Template Instructions

Complete a separate LSP for each building in which you have laboratory space defined as any location in which you store or use hazardous materials or equipment including common areas you may share with other research groups.

1. Complete all sections that apply to your laboratory and research and delete those that do not apply.
2. Prior to submission to EHS please delete all instructions in red and update the Table of Contents.

# Contents

[Contents 1](#_Toc76634068)

[Laboratory Project Information 2](#_Toc76634069)

[Hazard Identification 3](#_Toc76634070)

[Floor Plan 4](#_Toc76634071)

[Emergency Numbers 4](#_Toc76634072)

[Laboratory Safety Responsibility 5](#_Toc76634073)

[Principal Investigator 5](#_Toc76634074)

[Laboratory Safety Manager 5](#_Toc76634075)

[Chemical Hygiene Officer 6](#_Toc76634076)

[Laboratorians 6](#_Toc76634077)

[Door Signage 6](#_Toc76634078)

[Personal Protective Equipment (PPE) 8](#_Toc76634079)

[Hazardous Waste Procedures 9](#_Toc76634080)

[Transport of Hazardous Materials 9](#_Toc76634081)

[Laboratory Working Hours and Working Alone Policy 10](#_Toc76634082)

[Incident/Near Miss Reporting Expectations 10](#_Toc76634083)

[Training 10](#_Toc76634084)

[Lab-Specific Training 10](#_Toc76634085)

[Chemical Hazards 12](#_Toc76634086)

[Chemical Hazard Communication 12](#_Toc76634087)

[Chemical Inventory 13](#_Toc76634088)

[Laboratory-Specific Chemical Safety 13](#_Toc76634089)

[Disinfection and Decontamination 13](#_Toc76634090)

[Surface disinfection 13](#_Toc76634091)

[Autoclave 14](#_Toc76634092)

[Biological Hazards 17](#_Toc76634093)

[Agent Summary Statements/Risk Assessments 17](#_Toc76634094)

[Biohazard Waste Disposal 17](#_Toc76634095)

[Biological Spill Procedures 18](#_Toc76634096)

[Spill Outside of Primary Containment 18](#_Toc76634097)

[Spill inside Biological Safety Cabinet 18](#_Toc76634098)

[Centrifuge Spill 19](#_Toc76634099)

[Radiation 22](#_Toc76634100)

[Laser Equipment 22](#_Toc76634101)

[Laboratory Emergency Procedures 23](#_Toc76634102)

[Appendix A Laboratory Specific Training Checklist 25](#_Toc76634103)

[Appendix B Weekly Autoclave Testing Log 28](#_Toc76634104)

[Appendix C Biological Agent Specific Risk Assessment 29](#_Toc76634105)

[Appendix D BSL2 Laboratory Checklist 39](#_Toc76634106)

# Laboratory Project Information

First responders (EHS, University Police, Facilities, and Durham Fire Department) will use this information to contact the PI or the alternate lab safety contact in the event of an emergency.

Building: Click or tap here to enter text. Room(s): Click or tap here to enter text.

Principal Investigator (PI): Click or tap here to enter text.

PI email: Click or tap here to enter text.

PI phone number (business hours): Click or tap here to enter text.

PI phone number after hours: Click or tap here to enter text.

Alternate lab safety contact: Click or tap here to enter text.

Alternate lab safety contact email: Click or tap here to enter text.

Alternate lab safety contact phone number (business hours): Click or tap here to enter text.

Alternate lab safety contact phone number after hours: Click or tap here to enter text.

Laboratory Safety Officer: Click or tap here to enter text.

Chemical Hygiene Officer: Click or tap here to enter text.

# Hazard Identification

|  |  |  |
| --- | --- | --- |
| Hazard | Room number(s) | Present |
| Hazardous Chemicals |  | Y  N |
| Radioactive Materials |  | Y  N |
| Biological Hazards |  | Y  N |
| Laser Equipment |  | Y  N |
| Compressed Gas |  | Y  N |
| Formaldehyde |  | Y  N |
| Recombinant DNA |  | Y  N |

The Laboratory Standard requires communicating the following information to employees. Indicate the location of each item in this table

|  |  |  |
| --- | --- | --- |
| Document | Online location | Location in lab |
| NCCU Laboratory Safety Manual\* |  |  |
| Laboratory-Specific Safety Plan |  | Click or tap here to enter text. |
| Chemical Hygiene Plan (Chemical Safety Plan\* and Laboratory Safety Plan) |  | Click or tap here to enter text. |
| Chemical Inventory |  |  |
| Safety Data Sheets (SDS)\* |  | Click or tap here to enter text. |
| Training documentation for all laboratorians\*   * New Laboratorian Training * Annual lab safety training * Laboratory Standard Training * Other training as required |  | Click or tap here to enter text. |
| Documentation of initial/annual review of LSP (Appendix A) |  | Click or tap here to enter text. |
| Copies [NCCU Laboratory Worker Registration Form](https://nccu.co1.qualtrics.com/jfe/form/SV_3gEQis6VGbt3oSW) for all current laboratory personnel |  | Click or tap here to enter text. |
| Executed [NCCU Initial Lab Training Record](https://dynamicforms.ngwebsolutions.com/Submit/Page?form=54fd3585-0b37-4500-9481-c69ccaa458d0&section=343581&page=301845&token=jAbMTmPVpO56IWuOqOLyeYibRXjON_H8DdBSpJ8dN3c) for all current employees |  |  |

\*These documents can be referenced online – printed copies are not required in the lab as long as laboratorians have access to the online version in the lab.

# Floor Plan

Prepare and insert a floor plan for each laboratory room covered by the LSP showing the location of all:

1. Hazardous material storage (including wastes)
2. Benches and desks
3. Fume hoods, biosafety cabinets, laminar flow cabinets/benches
4. Safety equipment - fire extinguishers, spill kits, showers, eye washes, compressed gas cylinders, first aid kit, autoclave, exit doors, etc.

This information should be used to train new laboratorians and will be used to provide information to emergency response personnel.

# Emergency Numbers

|  |  |  |
| --- | --- | --- |
| Agency | Phone | Hours |
| Environmental Health & Safety | 919-530-7125 | 8:00 a.m. – 5:00 p.m |
| University Police | 919-530-6106 or 911 | 24 hours |
| Work related injuries | 919-530-6106 or 911 | 24 hours |
| Fire or Smoke | 919-530-6106 or 911 | 24 hours |
| NC Poison Control | 1-800-84 TOXIN (1-800-848-6946) | 24 hours |
| Gas Leaks or Odors | 919-530-7125  919-530-6106 or 911 | 8:00 a.m. – 5:00 p.m  24 hours |
| Physical Plant | 919-530-6392 | 8:00 a.m. – 5:00 p.m |
| Chemical/Radioactive Spills | 919-530-7125  919-530-6106 or 911 | 8:00 a.m. – 5:00 p.m  24 hours |

# Laboratory Safety Responsibility

## Principal Investigator

* Prepare a Laboratory Safety Plan which along with the Chemical Safety Plan constitutes the Chemical Hygiene Plan as required by OSHA.
* Ensure that laboratory personnel meet all laboratory safety training requirements within 30 days of hire and submit [NCCU Initial Laboratory Training Record](https://www.nccu.edu/form/nccu-initial-laboratory-training-record) to EHS
* Ensure that all laboratory workers submit a Submit a [NCCU Laboratory Worker Registration Form](https://nccu.co1.qualtrics.com/jfe/form/SV_3gEQis6VGbt3oSW) at hire and whenever there is a change in work location or laboratory assignment.
* Ensure annual review of all Plans and Manuals for laboratorians or staff
* Ensure that staff and visitors observe safety rules and don proper personal protective equipment (PPE) when working in or visiting the laboratory.
* Ensure that proper safety supplies and equipment, such as gloves, safety glasses and/or goggles, lab coats, etc. are available in the laboratory.
* Post appropriate hazard information signs at entrance and within the laboratory.
* Conduct an “exit interview” with laboratory workers prior to their departure to ensure that they have properly labeled and prepared hazardous materials for disposal by EHS or use by other workers.
* Notify EHS prior to vacating laboratory space when moving on campus and notify department chair and EHS of planned departure from NCCU or discontinuance of the use of hazardous materials. Decontaminate laboratory surfaces and prepare hazardous materials for disposal, surplus or transfer to another space by EHS.

## Laboratory Safety Manager

* Assist with day-to-day safety operations including PPE compliance, safe work practices, and training
* Annually review all safety plans, update as necessary and document laboratorian annual review
* Serve as liaison with EHS for safety and compliance issues

## Chemical Hygiene Officer

* Provide required **initial** and **annual** training to laboratory personnel on the contents of the Chemical Hygiene Plan and document training
* Provide annual review of Chemical Hygiene Plan, update as necessary and document laboratorian annual review.
* Keep accurate laboratory chemical inventory.

## Laboratorians

* Familiarize yourself with this Laboratory Safety Plan, NCCU Laboratory Safety Manual, and the NCCU Chemical Safety Manual.
* Complete appropriate training and submit the [NCCU Initial Laboratory Training Record](https://www.nccu.edu/form/nccu-initial-laboratory-training-record) within 30 days of employment or new laboratory assignment.
* Submit a [NCCU Laboratory Worker Registration Form](https://nccu.co1.qualtrics.com/jfe/form/SV_3gEQis6VGbt3oSW) to EHS at hire and whenever there is a change in work location or laboratory assignment.
* Follow safety guidelines when handling hazardous materials, including the proper use of personal protective equipment.
* Notify EHS of accidents, spills, or conditions that may warrant further investigation and/or monitoring.
* Review laboratory materials to ensure that you have properly labeled and prepared all hazardous materials for disposal by EHS or use by other workers before you leave the research group.

# Door Signage

The required NCCU comprehensive lab sign provides emergency responders, Facilities Management staff, and visitors with information regarding potential laboratory hazards, required precautions for entry, and contact information. It fulfills several hazard posting requirements and makes hazard communication at NCCU more standardized and recognizable.

NCCU provides a customizable template available on the [EHS website](https://www.nccu.edu/administration/administration-and-finance/environmental-health-and-safety) to produce door signage.

**Biohazardous Materials**

A biohazard sign https://ehs.virginia.edu/images/bsl2_small.gif must be posted at the laboratory entry where biohazardous materials are present per the CDC/NIH Biosafety in the Microbiology and Biomedical Laboratory, 6th edition (BMBL).

**Chemical Hazards**

Signage will incorporate the National Fire Protection Association (NFPA) 704 fire diamond https://ehs.virginia.edu/images/nfpa_small.gifto communicate the hazard of short-term, acute exposures to chemicals that could occur as a result of a fire, spill or similar emergency. See the Chemical Safety Plan for full description of NFPA labeling.

**Radioactive Material**

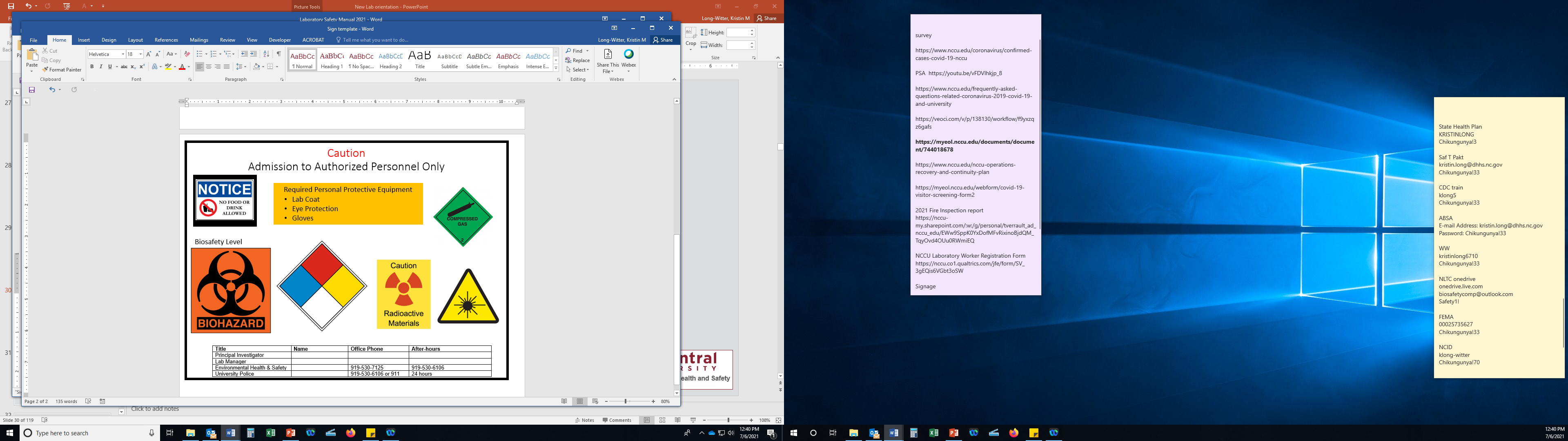
The radiation trefoil symbol https://ehs.virginia.edu/images/rad_small.gif should be included when radioactive materials are stored or used in the laboratory. Individuals entering this room who are not approved to use radioactive material, must be supervised to prohibit unauthorized removal of radioactive material or contaminated items present in the room. Laboratories bearing this sign must be locked to secure radioactive material when no one is present in the laboratory.

**Lasers**

The laser symbol https://ehs.virginia.edu/images/nfpa_laser_small.gif is incorporated when Class 3B or Class 4 lasers are present in the laboratory. **Do not enter** unless accompanied by lab personnel. When the laser is in operation, individuals entering this room must wear approved laser protective eyewear provided by lab personnel, if required by lab operating procedures for safe entry.

**Compressed Gas Hazard**

Laboratories with compressed gas cylinders must include the compressed gas hazard symbol  on their laboratory signage.



# Personal Protective Equipment (PPE)

Laboratories should set minimum lab apparel and PPE requirements based on the hazards encountered in the space using guidance in the NCCU Laboratory Safety Manual. The PI is ultimately responsible for ensuring compliance.

|  |
| --- |
| Document lab apparel rules and requirements (long pants, closed toed shoes, etc.) Click or tap here to enter text.  Specify lab-specific PPE requirements here; specify when and where PPE is required Click or tap here to enter text.  Specify PPE required for special hazards (cryogenic gloves, UV face shield, heat-resistant gloves, etc.) |

# Hazardous Waste Procedures

Describe the processes that generate hazardous chemical or radiological waste in your lab, the waste streams generated and estimate the amount of hazardous waste that will be generated on a weekly or monthly basis.

Prepare procedures to ensure proper segregation, containment and storage of wastes. Give special attention to avoid mixing of incompatible wastes, and to ensure proper segregation to minimize disposal costs.

Labs should not accumulate more than 10 bottles of liquid chemical waste before submitting an online [Hazardous Waste Pickup Request](https://nccu.co1.qualtrics.com/jfe/form/SV_d57tdt8QLFcTeBM).

Refer to Chemical Safety Plan and [NCCU Radiation Safety Plan](https://myeol.nccu.edu/documents/document/236260082) for detailed information on waste disposal.

# Transport of Hazardous Materials

Hazardous materials require specific packaging and labeling according to their potential hazards. Biological materials must be prepared and shipped according to Department of Transportation (DOT) and International Air Transport Association (IATA) regulations. These regulations state that you must receive specific training to legally package, ship or transport a hazardous biological material – including biological waste. Contact EHS to receive this training and to identify the specific requirements for your materials.

Transporting potentially hazardous materials outside of the laboratory requires a durable leak-proof secondary container. Containers should be gasketed, labeled, and closable. Use secondary containers (e.g. Ziploc bag with a paper towel or other absorbent material) if the primary container may become contaminated or punctured. Label the outermost container with the appropriate hazard symbol.

# Laboratory Working Hours and Working Alone Policy

The NCCU Laboratory Safety Manual states that researchers should avoid performing experiments alone in a laboratory building. Arrange with individuals working in separate laboratories outside of working hours to cross check periodically. Do not undertake experiments known to be hazardous when alone in a laboratory. See NCCU Laboratory Safety Manual for information and policies on underage persons in the laboratory.

Document your labs rules for working alone and/or working after hours

Click or tap here to enter text.

# Incident/Near Miss Reporting Expectations

Please review the NCCU Injury or Illness reporting requirements in the Laboratory Safety Manual. An investigation of any incident or near miss should take place as soon after the incident or near miss is recognized. EHS should be notified and lead the investigation.

|  |
| --- |
| Document your lab-specific policies on incident and near miss reporting here  Click or tap here to enter text. |

# Training

It is the Principal Investigator’s responsibility to ensure all laboratory personnel (employees, students, visiting researchers) receive and document all initial training on the [NCCU Initial Laboratory Training Record.](https://nccu-my.sharepoint.com/:b:/g/personal/klongwit_ad_nccu_edu/ETUeifFlQrlGpxSGK_T3wA0B8zUucKOdrZ-TnZwHvKqUeQ?e=kCZPeH)

## Lab-Specific Training

It is the responsibility of each PI/Lab Manager to provide training to laboratorians on hazards and protocols specific to each laboratory. Training must be provided at the time of an employee's initial work assignment, prior to assignments involving new potential exposure situations and **annually** thereafter. In the case that only one employee is working in the lab, that employee must review lab-specific training material annually and document that it has been done. [Appendix A](#_Appendix_A_Laboratory) should be customized to list training required for the specific laboratory.

# Chemical Hazards

Summarize the types of hazardous chemicals stored or manipulated in the laboratory to inform laboratory and emergency response personnel. THIS LIST IS A SUMMARY AND DOES NOT REPLACE A FULL CHEMICAL INVENTORY.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Chemical Name/  Mixture | Volume/ Concentration | Hazard Class | Route of Exposure | Risk to Pregnant Woman and/or Fetus | Storage Location/Conditions |
|  |  | Choose an item. | Choose an item. | Yes  No |  |
|  |  | Choose an item. | Choose an item. | Yes  No |  |
|  |  | Choose an item. | Choose an item. | Yes  No |  |

## Chemical Hazard Communication

All chemicals in the laboratory are required to have a label that indicates chemical contents and hazard warnings. Labs should write on the chemical the date received and the date the container was first open. Labs are responsible for labeling chemicals that are transferred from manufacturer containers into a secondary container or chemicals that are synthesized in the lab unless chemicals will be used within one work shift and will not be unattended during the work period.

[Identifying and Evaluating Hazards in Research Laboratories](https://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/publications/identifying-and-evaluating-hazards-in-research-laboratories.pdf) guide produced by American Chemical Society provides excellent guidance doing a hazard analysis in laboratories.

## Chemical Inventory

All laboratories at NCCU are required to keep an accurate and complete inventory of their hazardous chemicals which must be provided to internal and external inspectors upon request. Remember that compressed gasses must be included on the lab’s chemical inventory.

## Laboratory-Specific Chemical Safety

The NCCU Laboratory Safety Manual and Chemical Safety Manual provide general chemical safety protocols. Each Principal Investigator must supplement these plans with safe handling procedures and other safety requirements specific to the research group including:

* Detailed procedures for handling toxic chemicals and “select carcinogens” that are used in the laboratory, including designation of the work area and entry restrictions
* Identification of materials and procedures that are to be restricted to fume hoods or biological safety cabinets
* Detailed procedures for working with large quantities of hazardous chemicals (>4L)

# Disinfection and Decontamination

## Surface disinfection

The appropriate disinfectant and contact time required to inactivate agents are determined by agent-specific risk assessment. If more than one disinfectant is used, you must specify which conditions require a certain disinfectant.

Contact time is the amount of time an [EPA-registered disinfecting product](https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants) needs to be present on a surface in order to be effective against the microorganisms listed on its label. Allowing the disinfectant to remain **wet** on surfaces for the appropriate contact time ensures that microorganisms are exposed to the disinfectant long enough for it to be effective.

Use of the listed EPA-registered products consistent with the product labeling complies with the [Occupational Safety and Health Administration‘s requirements for Occupational Exposure to blood borne Pathogens (29 CFR 1910)](https://www.osha.gov/SLTC/bloodbornepathogens/standards.html) as well as proper management of any waste when disposed, which is regulated under the [Resource Conservation and Recovery Act (RCRA)](https://www.epa.gov/laws-regulations).

|  |  |  |
| --- | --- | --- |
| Infectious Agent/  Biological Material | Disinfectant/  Concentration | Contact time (minutes) |
|  |  |  |

## Autoclave

Autoclave use can pose physical hazards (e.g. heat, steam and pressure) and biological hazards (e.g. improperly disinfected hazardous waste). All persons who work in a lab that uses and autoclave are required to take a [one-time autoclave safety training](https://forms.office.com/r/dL5JPAKnHu) and be trained on the specific autoclave procedures for the lab. General safety measures include:

* Do not autoclave items containing corrosives, solvents, volatiles or radioactive materials
* Load the autoclave as per the manufacturer’s recommendation – NEVER overload
* Glassware should be placed in a heat resistant plastic tray - never place directly on racks or chamber floor.
* Select the correct cycle for the items being autoclaved. Wear the proper PPE, including:
  + Heat resistant gloves, lab coat, and eye protection to remove items from autoclave
  + Rubber apron and face shield should be used if hot liquids are involved
* Allow materials to cool for at least 10 minutes with the door open before unloading; open the door slowly keeping your head, face and hands away from the door.
* Prior to opening door, confirm that both temperature and pressure are in a safe range.

**Additional Practices for Autoclaving Liquids**

* To prevent bottles from shattering during pressurization and heating, the caps of containers with liquids must be loosened before loading.
* Use only borosilicate glass (Pyrex™ or Kimax™) or polypropylene plastic which can withstand the high autoclave temperatures.
* Liquids should be within a heat resistant plastic tray containing an ½ inch of water, to ensure even heating.
* Bottles of liquid should not be more than 75% full.
* Keep 1-2 inches of space between bottles.

**Additional Practices for Autoclaving Dry Loads**

* Check plastic autoclave bins used to hold materials in the autoclave for compatibility
  + Polyethylene plastics (LDPE and HDPE) cannot be autoclaved.

Performance Monitoring

Verification of autoclave performance is critical to ensure that hazardous materials are being fully decontaminated and critical lab reagents are being fully sterilized.

Customize table for lab – delete if autoclave is not present.

|  |  |  |
| --- | --- | --- |
| Method | Parameter(s) verified | Protocols |
| Heat-sensitive tape | Proper temperature has been reached | Use heat sensitive sterilization indicator tape for **each load** |
| Biological indicator | Proper temperature and pressure parameters were sufficient to kill biological organisms | **Required weekly** by NC  Document on [Weekly Autoclave Test Log](#_Appendix_B_Weekly) (Appendix B) |
| Chemical Indicator | Autoclave parameters were sufficient to achieve sterilization of instruments or tools | Can be used if autoclaving instruments; does not replace biological indicator |

Autoclave Preventative Maintenance

Autoclave operators should perform the following preventative maintenance on their autoclave to maintain the autoclave's effectiveness:

1. Remove the plug screen or drain strainer to make sure it is free of dirt, dust, or sediment that may collect in it and it should be cleaned as necessary.
2. Clean the interior surfaces of residues collected from the steam or materials being sterilized as needed.
3. Visually inspect the gaskets, doors, shelves and walls for residue buildup or wear regularly.

Manufacturer-recommended periodic inspections and preventive maintenance shall be conducted and recordkeeping shall be maintained.

**Autoclave Failure**

Discontinue use immediately if an autoclave is not working properly. Post a sign alerting others not to use the autoclave.

Document the procedure for waste handling/storage if the autoclave is not operational.

Mechanical failures need to be attended to by a trained technician. Contact the service company responsible for the maintenance of your autoclave or EHS for further guidance.

# Biological Hazards

## Agent Summary Statements/Risk Assessments

[The Biosafety in Microbiological and Biomedical Laboratories](https://www.cdc.gov/labs/BMBL.html) (BMBL) serves as a code of practice for biosafety in microbiological and biomedical laboratories. The sixth edition was released in 2020 and includes agent summary statements that describe the hazards, recommended precautions, and levels of containment appropriate for handling specific human and zoonotic pathogens in the laboratory and in facilities that house laboratory vertebrate animals. Agent summary statements are included for agents that meet one or more of the following three criteria:

1. the agent is a proven hazard to laboratory personnel working with infectious materials;
2. the agent has a high potential for causing LAIs even though no documented cases exist;
3. the agent causes grave disease or presents a significant public health hazard.

PIs are responsible for conducting or reviewing risk assessments before beginning work with an agent or procedure new to the laboratory. All staff must review the hazard statement or risk assessment for biological risks in the laboratory and have this review documented. There are three options for providing this information:

1. Review relevant Agent Summary Statements in the [BMBL, 6th ed.](https://www.cdc.gov/labs/BMBL.html)
2. Review [Pathogen Safety Data Sheet](https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment.html) for agents in your laboratory
3. Conduct a lab-specific, [agent-specific risk assessment](#_Appendix_C_Biological) (must be included as Appendix C of this Plan)

# Biohazard Waste Disposal

Document how all biohazard waste is decontaminated and disposed in the laboratory.

|  |  |  |
| --- | --- | --- |
| Type of waste | Examples | Decontamination/Disposal |
| Liquid | Cell culture waste, infectious liquid waste |  |
| Solid | Disposables- pipettes, tips, cell culture vessels |  |
| Sharps | Contaminated and non |  |
| Other (specify) |  |  |

# Biological Spill Procedures

These procedures cover spills involving biological materials, including spills involving recombinant or synthetic nucleic acids. All personnel who perform clean-up must be properly trained in the hazards present. If personnel do not feel comfortable cleaning up any spill, evacuate the area and call EHS.

Customize procedures below if necessary for your laboratory. A hard copy of your spill procedures should be kept with the spill kit.

Location of biological spill kit(s): Click or tap here to enter text.

## Spill Outside of Primary Containment

1. EVACUATE all personnel from the room and close the door if aerosols are a concern – wait 30 minutes to allow aerosols to settle before attempting to clean up the spill.
2. ALERT others to avoid contamination (post spill sign from spill kit)
3. REMOVE any contaminated clothing or personal protective equipment and place in a biohazard bag for decontamination and/or disposal. Wash your hands!
4. PUT ON clean gloves, lab coat, and eye/face protection.
5. REMOVE any solid/sharp objects using tongs, dustpan and broom or other mechanical device contained in spill kit.
6. CLEAN UP the spill

* Place absorbent material (paper towels) over spill
* Gently pour/spray disinfectant from the outer rim of the spill inwards until absorbent material is completely saturated.
* Allow disinfectant to stand for appropriate contact time.
* Clean up the spill working in a circular motion from the outer rim of the spill to the center.
* Rinse area with 70% ethanol or water if bleach is used to remove any corrosive residues.
* Dispose of absorbent materials as biohazard waste.
* Wash hands with soap and water.

1. REPORT incident to supervisor

## Spill inside Biological Safety Cabinet

1. Leave the biological safety cabinet blower on and begin cleanup immediately.
2. Do not place your head in the cabinet to clean the spill, keep your face behind the view screen.
3. REMOVE any solid/sharp objects using tongs, dustpan and broom or other mechanical device contained in spill kit.
4. CLEAN UP the spill

* Place absorbent material (paper towels) over spill
* Gently pour/spray disinfectant from the outer rim of the spill inwards until absorbent material is completely saturated.
* If necessary, flood the work surface as well as the drain pans and catch basins below the work surface, with disinfectant; be sure the drain valve is closed before flooding the area under the work surface.
* Wipe cabinet walls, work surfaces, and inside the view screen with disinfectant.
* Lift the front exhaust grill and work surface; wipe all surfaces with disinfectant.
* Allow disinfectant to stand for appropriate contact time.
* If necessary, place a container under the drain valve and drain the disinfectant under the work surface into the container.
* Rinse area with 70% ethanol or water if bleach is used to remove any corrosive residues.

1. Dispose of absorbent materials as biohazard waste.
2. Wash hands with soap and water.
3. REPORT incident to supervisor

## Centrifuge Spill

For BSL2 agents, always use sealed safety-caps, sealed buckets or sealed rotors with O-rings. Examine O-ring and replace if worn, cracking or missing. Check tubes and bottles for cracks and deformities before each use.

1. Wait five minutes before opening the centrifuge following the end of a run with potentially hazardous biological material. If a spill is identified after the centrifuge lid is opened, carefully close the lid. Let aerosols settle for 30 minutes.
2. Remove any contaminated protective clothing and place into a biohazard bag. Wash hands and any exposed skin surfaces with soap and water.
3. PUT ON clean gloves, lab coat, and eye/face protection.
4. CLEAN UP SPILL

* Keep rotors and buckets closed and transfer them to a biological safety cabinet.
* Carefully retrieve any broken glass from inside the centrifuge and/or rotor or bucket using forceps and discard into a sharps container. Smaller pieces of glass may be collected with forceps.
* Immerse rotor/buckets in 70% ethanol or a non-corrosive disinfectant for appropriate contact time. Allow to completely air dry.
* Intact tubes may be wiped down with disinfectant and placed into a new container.
* Wipe the inside of the centrifuge with disinfectant.

1. If bleach is used, follow with 70% ethanol to remove any corrosive residues.
2. Dispose of absorbent materials as biohazard waste.
3. Wash hands with soap and water.
4. REPORT incident to supervisor

Document all biological hazards stored or manipulated in the laboratory. Include all infectious agents, viral vectors, and biological toxins.

If the laboratory is designated as BSL2, complete the [BSL2 Checklist](#_Appendix_D_BSL2) in Appendix D. Each room designated as BSL-2 must be evaluated against these criteria. Multiple rooms may be listed on a single checklist.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Agent (genus & species) | Category | Biosafety Level | Location/room | Hazard statement/risk assessment location (include websites) |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |
|  | Choose an item. | Choose an item. |  |  |

# Radiation

All NCCU policies for use of radioactive materials or equipment can be found in the [NCCU Radiation Safety Manual](https://myeol.nccu.edu/documents/document/236260082).

# Laser Equipment

Provide information on the laser as requested on the form: location, laser type, manufacturer, beam characteristics, maximum output, frequency, aperture diameter, divergence, focal length, access controls, and emergency switch. List the names of the operators, and training requirements.

# Laboratory Emergency Procedures

Complete and post in lab near entry/exit door. The  [internal](https://myeol.nccu.edu/sites/default/files/2021-04/Inside-Assembly-Points.pdf) and [external](https://myeol.nccu.edu/sites/default/files/2021-04/Outside-Assemble-Points.pdf) assembly points for all buildings are found on the EHS website. Delete these instructions before printing/posting.

**Building:** Click or tap here to enter text. **Room:** Click or tap here to enter text.

**Designated Lab Safety Coordinator:** Click or tap here to enter text.

**The following emergency equipment is located in this room:**

**The following emergency equipment is not located in this room, but can be found at:** Click or tap here to enter text.

**FIRE**

1. If you see smoke and suspect a fire, activate the closest fire pull station. Fire pull stations are located Click or tap here to enter text.

2. Evacuate the building using the route described below. Never us an elevator. Warn everyone on your way out.

3. Proceed to your external assembly point

***Emergency Evacuation Route:***

*Briefly describe evacuation routes and meeting areas*

**SEVERE WEATHER**

**During a Severe Weather Watch:**

1. Be prepared to shut down experiments or equipment in case you need to evacuate.

Take into account possible power or other utility outages following a storm.

**During a Severe Weather Warning:**

1. Initiate critical lab shutdown procedures below **if you are not in immediate danger.**

2. Proceed to the designated internal gathering point closing doors as you exit

3. Emergency notifications are sent via email/text and calls. You must receive an “all clear” before leaving the safety area or returning to work.

***Severe Weather Safe Area:***

*Briefly describe the directions to the internal assembly point.*

**CHEMICAL SPILL**

**If there is a spill of chemicals or other hazardous substances:**

1. Evacuate personnel the spill area.

2. Close doors and isolate the area. Prevent people from entering the spill area.

3. If you are trained and able to clean up the spill safely, do so. If not:

4. From a safe location, call 919-530-7125 (or 919-530-6106 after hours). Tell them: **Where is it** (Fume hood, inside a lab, or in a public area)? **What is it** (flammable, toxic, corrosive, low hazard, oxidizer, reactive)? **How much** (< 1 L, > 1 gal, or still expanding)?

5. **Do not re-enter** the spill area until notified that it is safe to return.

**CRITICAL LABORATORY SHUTDOWN PROCEDURES**

Turn off all flames and ignition sources

Turn off all electrical equipment

Secure all hazardous materials

Close all fume hoods and biosafety cabinets

Other Lab Specific Click or tap here to enter text.

# Appendix A Laboratory Specific Training Checklist

Customize this this checklist to ensure that laboratorians receive the proper information and training before beginning work in the laboratory. The Certification of Lab-Specific Safety Plan Initial and Annual Review form must be kept with the laboratory safety documentation and made available for review to inspectors.

|  |  |
| --- | --- |
| **General** | |
|  | Who to contact for NCCU required training |
|  | Where to access Laboratory Safety Information and Plans within the work space (include initial review of Laboratory Safety Manual and Laboratory Safety Plan |
|  | Food and beverages restrictions in labs or hazardous areas |
|  | Location of signage including hazard communication, [door signs](https://dehs.umn.edu/23-signage), and emergency plan |
|  | Lab-specific standard operating procedures (SOPs) |
|  | Physical and health hazards associated with the lab activities |
|  | Methods and observation techniques to determine the presence or release of hazardous materials, including signs and symptoms associated with personal exposure to hazardous materials in the lab |
|  | Recent laboratory inspections and self-evaluations |
|  | Proper housekeeping and decontamination of laboratory equipment and work areas |
|  | Procedures for transporting hazardous materials safely across campus, off campus, or shipping hazardous materials |

|  |  |
| --- | --- |
| **Emergency Response** | |
|  | Emergency procedures including evacuations and spill clean-up |
|  | Laboratory Emergency Procedures posted by the door for incidents, including where to meet in the event of an evacuation |
|  | Eyewash/shower locations, use, and required testing |
|  | Location of emergency equipment including spill kits, fire extinguishers, pull stations, and first aid kit |
|  | How to contact NCCU Facilities Operations in the event of odors, a water event, or when damage to facility occurs |

|  |  |
| --- | --- |
| **Personal Protective Equipment** | |
|  | PPE requirements for personnel including selection, maintenance, and disposal of gloves, lab coats, etc. |
|  | Proper PPE removal before entering public spaces |
|  | Respiratory protection requirements |

|  |  |
| --- | --- |
| **Chemical Hazards** | |
|  | Storage location of chemicals and their segregation by compatibility |
|  | Requirements for chemical labeling and hazard communication on containers |
|  | Proper use and handling of hazardous chemicals and gases |
|  | Chemical inventory and reconciliation |
|  | Use of specific chemicals that would warrant exposure monitoring (e.g. formaldehyde) |
|  | Location of Safety Data Sheets |
|  | Use of other lab-specific engineering controls (e.g., snorkels, canopies, room ventilation) |
|  | Processes and locations for proper chemical waste disposal in your lab/building |
|  | Correctly labeling and storing hazardous chemical waste and waste containers |
|  | How to dispose of broken glass and prep glass bottles for recycling |

|  |  |
| --- | --- |
| **Biological Hazards** | |
|  | Initial and annual Bloodborne Pathogen training when working with blood or OPIM |
|  | Location of biological agent summary statements (may be online but staff must review relevant agents |
|  | Proper use of biological lab equipment, including biological safety cabinets, autoclaves, and centrifuges. |
|  | How to report an exposure or potential exposure l |
|  | Proper disposal of biohazardous and infectious waste |
|  | [Biological spill procedures](https://bohd.umn.edu/biological-spills) and kit location |

|  |  |
| --- | --- |
| **Additional Site Specific Topics (Describe any additional topics covered during the training)** | |
|  |  |
|  |  |
|  |  |

Certification of Lab-Specific Safety Plan Initial and Annual Review

Print and retain with Lab-Specific Safety Plan

In accordance with the OSHA Laboratory Safety Standard and the University’s Laboratory Safety Program, the individuals listed below have been provided with Lab-Specific Safety Training covering all topics included in Laboratory Training Checklist.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | | **Name/**  **Signature** | **Initial or**  **Refresher** | **Trainer Name/ Signature** |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |
|  |  | | **I  R** |  |

# Appendix B Weekly Autoclave Testing Log

**Year of** Click or tap here to enter text.

Location: Click or tap here to enter text. PI/Lab: Click or tap here to enter text.

Indicator Manufacturer/Model: Click or tap here to enter text.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date Autoclaved** | **Lot Number**  **Exp Date** | **Cycle** | **Results**  **(+/-)** | **Comments** | **Initials** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Must retain completed forms in lab for 3 years

# Appendix C Biological Agent Specific Risk Assessment

This worksheet is designed to identify risks and risk mitigations associated with biohazards in the laboratory setting.

The final document must be included as Appendix C of the Laboratory Safety Plan and reviewed at least annually as part of the Lab Safety Plan review. This document is updated when changes arise including but not limited to new biological hazards or risks, change in work process or flow, new equipment, changes to personnel training requirements, new work area, if mitigation strategies change, and as new information becomes available.

Instructions

If you have any questions or need assistance completing this worksheet, please feel free to contact the Biosafety Officer at [ehs@nccu.edu](mailto:ehs@nccu.edu).

1. Name of Agent – List scientific and any common names for biological agent and/or diseases.
2. Classification of agent – check box that describes what type of organism the agent represents.
3. Containment or biosafety level (BSL) – Defined in the [Biosafety in Microbiological and Biomedical Laboratories (BMBL)](https://www.cdc.gov/biosafety/publications/bmbl5/BMBL5_sect_IV.pdf).
   1. **BSL1** - Suitable for work involving well-characterized agents not known to consistently cause disease in immunocompetent adult humans, and present minimal potential hazard to laboratory personnel and the environment.
   2. **BSL2** - Suitable for work involving agents that pose moderate hazards to personnel and the environment. It differs from BSL-1 in that: 1) laboratory personnel have specific training in handling pathogenic agents and are supervised by scientists competent in handling infectious agents and associated procedures; 2) access to the laboratory is restricted when work is being conducted; and 3) all procedures in which infectious aerosols or splashes may be created are conducted in biosafety cabinets (BSC) or other physical containment equipment.
4. Pathogenicity – Describe typical and atypical disease course
5. Infectious to humans – Indicate whether agent is infectious in humans
6. Routes of laboratory transmission – Describe how infection could occur in your laboratory. For instance, an animal bite is where there is no exposure to animals.
7. Infectious dose and incubation period.
8. Risk to pregnant women/fetus
9. Reportable symptoms – List all signs and symptoms that laboratorians with exposure risk should be aware of and are instructed to report if they experience any following known or suspected exposure to the agent.

**Procedural Risks**

Describe all assays and procedures used in your lab to manipulate biohazard.

1. Manipulation of sharps – Sharps have the potential to cause puncture, cut, or scrape wounds. Indicate which types of sharps are used to manipulate the agent being assessed.
2. Manipulation of materials
   * 1. Spill potential
     2. Volume of single sample indicates average volume of a sample (i.e. 2 ml culture)
     3. # samples – on average how many samples would a laboratorian manipulate at one time (i.e. 6 well plate = 6)
     4. Total spill volume is calculated by multiplying volume of sample x # of samples manipulated.

**Risk Determination**

In this section you will use the Risk Matrix, Hierarchy of Controls, and the information that you identified in the Agent and Procedural sections to assess the level of risk for all tasks associated with manipulation biological hazards. Tasks are broken down into three areas and examples of each are described below:

* **Pre-experimental** –Receipt and transport of sample to lab, PPE, engineering controls
* **Experimental** – Manipulation of material
* **Post-experimental** - Removal of PPE, decontamination, waste disposal

1. **Activity/Practice/Procedure** – List the activity, test, or procedure that presents risk to laboratorians (i.e. Material is shipped or transported to/from laboratory)
2. **Potential hazard** – list all potential hazards associated with that activity or procedure (i.e. material dropped during transport or arrives damaged)
3. **Likelihood** – Refer to Risk Matrix
4. **Consequence** – Refer to Risk Matrix
5. **Risk Rating** – Where likelihood and consequence intersect on matrix (i.e. if Likelihood = Likely and Consequence = Moderate the risk rating would be HIGH.
6. **Control/Protection** - List controls/protections in each category (engineering, administrative and PPE). According to the Hierarchy of Controls engineering controls should be used before administrative or PPE controls.
7. **Additional Information** - List any additional notes or recommendations

**Controls and Mitigations**

This section details controls that are to be used to mitigate risks associated with the biological and chemical hazards in the laboratory.

**Risk-Assessment Template**

**Biological Agent Information**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name of Agent: | | |  | | | | | | | | | |
| Characteristics: | | |  | | | | | | | | | |
| Fungi | Bacteria | | | Recombinant DNA | | | Toxin | Virus | | | Other | | |
| Containment level: | BSL1 | | | BSL2 | | | Not applicable | | | |  | | |
| Pathogenicity: | | |  | | | | | | | | | |
| Infectious to humans? | | | | | | Yes | | | | No | | | |
| Possible routes of laboratory transmission | | | | | | | | | | | | | |
| Ingestion | | Inhalation | | Percutaneous | | | Mucous membrane | | | | | Other | |
| Transmitted by aerosol: | | | | | Yes | | | | No | | | | |
| Infectious dose: | | |  | | | | | | | | | | |
| Incubation period: | | |  | | | | | | | | | | |
| Risk to pregnant women and/or fetus: | | | | | Yes | | | | No | | | | |
| Reportable symptoms: | | |  | | | | | | | | | |

**Procedural Risks**

|  |  |  |
| --- | --- | --- |
| Standard Operating procedure available for each laboratory assay or research protocol | **Yes** | **No** |

|  |  |  |
| --- | --- | --- |
| Manipulation of Sharps | | |
| Manipulation of sharps- If no sharps are used, proceed to next section Yes | | |
| Pipette tips | Use of glass | Expelling air from tubes/bottles |
| Scalpels/blades | Necropsy | Remove needle from syringe |
| Aspirating fluids | Serological pipettes |  |
| Other (please describe): | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Manipulation of Materials | | | | | |
| Are needles and loops single use/disposable? Yes  No | | | | | |
| Does manipulation of infectious materials occur exclusively in BSC? Yes  No | | | | | |
| Spill potential | Volume of sample: | # vessels opened/manipulated at one time:  Total spill volume: volume x vessel # | | |
| Pipette material | Inoculating plates, tissue culture, etc. | | | Shaking/mixing: | |
| Flame loop  Bacticinerator | Vortex | | | Grinding/Blending | |
| Sonicate | Vacuum | | | Pulverizing | |
| Centrifugation  Are safety cups/rotors in use? Yes  No | | | Package infectious shipments | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Severity of Consequences Should a Laboratory Acquired Infection (LAI) occur | | | |
| Carrier | Asymptomatic infection | Acute infection | Chronic infection |
| Illness | Disease | Toxicity, oncogenicity, allergenicity | Death |
| Is infection spread person-to-person? Yes  No | | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Other Hazards | | | | | | | | | |
| Heat/burn | | | Cold | | | | Excessive noise | | |
| Hazardous chemicals | | | Allergens | | | | Steam | | |
| Repetitive movement | | | Heavy lifting >30 pounds | | | | Reaching | | |
| Slip/trip/fall | | | Pinch/crush/scrape | | | | Explosion | | |
| **RISK MATRIX** | | | **Consequence** | | | | | | |
| **Minimal:**  **Requires reporting and follow up action** | | **Minor:**  **Potential first-aid injury** | **Moderate:**  **Injury or exposure** | **Major:**  **Serious injury; non-permanent disability** | | **Severe:**  **Fatality or injury or illness with permanent disability** |
| **Likelihood** | | **Rare: Possible in extraordinary circumstances** | **LOW** | | **LOW** | **LOW** | **LOW** | | **MEDIUM** |
| **Unlikely: Event would require multiple systems and/or control failures** | **LOW** | | **LOW** | **MEDIUM** | **MEDIUM** | | **HIGH** |
| **Possible: Possible when additional factors are present.** | **LOW** | | **MEDIUM** | **HIGH** | **HIGH** | | **HIGH** |
| **Likely: Such an event is known to have occurred; a credible scenario.** | **LOW** | | **MEDIUM** | **HIGH** | **HIGH** | | **EXTREME** |
| **Highly Likely: Expected to occur in most circumstances.** | **MEDIUM** | | **HIGH** | **HIGH** | **EXTREME** | | **EXTREME** |

|  |  |  |
| --- | --- | --- |
| **Actions Required Based on Risk Matrix** | | |
| **Estimated Risk Level** | **Description of Estimated Risk Level** | **Actions** |
| **LOW** | **If the incident were to occur, there would be little likelihood that an injury would result.** | **Continue the activity with existing controls in place.** |
| **MEDIUM** | **There is some chance that an injury or exposure requiring first aid would result.** | **Additional controls are recommended.** |
| **HIGH** | **The incident would likely require medical attention.** | **Controls will need to be in place before activity is undertaken.** |
| **EXTREME** | **The incident would likely lead to a permanent, debilitating injury or death.** | **Consider alternatives to performing the activity. Significant control measures will need to be implemented to ensure safety.** |

|  |  |  |
| --- | --- | --- |
| **Hierarchy of Control Measures** | | |
| **Most Effective (High Level)**  **Least Effective (Low Level)** | **Engineering/Design Controls** | **Elimination: physically remove the hazard from the activity** |
| **Substitution: replace the hazard with a less dangerous one** |
| **Redesign: make equipment or processes safer** |
| **Isolation: isolate people from the hazard** |
| **Administrative Controls** | **Administration: putting rules, signage, or training in place to make the workplace safer** |
| **Personal Protective Equipment (PPE)** | **PPE: protective clothing and equipment** |

| **PRE-EXPERIMENTAL EXPOSURE RISK** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **ACTIVITY/PRACTICE/**  **PROCEDURE** | **POTENTIAL**  **HAZARD** | **LIKELIHOOD** | **CONSEQUENCE** | **RISK**  **LEVEL** | **CONTROLS** | **ADDITIONAL INFORMATION** |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** |  |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** |  |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** |  |

| **EXPERIMENTAL EXPOSURE RISK** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **ACTIVITY/PRACTICE/**  **PROCEDURE** | **POTENTIAL**  **HAZARD** | **LIKELIHOOD** | **CONSEQUENCE** | **RISK LEVEL** | **CONTROLS** | **ADDITIONAL INFORMATION** |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** |  |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** |  |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **POST-EXPERIMENTAL EXPOSURE RISK** | | | | | | | |
| **ACTIVITY/PRACTICE/**  **PROCEDURE** | **POTENTIAL**  **HAZARD** | **LIKELIHOOD** | **HAZARD SEVERITY** | **RISK**  **LEVEL** | **CONTROLS** | **ADDITIONAL INFORMATION** | |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** | |  |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** | |  |
|  |  | **Choose an item.** | **Choose an item.** | **Choose an item.** | **Engineering:**  **Administrative:**  **PPE:** | |  |

**Biohazard Controls and Mitigations**

**Engineering Controls**

|  |  |  |  |
| --- | --- | --- | --- |
| Biological Safety Cabinet in Lab | | Class II  Other | |
| Safety shield for benchtop processes | | Yes  No ☐ | |
| Restricted access to lab during infectious/ potentially infectious work | | Yes  No ☐ | |
| Centrifuges have biocontainment features | | Yes  No ☐ | |
| Single pass airflow | | Yes  No ☐ | |
| Lab exhaust HEPA filtered | | Yes  No ☐ | |
| Is an autoclave available in lab? | | Yes | No ☐ |
| If not, describe how materials are prepared, labeled, and stored for disposal and how waste is disposed of: | | | |
| Describe disinfection and disposal of liquid media, cultures and biological fluids |  | | |
| Describe disinfection and disposal of solid wastes including solid media |  | | |
| Describe disinfection and disposal of sharps |  | | |
| Describe decontamination and disposal of mixed wastes (biological and chemical) |  | | |

**Administrative Controls**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Vaccine available: | Yes | | No | |
| Immunization(s) required (list): | Yes | No | | Recommended |
| Medical monitoring required (i.e. titer, TB test, etc.) | Yes | | No | |
| Enrollment in respiratory protection program | Yes | | No | |
| Enhanced training required  Describe: | Yes | | No | |
| Lab has proper entry/exit procedures posted for PPE and work flow? | Yes | | No | |
| Spill procedures and biological spill kit available in lab and personnel receive training | Yes | | No | |

**Documentation of Risk Assessment and Mitigation**

**Date completed:**  Click or tap to enter a date.

**Names of individuals involved in conducting this assessment:**

|  |  |  |
| --- | --- | --- |
| **Name** | **Role** | **Signature** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Revisions to this assessment:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision(s) Made** | **Date** | **Reviewed/Trained** | **New document #** |
| Click or tap here to enter text. | Click or tap to enter a date. | Click or tap to enter a date. | Click or tap here to enter text. |

# Appendix D BSL2 Laboratory Checklist

The checklist is derived from federal, state, and local regulations and requirements

Laboratory/Room/Building: Click or tap here to enter text.

Principal Investigator: Click or tap here to enter text.

|  |  |  |
| --- | --- | --- |
| Standard Microbiological Practices | Yes | No |
| Access to the laboratory is limited or restricted at the discretion of the Principal Investigator or laboratory supervisor when experiments are in progress |  |  |
| Personnel wash their hands after handling viable materials, after removing gloves, and before leaving the laboratory |  |  |
| Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption is prohibited in laboratory areas. Food is stored outside the laboratory area in cabinets or refrigerators designated and used for this purpose only. |  |  |
| Mouth pipetting is prohibited; mechanical pipetting devices are used |  |  |
| Policies for the safe handling of sharps, such as needles, scalpels, pipettes, and broken glassware have been developed and implemented.   * Needles are not bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal. * Used disposable needles are placed in conveniently located puncture‐resistant containers used for sharps disposal. * Non‐disposable sharps are placed in a hard‐walled container for transport to a processing area for decontamination, preferably by autoclaving. * Only needle‐locking syringes or disposable syringe‐needle units (i.e. needle is integral to syringe) are used for injection or aspiration of fluids containing potentially infectious material/rDNA molecules. * Broken glassware is not handled directly. It is removed using mechanical means such as a brush and dustpan, tongs, or forceps. Plastic ware is substituted for glassware whenever possible. |  |  |
| All procedures are performed to minimize the creation of splashes and/or aerosols. |  |  |
| Work surfaces are decontaminated after completion of work and after any spill or splash of viable material (i.e. potentially infectious, contaminated with rDNA) with appropriate disinfectant.  Disinfectant and concentration used: Click or tap here to enter text. |  |  |
| All cultures, stocks, and other regulated wastes (including rDNA) are decontaminated before disposal using an effective method.   * Materials to be decontaminated outside of the immediate laboratory are placed in a durable, leak‐proof container and secured for transport. * Materials to be removed from the facility for decontamination are packed in accordance with applicable local, state, and federal regulations |  |  |
| A biohazard sign is posted at the entrance to the laboratory. Appropriate information to be posted includes the biosafety level, the investigator's name and telephone number, the name and telephone number of an additional contact person, and required procedures for entering and exiting the laboratory. |  |  |
| An effective integrated pest management program is in place. |  |  |
| Lab personnel receive appropriate training regarding their duties, the necessary precautions to prevent exposures, and exposure evaluation procedures. |  |  |
| Lab personnel receive annual updates or additional training when procedural or policy changes occur. |  |  |
| Personnel with medical conditions that may make them more susceptible to infection are encouraged to (i.e. pregnancy, immune‐suppressed) discuss their work with a medical provider. |  |  |
| Safety Equipment (primary barriers & PPE) | Yes | No |
| Properly maintained and certified biosafety cabinets (BSCs) are available for use whenever procedures with a potential for creating infectious aerosols or splashes are conducted and whenever high concentrations or large volumes of infectious agents are used. |  |  |
| When infectious materials are centrifuged in the open laboratory, sealed rotor heads or centrifuge safety cups are used. |  |  |
| Protective laboratory coats or gowns are worn while working in the laboratory and are removed before leaving the laboratory. |  |  |
| Protective clothing is disposed of appropriately; laboratory clothing is not taken home. |  |  |
| Eye and face protection (goggles, mask, face shield, or other splatter guard) is used for anticipated splashes or sprays of infectious or other hazardous materials when the microorganisms must be handled outside the BSC or containment device. Persons who wear contact lenses in laboratories also wear eye protection. |  |  |
| Eye and face protection is disposed of with other contaminated laboratory waste or decontaminated before reuse. |  |  |
| Gloves are worn to protect hands from exposure to hazardous materials. Alternatives to latex gloves are available.  Gloves are changed when contaminated, integrity has been compromised, or when otherwise necessary.  Gloves are removed and hands are washed when work with hazardous materials has been completed and before leaving the laboratory.  Disposable gloves are not washed or reused. Used gloves are disposed of with other contaminated laboratory waste.  Eye, face, and respiratory protection are used in rooms containing infected animals as determined by the risk assessment. |  |  |
| Facilities (secondary barriers) | Yes | No |
| Laboratory doors are self-closing and have locks. |  |  |
| The laboratory has a sink for hand washing. |  |  |
| The laboratory is designed so that it can be easily cleaned. Carpets and rugs are not permitted. |  |  |
| Bench tops are impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals. |  |  |
| Chairs used in laboratory work are covered with a non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant. No fabric chairs in labs. |  |  |
| If the laboratory has windows that open to the exterior, they are fitted with fly screens. |  |  |
| BSCs are installed so that fluctuations of the room air supply and exhaust do not interfere with proper operations - away from doors, windows that can be opened, heavily traveled laboratory areas, and other possible airflow disruptions.  BSCs are tested and certified annually and operated according to manufacturer’s recommendations. |  |  |
| An eyewash station is readily available and weekly functional checks are documented. |  |  |
| A method for decontaminating all waste is available in the facility (i.e. autoclave, chemical disinfection, incineration, or other validated decontamination method. |  |  |
| Special Practices | Yes | No |
| All persons entering the lab are advised of the potential hazards and meet specific entry/exit requirements. |  |  |
| Lab personnel are offered available immunizations for agents handled or potentially present in the lab. |  |  |
| Potentially infectious material is placed in a durable, leak‐proof container during collection, handling, processing, storage, or transport within a facility. |  |  |
| Lab equipment is routinely decontaminated, as well as, after spills, splashes, or other potential contamination.   * Spills involving infectious materials are contained, decontaminated, and cleaned up by personnel properly trained and equipped to work with infectious material. * Equipment is decontaminated before repair, maintenance, or removal from the lab. |  |  |
| The PI/lab director has ensured that lab personnel demonstrate proficiency in standard and special microbiological practices before working with BSL‐2 agents |  |  |
| Incidents that result in exposure to infectious materials and/or organisms containing rDNA are immediately evaluated and treated according to procedures described in the Laboratory Safety Manual and Laboratory Safety Plan. All incidents are immediately reported to the PI or lab manager. |  |  |
| Animals and plants not associated with the work being performed are prohibited from the laboratory |  |  |
| Other | Yes | No |
| Training certification for shipping biological materials/dangerous goods is current (must be renewed every 2 years). |  |  |
| A biological spill kit and spill management procedures are available in the lab. |  |  |