Emergency Procedures for Biological Containment Level 1 and 2 Laboratories
Document No. BIO-004-04

1. INTENT

This Standard Operating Procedure (SOP) applies to all faculty, staff and students at Wilfrid Laurier University handling or storing infectious materials in laboratories. The SOP was developed by Safety, Health, Environment & Risk Management (SHERM) to ensure that work with biohazardous materials is conducted in a safe manner reflecting best practices and adhering to the Canadian Biosafety Standard and Handbook published by the Public Health Agency of Canada and in compliance with the Pathogens and Toxins license issued to the university. The information in this document serves as an extension to the information in the Biosafety Manual published by SHERM. Any questions regarding this SOP can be directed towards the Biosafety Officer.

2. DEFINITIONS

Small Spill vs. Large Spill
Consider the hazard level of the agent in use, whether the laboratory spill kit contains materials that are adequate to clean the spill and the personnel are trained, have the appropriate personal protective equipment and if personal injuries have been sustained.

Exposure
Contact with a biological agent via inhalation, ingestion, inoculation, or mucous membrane absorption.

Risk Group 1 Organisms

Any biological agent that is not capable of causing human or animal disease, or is capable of causing human or animal disease but is unlikely to cause disease in healthy workers or animals. Those capable of causing disease are considered pathogens that pose a low risk to the health of individuals or animals, and a low risk to public health or animal population.

Risk Group 2 Organisms
Any pathogen that can cause human disease but, under normal circumstances, is unlikely to be a serious hazard to laboratory workers, the community, livestock, or the environment. Laboratory exposures rarely cause infection leading to serious disease;

effective treatment and preventive measures are available, and the risk of spread is limited.

3. ROLES AND RESPONSIBILITIES

Supervisors/Principal Investigators

Supervisors and Principal Investigators (PIs) are responsible for ensuring that:

- Full compliance with the SOP exists at all times
- Employees have been given adequate supervision and instruction on the hazards associated with working with biological agents
- Everyone working in the lab under the authority of the PI follows the procedures outlined within this SOP
- In the event of an incident, the Biosafety Officer is notified;
- In the event that there is a personal injury to any staff or student, an Accident/Incident Report Form is completed and submitted to SHERM
- Annual emergency response training is given to all members of the lab and recorded

Staff/Students Working In Labs

Staff and students working in labs are responsible for ensuring that they:

- Are familiar with the hazards and this SOP as it relates to working with biohazardous agents Participate in annual emergency response training
- Promptly report any known accidents or unsafe conditions to their supervisor

4. GENERAL GUIDELINES

All spills, accidents, and exposures or potential exposures must be reported to the Principal Investigator (PI) or supervisor as soon as circumstances permit. The PI or supervisor is then required to submit a completed Accident/Incident Report Form to SHERM and report the incident to the Biosafety Officer. Rapid and accurate reporting of accidents and incidents involving exposure to biohazardous agents is important to identify potentially hazardous operations and procedures.

Preservation of human life and safety should always be first and foremost in any emergency. If an emergency situation is too great to deal with, call Special Constable Service at extension 3333 for assistance, then report the incident to the Biosafety Officer.

5. PROCEDURES

5.1 Personal Injury or Exposure

- Move the injured person away from the spill or scene of incident.
- Do not attempt to move a non-ambulatory person unless it is absolutely necessary.
- Report the incident to the Principal Investigator.

5.1.1 Cuts/Scratches/Needlesticks

- Allow the wound to bleed freely.
- Wash with soap and water, away from the wound.
- Cover with a bandage and seek medical help.

5.1.2 Exposure to Infectious and Communicable Disease Agents

- Exposure can occur via inhalation, skin absorption, inoculation or ingestion.
- If a person has ingested, inoculated or inhaled an agent, seek prompt medical attention.
- If skin exposure has occurred, the exposed site must be washed with soap and water immediately.
- If exposure occurs superficially to a mucous membrane (i.e. eyes, nose, mouth) or non-intact skin, flush at the nearest eyewash station for 15 minutes.

5.2 Spill/Accidental Release of Biological Organisms

Note: Section 5.2 applies only to Containment Level 2 Laboratories. Basic spill cleanup procedures should be followed when containing spills in Containment Level 1 Laboratories.

- Each work area or laboratory has a spill kit that is capable of handling volumes of liquid from a small spill.
- Always wear appropriate personal protective equipment, which may include shoe covers and disposable coveralls.
- Notify others working in the area to prevent contamination of additional personnel and environment.
- “Biological Spill - Do not enter” signs must be placed on the doors during an evacuation.

5.2.1 Small Spill Outside the Biosafety Cabinet Cleanup Procedures

- Before working with any Biohazardous Material, fully understand which type of decontaminant is most effective as directed by the supervisor or PI.
- If the biohazardous materials can be transmitted by aerosol, evacuate and do not re-enter the lab for at least 30 minutes to allow for droplets to settle.
- Obtain the “Do not enter” sign(s) from the spill kit and post on any doors that enter the area.

- Remove any contaminated clothing and wash exposed skin with soap and water.
- Contain the spill using a soc or by covering the spill with and appropriate amount of paper towels, not allowing liquid to travel away from the spill area.
- Using forceps, remove any contaminated sharps from the spilled material and place in the sharps container.
- Pour an appropriate disinfectant with a sufficient concentration, effective against the pathogen(s) spilled starting at the outer margin of the spill and concentrically working toward the center allowing it to mix with the spilled material.
- After allowing for suitable contact time (approximately 30 min), use paper towels to absorb the spill; disinfectant and discard the paper towels into a biohazard bag.
- After spill cleanup, dispose of contaminated PPE into a biohazard bag.
- The contents of the biohazard bag are autoclaved, as per SOP BIO-006 Biological Waste Management.

5.2.2 Spill Inside the Biological Safety Cabinet (BSC)

- If the spill has occurred inside a BSC, continue running ventilation system during cleanup.
- Do not place your head in the cabinet to clean the spill, keep your face behind the sash.
- Using forceps, remove any contaminated sharps from the spilled material and place in the sharps container.
- Cover the spill area with disinfectant soaked paper towels.
- Wipe down the walls of the BSC, working from top to bottom, with the appropriate disinfectant.
- Collect the contaminated paper towels and PPE in a biohazard bag.
- Surface disinfect all objects in the BSC before removing them, or place them into biohazard bags for autoclaving.
- If necessary, flood the work surface as well as the drain pans and catch basins below the work surface with disinfectant. Note: Ensure drain valve is closed before flooding the area under the work surface.
- After cleaning allow the BSC to run for at least 10 minutes before resuming work or shutting down.

5.2.4 Large Spill Outside of the Biological Safety Cabinet

- Evacuate the area immediately and call Special Constable Service and the Biosafety Officer.
- Do not re-enter the area, and post “Do not enter” signs on the doors.
- Ensure that no one enters the area of the spill.

5.2.5 Spill Kits

- Biological spill kits are located in the laboratories.

- The kits should be stored in an area that is accessible to everyone working in the lab, and in a location that is labelled and easy to get to at the time of a spill.
- See Appendix A for a list of spill kit items.

5.3 Fire

Attempt to extinguish fires only if trained. Training is available to faculty and staff through the Emergency Management and Fire Safety Officer.

5.3.1 Fire Extinguishers

- Fire extinguishers are conspicuously located near the exit of the laboratories and should be unobstructed and easily accessible at all times.
- Additional signage should prominently indicate the location of the extinguisher if necessary.
- Any use of a fire extinguisher must be reported immediately to Facilities and Asset Management so the extinguisher can be recharged or replaced.
- The type of fire extinguisher used to extinguish the fire depends on the fire itself.

- There are four classes of extinguishers:
  - ***Class A***
    Ordinary combustibles i.e. paper, wood, rubber, plastics.
  - ***Class B***
    Flammable liquids i.e. any flammable and combustible liquid, oils, greases, tars, oil based paints, flammable gases, lacquer.
  - ***Class C***
    Energized electrical equipment i.e. wiring, fuse boxes, circuit breakers, plugged-in electrical equipment.
  - ***Class D***
    Combustible metals i.e. sodium, lithium, aluminum, titanium.

- Each laboratory has an ABC rated extinguisher.
- Any laboratory using combustible metals has a D-rated extinguisher.

5.3.2 Equipment Fire

- Call 9-911 or Special Constable Service if time permits.
- Try to extinguish the fire if you are trained and you can do so without putting your own safety or the safety of others at risk:
  - Locate a fire extinguisher.
  - Position yourself between the fire and the exit so that you always have an escape route.

- Pull the pin on the fire extinguisher.
- Aim the extinguisher nozzle or hose at the base of the flame.
- Squeeze the trigger.
- Using a sweeping motion, extinguish the fire.

- Portable extinguishers contain only enough material for 8 to 45 seconds of action, depending on their size.
- If at any time the fire becomes uncontrollable, activate the fire alarm and leave the building by the nearest safe emergency exit.
- Report to the Building Evacuation Coordinator or other emergency responders to ensure that all relevant information is available to them.
- Seek medical attention if required.

5.3.3 Clothing Fire

- If your clothing catches on fire:
  - Stop what you are doing.
  - Drop to the floor.
  - Roll around to smother the flames.
  - If possible, get to the nearest safety shower and rinse with copious amounts of water.
  - Seek medical attention.

5.4 Power Failure

If the power fails while working with biological agents inside a BSC:

- Safely remove yourself from the BSC, leave all work inside.
- Close sash and wait for power to come back on.
- Remove PPE, wash hands, and exit the laboratory.
- Ensure BSC is in working order before lifting sash again.
- Note: All BSCs are to be plugged into a red outlet indicated it is hooked up to a backup generator in the event that there is a power outage.

5.5 Loss of Containment of Biological Agents

If a biological agent, has been discovered missing due to loss, theft, misuse:

- Report to your supervisor as soon as possible.
- Report to the Biosafety Officer as soon as possible.
- Ensure inventory is update-to-date to ensure other agents are not missing.

6. APPENDICES

Appendix A: Spill Kit Contents

- Disinfectant
- Absorbent – paper towels, vermiculite, etc.
- Biological waste disposal bags
- Gloves

- Disposable coveralls
- Shoe covers
- Forceps
- "Do Not Enter" Signs

Appendix B: Relevant Standards/Legislation/Policies

Biosafety Manual, Safety, Health, Environment & Risk Management, Wilfrid Laurier University.

Canadian Biosafety Standard and Handbook, Public Health Agency of Canada.

Laboratory Health and Safety Manual, Safety, Health, Environment & Risk Management, Wilfrid Laurier University.

7. REVISION HISTORY

Revision	*Date*	*Comments*	*Initials*
00	July 14/08	SOP comes into effect	SJL
01	Dec 2013	Updated to include CBSG	SJL
03	Mar 2018	Updated, per annual review	SJL
04	June 2019	Updated to include power failure and loss of containment	VB
05	March 2021	Updated as per annual review and provide more details for spill response	RS