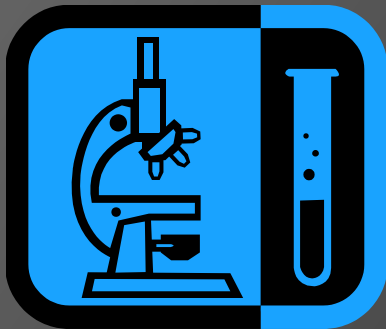


Northwestern Michigan College Science Departments

BIOSAFETY TRAINING



In this training you will learn:

- ① What is a biohazard
- ① How biohazardous organisms are classified
- ① Standard operating procedures for microbiology labs
- ① How to clean up spilled biohazards
- ① What extra precautions are used with genetically modified organisms, and with body fluids

What is a biohazard?

- a *biohazardous material* is any biological material capable of causing harm to humans, animals or plants, including both biohazardous agents and non-replicating materials such as toxins.
- A *biohazardous agent* is a disease-causing microorganism capable of replication, and capable of causing diseases in humans, animals, or plants.

What is a biohazard?

- This symbol means a biohazardous material may be present.



Biohazardous microorganisms are classified by based on their relative pathogenicity for healthy adult humans.

CDC Biosafety Level	NIH	Characteristics
1	Risk Group 1	Not known to consistently cause disease in healthy adults, and of minimal potential hazard to laboratory personnel and the environment.
2	Risk Group 2	Agents that are associated with human disease which is rarely serious and for which preventive or therapeutic interventions are often available; hazard is from percutaneous injury, ingestion, mucous membrane exposure
3*	Risk Group 3	Agents that are associated with serious or lethal human disease for which preventive or therapeutic interventions may be available (high individual risk but low community risk); potential for aerosol transmission
4*	Risk Group 4	Agents that are likely to cause serious or lethal human disease for which preventive or therapeutic interventions are not usually available (high individual risk and high community risk)

* Organisms in these categories are not used in NMC Science labs.

What microorganisms at NMC are in each category?

BSL-1	
<i>Alcaligenes faecalis</i>	<i>Enterobacter aerogenes</i>
<i>Bacillus cereus</i>	<i>Enterococcus faecalis</i>
<i>B. stearothermophilus</i>	<i>Micrococcus luteus</i>
<i>Bacillus subtilis</i>	<i>Proteus vulgaris</i>
<i>Clostridium butyricum</i>	<i>Pseudomonas aeruginosa</i>
<i>Clostridium sporogenes</i>	<i>Pseudomonas fluorescens</i>
<i>Cornybacterium xerosis</i>	<i>Serratia marsescens</i>
<i>Escherichia coli</i> (no K1 antigen)	<i>Staphylococcus epidermidis</i>
BSL-2	
<i>Klebsiella pneumoniae</i>	
<i>Salmonella typhimurium</i>	
<i>Staphylococcus aureus</i>	
<i>Streptococcus pyogenes</i>	

STANDARD OPERATING PROCEDURES IN MICROBIOLOGICAL LABS #1

These procedures must be followed whenever lab work is done with *ANY* organism, whether BSL-1 or BSL-2:

- Persons wash their hands before working in the lab, after they handle viable materials, after removing gloves, and before leaving the laboratory.
- Eating, drinking, applying cosmetics or lip balm, and handling contact lenses in the laboratory are *strictly prohibited*.
- Laboratory coats, gowns, or uniforms should be worn to prevent contamination of street clothes.

STANDARD OPERATING PROCEDURES IN MICROBIOLOGICAL LABS #2

- Work surfaces are disinfected after each lab, and after any spill of viable material.
- Minimize the use and exposure to sharps in the workplace.
- Use a bulb or other pipetting device.
- Whenever an incubator is in use, a sign incorporating the universal biohazard label must be posted prominently on the outside of the unit.

STANDARD OPERATING PROCEDURES IN MICROBIOLOGICAL LABS #3

- Glass microscope slides that have been exposed to microorganisms will be placed in a disinfectant solution for at least 30 minutes, and then transferred to a container dedicated to broken glass.
- Broken glassware must not be handled directly by hand, but must be removed by mechanical means such as a brush and dustpan, tongs, or forceps.
- *Spills and accidents that result in overt exposures to infectious materials are immediately reported to the Lab Manager.*

Extra precautions for BSL-2 organisms:

- Gloves are worn when hands may contact potentially infectious materials, contaminated surfaces or equipment.
- Protective laboratory coats or smocks must be worn while in the laboratory. This protective clothing is removed and left in the laboratory before leaving for non-laboratory areas.
- Goggles must be used for procedures which may result in splashes or sprays of infectious or other hazardous materials to the face.

CLEANING UP SPILLS

- Wear protective equipment: gloves, goggles (for BSL-2), long-sleeved lab coat.
- Disinfect the area for 15 minutes then wipe up the spill with disposable paper towels. Always clean spills from the periphery of the spill towards the center. Dispose of all spill materials in an autoclaveable bag.
- Broken glass should be handled only by remote means such as tongs or forceps.
- Notify the Lab Manager of the spill.

WORKING WITH GENETICALLY MODIFIED ORGANISMS (GMOs)

- Use disposable Petri dishes, culture tubes, and inoculating loops when possible.
- Wear disposable gloves, and place them in a biohazard bag after use. Wash hands thoroughly before leaving the lab.
- Autoclave all materials after use.
- If culture plates are transported outside the lab, seal them with Parafilm.
- Autoclave cultures of GMOs *as soon as possible after use.*

WORKING WITH BLOOD AND BODY FLUIDS

- All persons shall wear gloves while working with blood or body fluids.
- Whenever possible, persons should only handle their own blood.
- A high degree of precaution must always be taken with any contaminated sharp items, including needles and syringes, slides, pipettes, capillary tubes, and scalpels.

WORKING WITH BLOOD AND BODY FLUIDS (2)

- “Sharps” contaminated with blood are placed in a “sharps” container after use.
- All persons should wash their hands thoroughly before leaving the lab.
- Amounts of blood that can be cleaned up with a paper towel may be disposed of in the regular trash container.