

# Biological Spills and Cleanup

## 1 – Introduction and Facts About Bleach

Appropriate decontamination procedures can be obtained from product information sheets, PSDS, etc. It is important to ensure that the appropriate dilution of the active ingredient (for example sodium hypochlorite in bleach) is used to decontaminate liquid waste and the contact time for complete decontamination is achieved.

### Bleach Facts:

- Active ingredient is sodium hypochlorite (NaClO).
- Bleach stocks come in a variety of different concentrations of NaClO, from as low as 3% up to 12% for some industry brands
- Lab members MUST know the concentrations of NaClO in their stock to be able to calculate the final dilution of NaClO. For example, if your bleach stock is 6% then 100 mL of bleach stock can be added to 500 mL of fluid to result in 600 mL of 1% NaClO (the dilution often used for spills). Lab SOPs should state the final dilution of NaClO required for disinfection NOT the % dilution of bleach (since bleach stocks are so variable).
- Diluted bleach breaks down very quickly and must be made fresh every 24 hours.
- Bleach is very corrosive, if using 0.5% or higher of NaClO to disinfect surfaces then be sure to rinse them after the required contact time (usually 20-30 minutes depending on organism).
- Bleach must never be autoclaved (can cause chlorine gas to be released).

## 2 – Personal Protective Equipment (PPE)

When disposing of biological waste or cleaning up a biological spill one must wear appropriate PPE. This includes gloves, long pants, close-toed shoes and a lab coat plus safety glasses or face shield as required.

## 3 - Biological Spill outside a Biosafety Cabinet

This procedure assumes the spill of biohazardous material of significant quantity or risk outside a biosafety cabinet (BSC).

**Note:** All blood must be considered biohazardous, not just that which is known to be infected with a pathogen.

1. If you spilled a Risk Group 1 (RG1) material, or a small dilute amount of an RG2 material, remove any contaminated clothing, wash contaminated body areas with soap and water, and proceed to Step 6.
2. If you spilled a significant amount (e.g., 100 ml or more) of an RG2 or higher material, hold your breath, leave the room immediately, and close the door.
3. Warn others not to enter the contaminated area. Get help as needed and call the emergency or non-emergency phone numbers. If you leave the area, post a sign warning others to not enter the area.

4. Remove and put contaminated clothing into a container for biohazardous waste disposal, and thoroughly wash hands and face.
5. Wait 30 minutes before re-entering the area to allow dissipation of airborne biological materials (aerosols) created by the spill. Put on personal protective equipment (PPE) before re-entering the room.
6. Put on the following PPE: lab coat or gown, safety glasses, and double gloves. If the risk of the material or contamination is high, wear additional appropriate PPE such as a respirator, jumpsuit with tight-fitting wrists, or shoe covers.
7. Cover the spill with paper towels or other absorbent material to prevent liquid migration and aerosol production.
8. Gently pour or squirt a freshly prepared solution of 1% sodium hypochlorite or other appropriate disinfectant around the edges and then into the center of the spill area until the towels are soaked with the disinfectant.
9. Let the disinfectant stay in contact with the spilled material for at least 20 minutes, and up to 30 minutes for larger volumes or RG2 materials.
10. Use paper towels to wipe up the spill, working from the edges into the center of the spill. If sharps or sharp fragments such as glass might be in the spill, do not touch the spill materials with gloved hands. In this case, use a dustpan and squeegee or disposable cardboard to scoop up the spill materials and sharps.
11. Clean the spill areas with paper towels soaked with disinfectant, and then with paper towels wetted with water.
12. Dispose of contaminated items. Dispose of contaminated items using biohazardous waste containers, biohazard bags, and sharps containers.
13. Remove and dispose of PPE, or place coats in lab-coat laundry bin. Wash hands with soap and water.
14. Report spill, exposure, and injury incidents to your supervisor.

## 4 - Biohazardous Spill inside a Biosafety Cabinet

This procedure assumes the spill of biohazardous material of significant quantity or risk inside a biosafety cabinet (BSC).

**Note:** All blood must be considered biohazardous, not just that which is known to be infected with a pathogen.

1. Ensure the BSC is operating and continues to operate during this procedure so as to prevent airborne contaminants from escaping the cabinet.
2. Put on the following PPE: lab coat or gown, safety glasses, and chemical-resistant double gloves. Wear additional PPE (e.g., respirator or goggles) as needed based on the risk of the material, contamination, or splashing.
3. Spray or wipe walls, work surfaces, and equipment with a disinfectant that is effective against the agents that may be present. A 1% solution of sodium hypochlorite is effective against most viruses, bacteria, fungi, and mycobacterium.
4. Flood the BSC's top work-surface tray with disinfectant. In a Class II BSC, also flood with disinfectant the drain pans and catch basins below the work surface. Allow the disinfectant to stand

for 10 to 15 minutes.

5. Remove excess disinfectant from the tray by wiping with a sponge or cloth soaked in disinfectant. In a Class II BSC, drain the BSC's top work surface into the BSC catch basin, lift out the work surface and removable exhaust grilles, and wipe the top and bottom (underside) surfaces with a sponge or cloth soaked in disinfectant. Replace the work surface and grilles. Drain the disinfectant from the BSC base into an appropriate container. Place the container with disinfectant, gloves, cloth, or sponge in an appropriate container and dispose of.
6. Report spill, exposure, and injury incidents to your supervisor.

## 5 - Centrifuge Malfunction or Spill

This procedure assumes that the following types of centrifuge events have occurred, especially if RG2 materials are involved: the spill of biological material in the centrifuge, significant mechanical failure (e.g., rotor failure), or centrifuge tube or container breakage. Evidence of such conditions might include noises during centrifuge operation or visual signs of failure or leakage when the centrifuge is opened. Note that breakage of tubes and leakage of fluid into the centrifuge wells or cups during centrifugation may release relatively few agents into the air. However, if a tube breaks and leaks in the centrifuge chamber, then aerosols and droplets may be created and dispersed.

**Note:** All blood must be considered biohazardous, not just that which is known to be infected with a pathogen.

In the event of a centrifuge malfunction or spill, follow the following steps:

1. Turn centrifuge off immediately. Keep the centrifuge lid closed and latched.
2. Notify others.
3. Evacuate the laboratory if hazardous aerosols may have been generated. Close the door, post a biohazard spill sign at the lab door, and stay out of the laboratory for 30 minutes.
4. For spill cleanup, the operator should wear PPE (i.e., gloves, lab coat, eye protection), remove debris, and clean and disinfect centrifuge interior, rotors, safety cups, or buckets in accordance with the manufacturer's instructions.
5. Place any contaminated PPE and all cleanup materials in a biohazardous waste container. Wash hands and any exposed skin surfaces with soap and water.

## 6 - Chemical and Biohazardous Spill

This procedure assumes that the spill of a material took place outside a biosafety cabinet, the material has both chemical and biological hazards, the chemical in the material is considered a hazardous waste, and the chemical has not already rendered the biological material nonviable or inactive.

**Note:** All blood must be considered biohazardous, not just that which is known to be infected with a pathogen.

1. Prior to starting your research, determine which chemical disinfectant(s) and absorbent materials are compatible with the chemical(s) that may become biologically contaminated.
2. If you spilled a significant amount (e.g., 100 ml or more) of an RG2 material, hold your breath, leave the room immediately, and close the door.

3. Warn others not to enter the contaminated area. Get help as needed. If you leave the area, post a sign warning others to not enter the area.
4. Remove and put contaminated clothing in container lined with a plastic bag for eventual decontamination or disposal. Thoroughly wash hands and face.
5. If you evacuated the laboratory as stated in Step 2, call the emergency or non-emergency phone numbers and wait 30 minutes before re-entering the area to allow dissipation of airborne biological materials (aerosols) created by the spill. Put on PPE before re-entering the room.
6. Consult the emergency response procedures for chemical spill cleanup information. If the chemical(s) in the spill present a greater hazard than the biological agent(s), proceed with chemical decontamination first.
7. Put on at least the following PPE: lab coat or gown, safety glasses, and chemical-resistant double gloves. If the risk of the material or contamination is high, wear additional appropriate PPE such as a respirator, a jumpsuit with tight-fitting wrists, or shoe covers.
8. Cover the spill with an absorbent material or towel that will not react chemically with the spilled chemical. Towels will prevent liquid migration and aerosol production.
9. Use a disinfectant that is compatible with the chemical(s) in the spill. Gently pour or squirt the disinfectant around the edges and then into the center of the spill area until the absorbent material or towel is soaked with the disinfectant.
10. Let the disinfectant stay in contact with the spilled material for at least 20 minutes, and up to 30 minutes for larger volumes or RG2 materials.
11. Use chemically compatible towels, dustpan, squeegees, or cardboard to scoop and wipe up the spill, working from the edges into the center of the spill. If there might be sharps or sharp fragments such as glass in the spill, do not touch the spill materials with gloved hands.
12. Clean the spill areas with towels soaked with disinfectant, and then with towels wetted with water.
13. Dispose of all cleanup material in biohazardous waste containers marked "spill cleanup - contains {name of disinfectant}"
14. Report spill, exposure, and injury incidents to your supervisor.

## **7 - Accident/Incident Report Forms**

- Employees:
  - <https://ehs.utoronto.ca/report-an-incident/online-accidentincident-eform-for-employees/>
- Students, visitors, and contractors:
  - <https://ehs.utoronto.ca/report-an-incident/online-accidentincident-eform-for-students-contractors-and-visitors/>