Title: Infectious and GMO microbiological spill clean-up.
Purpose: To provide step-by-step instructions for the clean-up of biological spills involving samples containing genetically modified (GM) microorganisms, viral vectors, or pathogenic microorganisms (including human, animal, plant, and aquatic pathogens).

Contents

Research groups are responsible for the preparation of Safe Operating Procedures (SOPs) and Risk Assessments for their own work.

Spills inside of a biosafety cabinet

1. Keep the biosafety cabinet running.
2. Inside the biosafety cabinet, disinfect the outside of your gloves with disinfectant. Remove hands from the cabinet, then remove gloves and wash or sanitise hands.
3. Put on fresh gloves and collect your spill cleanup materials (see 'Planning for control of spills' for suggested spill cleanup materials).
4. Prepare fresh solution of sodium hypochlorite (1% available chlorine*) or, where applicable, alternative approved disinfectant.

   *Important note: Sodium hypochlorite should not be used for spills that contain acids, ammonia or formaldehyde.

   1% available chlorine is NOT the same as 1% bleach. For bleach containing 12.5% available chlorine (typical lab strength, but check the bottle), a 1:11 dilution of bleach to water is sufficient. For bleach containing 4% available chlorine (typical household strength, but check the bottle), a 1:3 dilution of bleach to water is required.
5. Cleanup can start straight away as spills inside a cabinet are contained and aerosols are removed by the HEPA filter.
6. Wet absorbent material with disinfectant solution and place the absorbent material over the spill. Leave the disinfectant on the surface for 10 minutes.
7. After 10 minutes, remove any sharp objects in the spill area using forceps or tweezers and discard in a sharps container. Remove absorbent material and place in biohazard waste bag.
8. Wipe the outside of any items with paper towel wetted with disinfectant solution before removing from the cabinet. Disposable items should be placed directly into a biohazard waste bag. Reusable items will need to be further decontaminated before reuse.
9. Wipe down the inside of the biosafety cabinet, including the work area, sides, back and inside of the glass sash with paper towel wetted with disinfectant solution.
10. Check that the spill has not contaminated the sump (area under the work surface) of the cabinet. Where spilt material has fallen into the sump, add disinfectant solution to cover the sump floor, leave for 10 minutes, then wipe up with clean absorbent material.
11. Wipe all surfaces where sodium hypochlorite has been used with clean water or ethanol to prevent corrosion of stainless-steel surfaces.
12. Place all paper towel waste into a biohazard bin bag.
13. Seal the biohazard bin bag and dispose all waste to the clinical wheelie bin.
14. Remove gloves and dispose to the biohazard waste bin.
15. Remove gown and arrange for decontamination (soak in disinfectant or autoclave) before it is sent to the laundry.
16. Wash hands with soap and water or disinfect using hand sanitiser.
17. Notify the facility managers and the IBC of the spill. The IBC Biosafety Officer shall determine whether further decontamination needs to occur before the cabinet is used.
18. Submit an incident report in UniSafe.

Spills outside of a biosafety cabinet of < 50 mL volume, and NOT a viral vector, and NOT infectious via respiratory route

1. Collect spill cleanup equipment (see 'Planning for control of spills' for a list of spill kit requirements). Make fresh solution of sodium hypochlorite solution (1% available chlorine*) or, where applicable, alternative approved disinfectant.

   *Important note: Sodium hypochlorite should not be used for spills that contain acids, ammonia or formaldehyde.

   1% available chlorine is NOT the same as 1% bleach. For bleach containing 12.5% available chlorine (typical lab strength, but check the bottle), a 1:11 dilution of bleach to water is sufficient. For bleach containing 4% available chlorine (typical household strength, but check the bottle), a 1:3 dilution of bleach to water is required.
2. Before entering the spill area, put on a long-sleeved laboratory gown (disposable where available), disposable gloves, and safety glasses.
3. Assess the extent of contamination, including any areas where splashes or aerosols may have landed. Any nearby furniture or equipment should be considered as potentially contaminated.
4. Wet your absorbent material (e.g., paper towels) with disinfectant solution and place the absorbent material over the spill. Leave it to sit for at least 10 minutes.
5. After 10 minutes, remove any sharp objects in the spill area using forceps or tweezers and discard in a sharps container. Remove absorbent material and place in biohazard waste bag.
6. Starting from the outside edge of the spill, use a mop and bucket with disinfectant solution to mop towards the centre of the spill.
7. Dispose of mop water via the laboratory sink.
8. Make up fresh bucket of disinfectant and soak mop for 10 minutes. Dispose of mop water via laboratory sink.
9. Wet paper towel with disinfectant and wipe over surrounding furniture and areas that are likely to have been contaminated with splashes or aerosols.
10. Wipe all stainless-steel surfaces where sodium hypochlorite has been used with clean water or ethanol to prevent corrosion.
11. Dispose of all paper towel and other absorbent material into biohazard waste bag.
12. Remove gloves and dispose in biohazard waste bag.
13. Wash hands with soap and water, or where handbasin is unavailable, use hand sanitiser.
14. Remove safety glasses and wipe with ethanol to decontaminate before storing.
15. Remove gown and soak in disinfectant or autoclave it before sending to laundry services.
16. Spray the bottom of your shoes with disinfectant.
17. Re-wash hands with soap and water, or where handbasin is unavailable, use hand sanitiser.
18. Notify facility managers and the IBC that spill cleanup is complete.
19. Submit an incident report in UniSafe.

Spills outside of a biosafety cabinet of > 50 mL volume, or containing viral vectors or microorganisms infectious via respiratory route

Remove contaminated PPE
Exit the area
Stop others entering
Phone for help – others in the area, technical officers, or IBC
Organise clean-up
No rush
Decontaminate the area

Steps for people working in the area when the spill happens:

1. Move away from the spill, warning others around you to exit the lab.
2. Remove potentially contaminated gown and shoes and place on the floor away from the spill as you exit.
3. Warn others to keep out of the area of the spill.
4. If you have been contaminated, wash exposed skin at a sink. Use eyewash if the eyes or face have been exposed.
5. Leave the facility and place a sign saying 'DO NOT ENTER' on the door.
6. Notify your supervisor, the facility manager, and the IBC of the spill.
7. If you have not been injured or contaminated, remain on site to assist with the spill cleanup, otherwise ensure that your lab group and the facility managers are able to undertake cleanup by making them aware of the spill location and what has been spilt.
8. If spilt material has soaked through your clothing, take a shower in a regular shower (i.e., *not* an emergency shower*) as soon as possible. Clothing should be soaked in disinfectant before laundering, or otherwise disposed as biohazard waste.

   *Safety showers are designed for chemical spills and have the potential to spread microbiological contamination and create more aerosols. Where a drain is not present, all the water pooling on the floor also becomes biologically contaminated waste that must be decontaminated during spills cleanup, increasing risk of the cleanup process.
9. Stay out of the spill area for at least 30 minutes to allow aerosols and droplets to settle.

Steps for people cleaning up the spill:

10. Collect spill cleanup equipment (see 'Planning for control of spills' for a list of spill cleanup materials).
11. Make fresh solution of sodium hypochlorite solution (1% available chlorine*), or, where applicable, alternative approved disinfectant.

    *Important note: Sodium hypochlorite should not be used for spills that contain acids, ammonia, or formaldehyde.

    1% available chlorine is NOT the same as 1% bleach. For bleach containing 12.5% available chlorine (typical lab strength, but check the bottle), a 1:11 dilution of bleach to water is sufficient. For bleach containing 4% available chlorine (typical household strength, but check the bottle), a 1:3 dilution of bleach to water is required.
12. Before entering the spill area, put on a long-sleeved laboratory gown (disposable where available), disposable gloves, safety glasses and either a surgical face mask or a P2/N95 face mask (use the latter where the spill is material infectious via the respiratory route).
13. Assess the extent of contamination, including any areas where splashes or aerosols may have landed. Any nearby furniture or equipment should be considered as potentially contaminated.
14. Wet your absorbent material (e.g., paper towels) with disinfectant and place the absorbent material over the spill. Leave it to sit for at least 10 minutes.

15. After 10 minutes, remove any sharp objects in the spill area using forceps or tweezers and discard in a sharps container. Remove absorbent material and place in biohazard waste bag.
16. Starting from the outside edge of the spill, use a mop and bucket with disinfectant solution to mop towards the centre of the spill.
17. Dispose of mop water via the laboratory sink.
18. Make up fresh bucket of disinfectant and soak mop for 10 minutes. Dispose of mop water via laboratory sink.
19. Wet paper towel with disinfectant and wipe over surrounding furniture and areas that are likely to have been contaminated with splashes or aerosols.
20. Wipe all stainless-steel surfaces where sodium hypochlorite has been used with clean water or ethanol to prevent corrosion.
21. Dispose of all paper towel and other absorbent material into biohazard waste bag.
22. Remove gloves and wash hands with soap and water or use hand sanitiser provided.
23. Remove face mask and dispose in biohazard waste.
24. Remove safety glasses and wipe with ethanol to decontaminate before storing.
25. Remove gown and dispose or soak in disinfectant or autoclave it before sending to laundry services.
26. Spray the bottom of your shoes with disinfectant.
27. Seal biohazard waste bag and take to the clinical waste wheelie bin.
28. Wash hands with soap and water, or where handbasin is unavailable, use hand sanitiser.
29. Notify facility managers and IBC that spill cleanup is complete.
30. Submit an incident report in UniSafe.

Planning for control of spills before they happen	
1	Ensure that everyone working in the facility is aware of and familiar with these procedures.
2	Ensure that a copy of the spill clean-up poster is printed and available in the facility.
3	Have a biological spills clean-up kit available. This doesn't have to be a commercial kit – often making your own is a better option to make sure that the right items are available. Remember that chemical spill kits are different to biological spill kits. A good biological spills clean-up kit should include the following items: • Forceps or tweezers to pick up any sharps • Disposable gloves (several pairs) • Long-sleeved laboratory gown – disposable where possible • Surgical face masks or where materials infectious via the respiratory route are present, provide P2 or N95 face masks. • Safety glasses • Absorbent material – e.g., paper towel, or lab absorbent pads • Sodium hypochlorite bleach (undiluted and within expiry date) • Biohazard waste bags • Mop and bucket • Spare clothing (surgical scrubs), available through laundry service provider
4	Have a contact list for trained staff who are available to assist with spills clean-up if required – technical officers, IBC research compliance officers, etc.
5	Know where the eyewash is in your facility.

Hazard Management:

Remember that a biological spill has the potential to contain infectious material that can cause injury or illness in exposed or susceptible personnel. Microorganisms in spilt material can be spread via aerosols or droplets during a spill and during clean-up activities if they are performed incorrectly.

General precautions

- With large volume (> 50 mL) spills, or spills involving material infectious via inhalation, leave the area for a minimum of 30 minutes to avoid inhalation of infectious aerosols.
    - In some facilities (e.g., AHMS) there are labelled buttons to initiate air exhaust from the facility. These may be pressed where a large volume spill has occurred. Follow local instructions.

- Take care when selecting disinfectants for spill cleanup.
    - The disinfectant must be effective against microorganisms that may be present.
    - Ensure chemical safety is considered – e.g., be aware the using sodium hypochlorite/bleach for a spill that contains acids, ammonia or formaldehyde can produce toxic vapours.

- Do NOT use safety showers to decontaminate personnel exposed to biological material. Instead, wash the affected body part at a sink or remove as much external clothing as possible before moving to the closest changeroom with cubicle showers.
    - Safety showers are designed for chemical spills and have the potential to spread microbiological contamination and create more aerosols. Where a drain is not present, all the water pooling on the floor also becomes biologically contaminated waste that must also be decontaminated during spills cleanup, increasing risk of the cleanup process.

- Wear full PPE during spill clean-up, including but not limited to a long-sleeved gown or lab coat, disposable doubled-gloves, safety glasses and a surgical face mask. A P2/N95 face mask should be worn when cleaning up materials infectious via the respiratory route.

Legislation, Guidelines and Standards:

- Australian/New Zealand Standard 2243.3 Safety in Laboratories – Part 3: Microbiological Safety and Containment
- Gene Technology Act 2000
- OGTR Guidelines for Certification of PC1/PC2 Physical Containment Facilities/Laboratories/Animal Facilities/Plant Facilities/Invertebrate Facilities/Constant Temperature Rooms/Aquatic Facilities

This guidance document is supplied to specify requirements under relevant legislation, guidelines and standards relating to the compliant handling of regulated biological materials including but not limited to GMOs, microorganisms and samples/organisms containing these.

Research groups are responsible for the preparation of Safe Operating Procedures (SOPs) and Risk Assessments for their own work.