

Biological Spill Procedures & Materials

Scope

The scope of the procedure pertains to the clean-up and decontamination of biological spills involving experimental samples and related wastes. The procedure outlines materials and practices to be used to restore sanitary conditions within the laboratory, material storage area, and transport corridors.

Responsibilities

A. Environmental Health & Safety (EHS)

1. EHS will assist in biological spill cleanup, decontamination, and disposal.
2. EHS will provide biological safety training.

B. Other Departments/End User

1. It is the responsibility of laboratory personnel to report emergencies/injuries related to biological spills to 911, TUPD, EHS, and if applicable, Facilities Management.
2. It is the responsibility of lab personnel to report biological spills to EHS for spill assistance, decontamination, and disposal.
3. It is the responsibility of the department or individual laboratories to maintain biological spill kit materials and personal protective equipment in the areas that may require them.
4. The employee(s) who clean the spill must notify other lab personnel of the spill area.
5. Only biosafety-trained personnel will perform biological spill cleanup.

Procedure

A. Spill Kit Recommendations

1. A spill kit should be kept in each laboratory where work with microorganisms is conducted. At a minimum, the spill kit should contain:
 - a) Diluted disinfectant in a spray bottle (such as 10% chlorine bleach or 1% sodium dodecyl sulfate solution [SDS])
 - i. 10% chlorine bleach [sodium hypochlorite solution] is made from 1 part liquid household bleach and 9 parts water (e.g. 100 mL bleach and 900 mL water).
 - ii. 0.6 parts pure sodium hypochlorite powder to 99.4 parts water (e.g. 21.5 g or 5 tsp in 1 gallon water).
 - iii. 1% SDS [sodium dodecyl sulfate solution] is made from 1 part pure sodium dodecyl sulfate powder to 99 parts water (e.g. 35.8 g or 6.5 tsp in 1 gallon water)
 - b) Paper towels or other sorbent material to cover and absorb spilled material
 - c) Disposable gloves
 - d) Autoclave bags
 - e) Biohazard bags

- f) Biohazard Sharps container
- g) Tongs/forceps to pick up broken glass

B. General Spill Cleanup Procedure

1. Communicate The Hazard, Assess Damage
 - a) If there are emergency conditions, such as an injured person or an immediate threat to life, contact 911.
 - b) If there are other urgent conditions from the experiment (uncontained airborne pathogenic sample), high hazard equipment (flame, electrocution, etc.), or damage to the facility, contact TUPD at 410-704-4444, Environmental Health & Safety (EHS) at 410-704-2949 or safety@towson.edu, and if applicable, Facilities Management at 410-704-2481. Facilities Management may be required to repair damage to the facility or disconnect utilities that exacerbate or hinder spill cleanup. EHS can be contacted for assistance with spill and disposal of cleanup materials.
 - c) Inform all laboratory personnel in the immediate vicinity of the spill.
 - d) Inform the Principal Investigator of the spill.
 - e) If possible, block access to the spill area and place Biohazard Spill signage.
2. Don (Put On) Personal Protective Equipment (PPE), If Not Currently Worn
 - a) Inspect PPE to make sure there are no holes, rips, or other deficiencies that compromise the equipment.
 - b) Put on the shoe covers, lab coat/gown, mask (or particulate respirator for aerosol/ inhalation hazards), splash goggles, and gloves in this order.
3. Control Spill
 - a) Minimize spill area by turning off utility valves, and rectifying containers or sample vessels.
 - b) Block area with sorbent materials, such as pads or paper towels.
4. Contain Spill
 - a) Use tongs/forceps to pick up broken glass or any other sharps involved, if applicable, and discard into the biohazard sharps container.
 - b) Cover spilled material with dry paper towels or other sorbent material. If the material is dry, use a damp, paper towel.
 - c) Remove any contaminated clothing and place in biohazard bag for decontamination.
5. Decontaminate Spill
 - a) Prepare the diluted disinfectant in the spray bottle. Only fresh disinfectant should be used. Disinfectant that was prepared < 24 hours ago is considered fresh. If disinfectant is 24 hours or older, discard appropriately.
 - b) Use the spray bottle to apply diluted disinfectant in sufficient quantity over the spill area to ensure effective microbial inactivation. Spray at the perimeter of the

spill and continue until the center is reached. Spill area should be saturated with disinfectant solution.

- c) Allow the disinfectant sufficient contact time to kill pathogens. Always follow the manufacturer's instructions for applying disinfectant to surfaces. Many products have a contact time of 10 minutes for efficacy. If instructions are not available, leave the diluted solution on the surface for 20 minutes before removing or wiping. The surface should remain visibly wet during the contact time.

6. Clean Up Spill & Remove Waste

- a) Place spill cleanup and sorbent materials in an autoclave bag.
- b) Wipe spill area with diluted disinfectant and paper towels, then place into same bag. Minimize creation of any splashes or aerosols.
- c) Materials to be decontaminated outside of the immediate laboratory are placed in a durable, leakproof container and secured for transport. For infectious materials, the outer surface of the container is disinfected prior to moving materials and the transport container has a universal biohazard label.
- d) Autoclave contaminated spill cleanup materials.
- e) Place autoclaved materials into biohazard bag, tape closed, and put into biohazardous waste container for shipment.
- f) Dispose biohazard sharps container appropriately when it is 3/4 full.
- g) Set aside tongs/forceps, spray with disinfectant, and allow proper contact time.

7. Doff (Take Off) Personal Protective Equipment (PPE) and Perform Hand Hygiene

- a) Remove shoe covers and toss into biohazardous waste bag. Each disposable product in Step B7 will be disposed (or tossed) as biohazardous waste.
- b) Remove gloves by carefully turning inside out for each hand together and toss.
- c) Undo lab coat/gown, remove by touching uncontaminated suit parts, and toss.
- d) Wash hands with soap and water. If sink not immediately available, use hand sanitizer.
- e) Remove splash goggles and set aside to spray with appropriate disinfectant.
- f) Remove mask or respirator, taking care not to touch front or face, and toss.
- g) Wash hands with soap and water when finished. If sink not immediately available, use hand sanitizer. Once sink is available, proceed to washing hands.

8. Sanitize Tools and PPE

- a) Wipe tongs/forceps clean with paper towel.
- b) Use a paper towel and diluted disinfectant to disinfect goggles for future use.
- c) Wash hands with soap and water when finished.

9. Restock Kit

- a) Restock biological spill kit contents in preparation for future incidents by purchasing inventory in quantities as listed in Step I below.

C. Specific Spill Cleanup Procedure - Spill of Human Blood

1. Follow all steps in Step B, except:
 - a) Use an appropriate detergent solution to clean all visible blood.

D. Specific Spill Cleanup Procedure - Spill of Biosafety Level 1 (BSL-1) Materials

1. Follow all steps in Step B.

E. Specific Spill Cleanup Procedure - Spill of Biosafety Level 2 (BSL-2) Materials

1. Follow all steps in Step B.

F. Specific Spill Cleanup Procedure - Spill of Biosafety Level 3 (BSL-3) Materials

1. Towson University currently does not allow BSL-3 research at this time as there are no appropriate facilities to house such work on campus.
2. If BSL-3 work is allowed or such materials are spilled near or on campus:
 - a) Stop work immediately.
 - b) Avoid inhaling airborne material while quickly leaving the area. Notify others to leave. If it is within a room, close the door and post warning sign on it.
 - c) Remove contaminated clothing, turning it inward, and place into biohazard bag.
 - d) Wash hands with water and soap.
 - e) Follow Step B1 for communicating the hazard.
 - f) Allow at least 30 minutes for aerosols to disperse before re-entering the laboratory to begin cleanup, if feasible.
 - g) Follow the remaining steps in Step B (Steps B2-B9).

G. Specific Spill Cleanup Procedure - Spill in a Biosafety Cabinet (BSC)

1. Maintain Airflow
 - a) Leave the cabinet turned on, maintaining continuous airflow.
2. Take Precautions (Communicate, Don PPE, Control & Contain Spill)
 - a) Follow Steps B1-B4 as needed. EHS should be notified if the spill overflows into the interior of the cabinet. It may be necessary to do a more extensive decontamination of the cabinet. If spill is confined to BSC with no emergency conditions, proceed to next step below.
3. Decontaminate Spill
 - a) Disinfect cabinet walls, work surfaces, and equipment by spraying with disinfectant (e.g. 70% ethanol). If necessary, flood work surface, as well as drain pans and catch basins below the work surface, with disinfectant. Allow contact time of at least 20 minutes.
 - b) Soak up the disinfectant and spill with paper towels, and drain catch basin into a container. Lift front exhaust grille and tray, and wipe all surfaces. Ensure that no paper towels or solid debris are blown into area below the grille.

- c) Surface disinfect all items that may have been spattered before removing them from the cabinet.
- 4. Clean Up Spill, Remove Waste, Doff PPE, Sanitize Tools & Hands, Restock Kit
 - a) Follow Steps B6-B9.

H. Specific Spill Cleanup Procedure - Spill in a Biological Radioactive Spill

1. General Rules

- a) Spills involving both radioactive and biological materials requires emergency procedures that are different than spills involving the material types separately.
- b) Do not use bleach solutions as a disinfectant on materials that contain iodinated compounds such as I_{125} , because radioactive iodine gas may be released. Instead use a disinfectant such as an iodophor.
- c) Disinfect the microorganism with appropriate disinfectant, then dispose of all cleanup materials in a separate bag/container labeled to indicate that the radioisotope is mixed with a chemically-disinfected microorganism.
- d) Do not autoclave biological radioactive materials unless approved by the Radiation Safety Officer (RSO).
- e) Use procedures to protect yourself from the radionuclide while you disinfect the biological material. Before any cleanup, consider the type of radionuclide, the characteristics of the microorganism, and the volume of the spill. Contact the RSO at 410-704-2949 for specific radioisotope cleanup procedures.

2. Preparation for Cleanup

- a) Avoid inhaling airborne material, while quickly leaving area. Notify others to leave area. If it is within a room, close the door and post warning sign on it.
- b) Remove contaminated clothing, turn exposed area inward, and place in a biohazard bag.
- c) Wash all exposed skin with soap or hand-washing antiseptic, followed by a three-minute water rinse.
- d) Follow Step B1 for communicating the hazard. Inform the PI and the RSO/EHS at (410) 704-2949 of the spill, and monitor all exposed personnel for radiation.
- e) Allow at least 30 minutes for aerosols to disperse before re-entering the laboratory to begin cleanup, if feasible.
- f) Assemble cleanup materials from biological spill kit.
- g) Confirm with the RSO that it is safe to enter the lab.

3. Don (Put On) Personal Protective Equipment (PPE), If Not Currently Worn

- a) Inspect PPE to make sure there are no holes, rips, or other deficiencies that compromise the equipment.

- b) Put on the shoe covers, lab coat/gown, mask (or particulate respirator for aerosol/ inhalation hazards), splash goggles, and gloves in this order.
Note: Depending on the nature of the spill, it may be advisable to wear a HEPA-filtered respirator instead of a surgical mask. In setting up your spill plan, contact EHS for advice since the use of many types of respirators requires prior training, fit-testing, and medical approval.
4. Control & Contain Spill
- a) Minimize spill area by turning off utility valves, and rectifying containers or sample vessels.
 - b) Block area with sorbent materials, such as pads or paper towels.
 - c) Use tongs/forceps to pick up broken glass or any other sharps involved, if applicable, and discard into the biohazard sharps container. Label the container according to Radiation Safety guidelines.
 - d) Cover spilled material with dry paper towels or other sorbent material. If the material is dry, use a damp, paper towel.
 - e) Remove any contaminated clothing and place in biohazard bag for decontamination.
5. Decontaminate Spill
- a) Do not use bleach as a disinfectant. Instead, use an iodophor disinfectant. Apply disinfectant in sufficient quantity over the spill area to ensure effective microbial inactivation. Spray at the perimeter of the spill and continue until the center is reached. Spill area should be saturated with disinfectant solution. Avoid enlarging the contamination area.
 - b) Allow the disinfectant sufficient contact time to kill pathogens. Leave the disinfectant on the surface for 20 minutes before removing or wiping. The surface should remain visibly wet during the contact time.
6. Clean Up Spill & Remove Waste
- a) Place spill cleanup and sorbent materials in an approved radioactive waste container. Keep separate from other radioactive waste.
 - b) Wipe spill area with diluted disinfectant and paper towels, then place into same container. Minimize creation of any splashes or aerosols. Do not autoclave radioactive-contaminated waste unless approved by RSO.
 - c) Dispose biohazard sharps container appropriately when it is 3/4 full.
 - d) Set aside tongs/forceps, spray with disinfectant, and allow proper contact time.
7. Doff (Take Off) Personal Protective Equipment (PPE) and Perform Hand Hygiene
- a) Disinfect contaminated protective clothing in Step H7 prior to disposal. Each disposable product in Step H7 will be disposed (or tossed) as radioactive waste if found to be radioactively-contaminated by dosimetry. If not, the item will go into biohazardous waste.

- i. *Place potentially contaminated item(s) such as clothing and PPE on absorbent paper and scan for radioactivity. If none is detected, dispose items as biohazardous waste.*
 - ii. *If radioactive, spray with disinfectant and allow 20-minute contact time.*
 - iii. *Wrap the items inside the absorbent paper and dispose of as radioactive waste.*
- b) Remove shoe covers and toss.
 - c) Remove gloves by carefully turning inside out for each hand together and toss.
 - d) Undo lab coat/gown, remove by touching uncontaminated suit parts, and toss. Wash hands with soap and water and exposed skin areas.
 - e) Remove splash goggles and set aside to spray with appropriate disinfectant.
 - f) Remove mask or respirator, taking care not to touch front or face, and toss.
 - g) Wash hands with soap and water when finished.
 - h) Monitor personnel and spill area for residual radioactive contamination. If skin contamination is detected, repeat decontamination procedures under the direction of the RSO. If spill area has residual activity, determine if it is fixed or removable and handle it accordingly.
8. Sanitize Tools and PPE
- a) Wipe tongs/forceps clean with paper towel and set aside for re-use, if desired.
 - b) Use a paper towel and diluted disinfectant to disinfect goggles for future use.
 - c) Wash hands and exposed skin areas with soap and water when finished.
9. Restock Kit
- a) Restock biological spill kit contents in preparation for future incidents by purchasing inventory in quantities as listed in Step I below.

I. Biological Spill Kit Contents

Note: Biological Spill Kit contents **must** be completely replenished after each use.

*In Case of Emergency – Add tap water and mix thoroughly

<u>Part</u>	<u>Quantity Needed</u>
Biohazard Labels	10
Large Biohazard/Special Medical Waste Bags	5
Small Biohazard/Special Medical Waste Bags	5
Large Autoclave Bags	2
Bundle Grey Sorbent Pads	1

Bundle White Sorbent Paper	1
Spray Bottle with Sodium Dodecyl Sulfate (dry)*	1
Spray Bottle with Sodium Hypochlorite (dry)*	1
Package of Disposable Nitrile Gloves – Check Annually	1
Package of Disposable Shoe Covers	1
Package of Disposable Surgical Masks	1
Particulate Respirators (training required per Respiratory Protection Program)	1
Disposable Lab Coats Or Water-Resistant Gowns (Size Large)	4
Laboratory Splash Goggles – Check Straps Annually	2
Special Medical Waste Sharps Container	1
Set of Forceps/Tongs	1
Resealable Bag with Sodium Dodecyl Sulfate (dry)	1
Resealable Bag with Sodium Hypochlorite (dry)	1
Biohazard Spill Area Sign, Laminated (With Red Chain Attached for Hanging)	2