that is reviewed by the IBC.
3. Instruction/guidance relative to laboratory access restrictions, as well as specific entry and exit procedures. This information is generally captured in the protocol that is reviewed by the IBC and documented on the laboratory door placard. The EHS SOP, ***Door Postings for Potentially Hazardous Locations***, provides explanatory information.
4. PIs must provide laboratory workers with access to written, relevant, and laboratory-specific procedures by including these in the laboratory-specific biosafety manual. In the case of inexperienced workers, a progression of work activities must be assigned as techniques are learned and proficiency is developed.
5. Proper use of containment equipment, including biosafety cabinets. Refer to the EHS SOP, ***Biosafety Cabinets***.

Training Specific to HIV and HBV Laboratories

In addition to the training specified elsewhere in this SOP, employees working in HIV and HBV laboratories must complete EHS Bloodborne Pathogens training. This training is offered as a web-based module on the EHS web page. OSHA's Bloodborne Pathogen Standard requires annual re-training. Therefore, all staff must complete the EHS web-based Bloodborne Pathogens training module each year. .

Additional Considerations

1. Use of a respirator requires full participation in UNL's Respiratory Protection Program, which includes medical qualification, annual training, and fit-testing. Training is accomplished via EHS.
<http://ehs.unl.edu/documents/RespProtection.shtml>
2. All laboratory workers should complete EHS Core Training, which includes the following modules: UNL's Injury and Illness Prevention Plan, Chemical Safety, and Emergency Preparedness. In addition, this general training should be supplemented with instruction on building specific alarms, evacuation routes, shelter-in-place locations, locations of alarm stations, etc. See UNL's Emergency Planning and Preparedness website at <http://emergency.unl.edu/>.

3. PIs are encouraged to create a general laboratory safety manual, as a supplement to the biosafety manual. EHS SOPs and the Virtual Manual tool can be used for this purpose. <https://scsapps.unl.edu/VirtualManual/>. The Virtual Manual will also identify other relevant safety-related training that may be appropriate.
4. Use of radioactive materials and/or radiation-producing devices is subject to prior approval by the Radiation Safety Committee and requires specific training, delivered solely by EHS. <http://ehs.unl.edu/documents/RadSafe.shtml>
5. Use of vertebrate animals is subject to prior approval by the Institutional Animal Care and Use Committee (IACUC) and requires specific training. <http://research.unl.edu/orr/animalsubjectsresearch.shtml>
6. Any person who participates in a transport function related to hazardous materials/dangerous goods (e.g., signs paperwork, conducts packaging, etc.) must participate in the EHS DOT/IATA training program. <http://ehs.unl.edu/documents/Shipping.shtml>.

Records

The OSHA Bloodborne Pathogen Standard (29 CFR 1910.1030) mandates that training records be maintained for a minimum of three years from the date that training occurred. Records of training provided by EHS are maintained by EHS (including records of completion of web-based training modules). A copy of the current training records for your lab can be provided upon request. PIs are responsible to maintain records of training that is provided under their supervision, including annual refresher training (review of lab-specific biosafety manual by all laboratory workers).

While the NIH Guidelines and BMBL are silent as to maintenance of training records, PIs are encouraged to maintain training records for three years.

Model training documentation forms (limited in scope to biosafety training) are included in Appendices A and B to this SOP. These forms are provided for convenience only. Equivalent documentation is acceptable.

Appendix B

Annual Biosafety Lab Refresher Training

Topics Covered (check all that apply)

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|---|---|
| <input type="checkbox"/> Biosafety Manual Review | <input type="checkbox"/> PPE use, limitation, care, and maintenance |
| <input type="checkbox"/> Bloodborne Pathogens Training | <input type="checkbox"/> Lab Security Provisions |
| <input type="checkbox"/> Standard and Special Microbial Practices | <input type="checkbox"/> Medical Surveillance Provisions |
| <input type="checkbox"/> Lab-Specific Procedures | <input type="checkbox"/> Emergency Procedures and Spill Protocols |
| <input type="checkbox"/> Aseptic Technique | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Disinfection and Decontamination | |

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Trainer

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Signature _____