**VUMC Lab-Specific Biosafety Manual**

**Biosafety Level 2 Containment Lab**

**PI: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Building and Room:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

VUMC OCRS Biosafety program helps to ensure that personnel are qualified to perform their jobs safely through training and documentation of technical expertise. The goal of **biological safety** is the containment of potentially harmful biological agents. Containment refers to safe methods, facilities, and equipment for managing biohazardous materials in the laboratory environment, to reduce or eliminate exposure of laboratory workers, VUMC staff, and the lay community to hazardous biological agents and materials. All local, state, and federal regulations are followed.

[VUMC OCRS Biosafety Website](https://www.vumc.org/safety/bio) contains additional information to address Biosafety concerns and needs.

Risk assessment for research agent/materials and procedures determine the appropriate combination of practices, facilities, and equipment to mitigate research risks.

**Transmission Route and Mitigation**

Risk Group 2 agents and agents requiring BSL 2 containment are usually transmitted through the fecal-oral route, mucous membranes, and accidental scratch or puncture.

General lab attire should include a shirt, long pants, and closed-toed shoes for entry into VUMC BSL2 laboratories.

Personal protective equipment (PPE) for VUMC BSL2 labs includes laboratory coats, gloves, and safety glasses for aerosol-generating procedures.

Adherence to standard microbiological practices and the special practices required for Biosafety level 2 containment per the Biosafety in Microbiological and Biomedical Laboratories (BMBL) 6th edition enables lab staff to conduct research safely.

BSL-2 containment is appropriate for research with human-derived materials such as; blood, body fluids, and tissues when the presence of an infectious agent is unknown. Lab personnel handling human-derived materials must follow TOSHA Bloodborne Pathogen Standard precautions.

Personnel working with infectious agents or potentially infected material(s) must be advised of potential hazards and must be trained to become proficient in the practices and techniques required for handling such material safely. The laboratory PI is responsible for providing appropriate training of personnel.

This laboratory handles the following agents:

Insert table list etc.

**Training**

Laboratory personnel receive agent specific training and hazard information by reviewing [Pathogen Safety Data Sheets](https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment.html), published by Public Health of Canada.

Research is supervised by scientists competent in handling agents and associated procedures that require BSL2 containment and handling.

Laboratory staff are trained in the use of lab equipment:

Biosafety cabinet (BSC), centrifuge with safety cups, secondary container for transport, and any other laboratory equipment for the manipulation of biological agents.

The VUMC OCRS training minimally required for all personnel working in laboratories at BSL-2 laboratory is outlined below: (please note additional training may be required based on risk assessment)

***Biosafety 101: Standard Microbiological Practices (SMP)****. This BSL-1 course is available online in the Learning Exchange. All PIs and lab personnel whose research involves biological materials are required to complete this course.*

***Biosafety 201: Formerly the Principles and Practices of Biosafety course****. This BSL-2 course is required for lab personnel who work with biological materials requiring BSL-2 containment. It is a 2-hour instructor-led course offered virtually via Zoom. Biosafety 101: SMP and Biosafety Cabinet Training (BSC) courses before you can pre-register.*

***Working Safely with Human Derived Materials Course.*** *This course meets the Bloodborne Pathogen Standard, OSHA 1910.1030. This course is* ***required*** *for all research that involves any human-derived materials and must be refreshed annually.*

***Biosafety Cabinet (BSC) Training.*** *This course introduces the different types of BSCs with a focus on class II cabinets. It describes how to use a BSC for the containment of hazardous biological materials, including how to maintain good airflow, and how to decontaminate before and after use.*

**Safety Equipment** (PRIMARY BARRIERS)

Safety equipment includes biological safety cabinets (BSC), enclosed containers, and other engineering controls designed to remove or minimize exposures to hazardous biological materials.

The Class II BSC is the principal device used to provide containment for splashes or aerosols that may be generated by procedures used in VUMC BSL2 labs. The BSC offers protection to laboratory personnel, the research product, and external environment when used with good microbiological techniques.

**Facility Design & Construction** (SECONDARY BARRIERS)

The design and construction of the laboratory contributes to the laboratory workers' protection, provides a barrier to protect persons outside the laboratory, and protects persons or animals in the community from infectious agents that may be accidentally released from the laboratory.

Secondary barriers in place in the laboratory to minimize these exposures include:

* Separation of the laboratory work areas from public access via controlled access to the building.
* Separation of the laboratory work area from “clean” areas (i.e. hallways) by self-closing doors.
* Relative negative pressure of laboratory (i.e. direction air flow from hallways into the laboratory).
* Biohazardous waste collection.
* Hand washing facilities.

**Cleaning and Decontamination**

• All areas of the laboratory must be kept clean and orderly.

• Dirt, dust, and clutter are safety hazards.

• Vacuum lines should be protected by a liquid disinfectant trap and/or a HEPA filter.

• Contaminated materials to be reused must be chemically disinfected or placed, untreated, in autoclave bin prior to autoclaving.

• Surfaces are to be decontaminated after each use.

• Appropriate disinfectants should be available specific to the agents in use.

Lab Disinfectants in use:

Ensure appropriate contact time for the disinfectant and biohazardous material(s), follow manufacturer’s recommendations.

NOTE: Recommended disinfectants include EPA Registered/Approved Disinfectants, 10% bleach, 70% ethanol (when appropriate), Lysol, Virex, and quaternary ammonia compounds. Contact [VUMC OCRS Biosafety](mailto:Biosafety@vumc.org) if guidance is needed for disinfectant selection.

**Storage of Biological Agents**

Signs - All areas and laboratories that contain biohazardous agents must be posted with a lab door sign that includes the biohazard symbol. The biohazard symbol must also be placed on:

* Containers of infectious materials; including waste and storage
* Refrigerators
* Incubators and/or freezers
* Equipment which may be contaminated through normal use of biohazards
* Laboratory animals (cages) which are potentially infectious

**Biohazardous Waste**

VUMC research and clinical areas now use the Sani-Pak sterilization system to sterilize red bag biohazardous waste. In VUMC research buildings\*, red bag biowaste is picked up by School of Medicine Environmental Services (SOM EVS) staff in the evenings.

1. Securely close each red biohazard waste bag
2. Place closed bags in the large Sani-Pak cart closes to your lab

**Do Not** place sharps or red sharps containers in these bags

Sani-Pak Carts have been placed in locations that were carefully reviewed by both SOM EVS and OCRS Biosafety. Individual labs should not move them to other locations. If you find that the Cart has been moved, please contact SOM EVS at 615-322-6107 to report this problem.

**VUMC Occupational Health Clinic (OHC)**

VUMC Occupational Health Clinic (OHC) protects faculty and staff health while they are at work through programs to monitor exposure to workplace hazards and treat work-related illness and injury. The Occupational Health Clinic at Suite 640 in the Medical Arts Building is open between 7:00 a.m. and 4:30 p.m. 615-936-0955.

**Medical Surveillance:**

OHC, in collaboration with the Institutional Biosafety Committee (IBC) and OCRS Biosafety reviews research registrations to assess need for vaccination based on the agents in use and techniques outlined in the IBC registration. [Here](https://redcap.vanderbilt.edu/surveys/?s=7CXL3D8JJJ) is also a link to complete the OHC Biological Risk Assessment.

Employees have the option to opt out of vaccinations and must sign a vaccine declination form that is maintained by Occupational Health. Vaccination records are maintained by Occupational Health.

**In the event of an exposure incident**

1. Proceed to the closest sink/eyewash. Remove impacted PPE and flush the exposure site.
2. If the exposure involved broken or compromised skin, use soap and water to thoroughly cleanse the wound. (Do not use bleach or other harsh chemicals that can degrade tissues.)
3. Flush/cleanse the exposure site for 15 minutes.
4. Cover the wound with a bandage (if applicable).
5. Report to the Occupational Health Clinic or Adult Emergency Department if outside routine business hours.
   * Take any information about the source material that you have readily available along with you.
6. Notify the LAB SUPERVISOR (xxx-xxx-xxxx) and OCRS Biosafety at 615-322-2057 as soon as possible once medical follow-up actions have been initiated.

**Emergency information**

[Responding to Personnel Exposures & Spills Involving Biological Materials | Office of Clinical and Research Safety (vumc.org)](https://www.vumc.org/safety/bio/responding-to-bio-exposures-and-spills)

Biosafety in Microbiological and Biomedical Laboratories (BMBL) 6th ed published by,

Centers for Disease Control and Prevention and National Institutes of Health 2021.

<https://www.cdc.gov/labs/BMBL.html>

**For Medical Emergencies:**

Call 911 on in-house phone or 615-421-1911 from mobile. If you dial 911 from a mobile phone, you will reach Nashville Metro police and will be redirected to the Vanderbilt University Police Department (VUPD). You may also call 1-1111 from an in-house phone (615-421-1111 from external/mobile phone). These numbers are included on the VUMC Badge Buddies provided to all workforce members. Contact OCRS if you need Badge Buddies.

If necessary and possible, remove any hazardous materials from near the victim that might interfere with the response by medical personnel.

Remain with the victim until medical response personnel arrive.

If hazardous material spills or exposures are involved, follow the appropriate lab response plan including contacting OCRS (615-322-2057 business hours, 615-875-3779 after-hours).

If your laboratory has special entry/exit protocols for the protection of workers or for security purposes that could affect the response by medical personnel, contact OCRS for assistance in developing a specific response plan.

Additional Resources:

OCRS:  [www.vumc.org/safety](http://www.vumc.org/safety)

VUMC Emergency Preparedness:  [www.vumc.org/emergency](http://www.vumc.org/emergency)

Facilities Management:  [www.vumc.org/facilities](http://www.vumc.org/facilities)

**For Facility Malfunctions:**

Contact Facilities Management:  [www.vumc.org/facilities](http://www.vumc.org/facilities) (615-322-2041 after-hours number) for issues related to your facility including:

Electricity loss or malfunction

If you work in your lab such that a loss of power/lights would not provide adequate lighting to safely move through the lab or shutdown an experiment, ensure that facility emergency lighting, flashlights, battery-powered night lights, or other appropriate secondary lighting is available.

Plumbing issues

Fire alarm issues/concerns

Water leaks or intrusion

Fume hood malfunction

Temperature/humidity issues

Ventilation issues

Door/lock malfunctions

For biosafety cabinet issues/concerns, contact the vendor utilized for your biosafety cabinet.  Refer to the OCRS website ([www.vumc.org/safety](http://www.vumc.org/safety)) for a link to accredited vendors in Tennessee.

Additional Resources:

OCRS:  [www.vumc.org/safety](http://www.vumc.org/safety)

VUMC Emergency Preparedness:  [www.vumc.org/emergency](http://www.vumc.org/emergency)

Facilities Management:  [www.vumc.org/facilities](http://www.vumc.org/facilities)

**Other Emergencies:**

Each department should develop a departmental Emergency Response Sub-Plan that may contain more response procedures for a variety of other emergency situations. Contact the Emergency Preparedness department for information on and assistance in developing a Sub-Plan.

1. Know your codes. VUMC may announce several emergency codes. These are included on the VUMC Badge Buddies provided to all VUMC workforce members. Contact OCRS if you need Badge Buddies. You can also voluntarily sign up for emergency notifications through your electronic devices within your Human Resources account. Contact Emergency Preparedness for more information. Some key codes include:
   1. Red Alert – potential fire situation.
   2. Code Black – bomb threat.
   3. Code Silver – active shooter.
   4. Yellow Alert – prepare to activate a response to a situation (example: Yellow Alert for inclement weather).
   5. Orange Alert – activate a response to a situation (example: Orange Alert for inclement weather).

Additional Resources:

1. OCRS:  [www.vumc.org/safety](http://www.vumc.org/safety)
2. VUMC Emergency Preparedness:  [www.vumc.org/emergency](http://www.vumc.org/emergency)
3. Facilities Management:  [www.vumc.org/facilities](http://www.vumc.org/facilities)

Revision History

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| **Date** | **Description of Revision** | **Initials** |
| 10.25.22 | Initially posted | SJ |
| 12.15.22 | Removed Annual Training | SJ |
| 3.24.23 | Updated to reflect training info on website | SJ |
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