THE
UNIVERSITY
OF RHODE ISLAND

Laboratory Waste Guidebook

Environmental Health and Safety
University of Rhode Island
177 Plains Road
Kingston, RI 02881

401-874-7993
https://web.uri.edu/ehs/

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Environmental Policy & Principles

Environmental Health and Safety (EHS) has established the following Environmental Policy and these Principles to align with the University's Safety Policy. All members of the University community are responsible for complying.

Environmental Policy

The University of Rhode Island is committed to compliance with applicable federal, state, and local regulations, to pollution prevention objectives, and to continuous improvement of its environmental systems.

Environmental Principles

The University will adhere to the following Environmental Principles:

- Comply with all applicable environmental regulations.
- Educate and train faculty, staff, and students to properly implement University health and safety programs and procedures.
- Minimize the University's impact on the environment and surrounding community.
- Implement pollution prevention and waste minimization programs.
- Monitor adherence with University programs by measuring performance against established goals and matrices.

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Emergency Contact Information

EMERGENCIES	
Kingston and Bay Campus	
Medical Emergencies/Fire/Security Threat	**911**
Public Safety Dispatch (to reach on-call EHS staff after hours)	874-4910
NON-EMERGENCIES	
Environmental Health & Safety Office	
Telephone (questions, lab cleanouts)	874-7993 or 874-2592
Email	srm@etal.uri.edu
Website	https://web.uri.edu/ehs/
Radiation Safety Office	789-9391

1.0 Laboratory Waste Management

There are several different types of waste generated in laboratories at the University of Rhode Island. This guidebook contains information regarding the proper management of these various types of waste and includes the procedures to be followed in the event of a spill.

Roles and Responsibilities of University personnel who handle laboratory waste:

Environmental Health and Safety (EHS): Implements and manages all aspects of the laboratory waste program to include training, monitoring and recordkeeping.

Department Chairs: At the beginning of each academic year, chairs provide EHS with the names of Principal Investigators who have a lab in their department; ensure that training of the department's faculty, staff and students is current; complete their own annual EHS safety training.

Principal Investigators: Complete annual EHS safety training; ensure that students and staff working in their labs are current with their annual EHS safety and hazardous waste training.

Laboratory Workers: Researchers, research and teaching assistants, students complete annual training; handle waste according to University procedures outlined in this guidebook.

Students: Undergraduates and Graduate students working in research laboratories complete annual lab safety and hazardous waste training; handle waste according to University procedures.

Other Personnel: Paid personnel who may handle waste (e.g., stock room, technical support or University Affiliates) complete annual training; handle waste in accordance with University procedures.

Laboratory Visitors: Complete paperwork for the Risk Manager; complete all training appropriate to the work they will be doing before they begin working in the lab; handle waste in accordance with University procedures.

2.0 Compliance

EHS is responsible for ensuring that faculty, staff, and students comply with the procedures established in this guidebook. If there are deficiencies, the Principal Investigator will have up to 30 days to correct them (depending on the severity and/or complexity of the deficiencies) or notify EHS if assistance is needed.

If not corrected, EHS will notify the Director of Enterprise Compliance to discuss further action. This may include but is not limited to informing the Chairperson and Dean; correction by EHS with costs assessed to department; closure of laboratory; loss of laboratory privileges; or others as appropriate.

3.0 Laboratory Safety

Implement the Hierarchy of Controls to prevent an exposure by the principal routes of exposure: contact with skin; mucus membranes of the eyes, nose and mouth; inhalation, and ingestion. The Hierarchy of Controls include Source Elimination, Substitution for a less hazardous product, Engineering Controls, Administrative Controls and Personal Protective Equipment (PPE).

3.1 Risk Assessment

Conduct a risk assessment to determine the appropriate controls for your specific application. EHS offers a basic Risk Assessment class on Brightspace.

Register at https://web.uri.edu/ehs/training_registration_form/

For a deeper dive into Biological Risk Assessment, consult the CDC Risk Assessment tool, *Biological Risk Assessment: General Considerations for Laboratories*

For a full chemical risk assessment, see the American Chemical Society (ACS) tool.

3.2 Personal Protective Equipment

No two laboratories have the same combination of hazards; however, many hazards are present in every laboratory, and many are underacknowledged. Engineering and administrative controls are the principal tools you will use to manage the risk of exposure to these chemical or biological hazards. The final layer of protection is applied using correct personal protective equipment (PPE) for the hazards you are working with.

Institutional policy requires all lab workers to wear safety glasses in the lab. Ordinary prescription glasses do not provide adequate protection against injury. A relatively inexpensive option to prescription safety glasses is the addition of side shields to standard prescription glasses. If carefully selected, they do provide an extra layer of protection. Prescription safety glasses are available online with a prescription from your eye doctor. A better fit can be had if buying in person and sports style safety glasses are now generally available. Just be certain the lenses meet the ANSI Z87.1-2020 impact standard and offer wrap-around protection. Alternatively, over-prescription safety glasses, face shields and goggles are available from lab supply vendors. Safety goggles should have indirect venting if used to protect against splash hazards.

Lab coats are to be worn when working with chemicals. This is particularly important if personal clothing leaves skin exposed. Lab coats are to be laundered professionally (e.g., Pier Cleaners, Peace Dale, RI). Do not launder lab coats at home. Labs that work with cell cultures should be on a regular pick-up schedule with a professional laundry as dirty lab coats are a major source of cell

culture contamination.
Wear appropriate gloves when handling hazardous chemicals, sharp-edged objects, very hot or very cold (cryogenic) materials, toxic chemicals, and substances of unknown toxicity. Inspect gloves regularly for indication of contamination or small tears. Gloves should not be worn outside the lab and should also be replaced frequently due to degradation of the glove material. Wash hands each time the gloves are removed and/or replaced. Consult glove manufacturers' glove guides to select gloves appropriate to the chemicals being used.

3.3 Proper Laboratory Apparel

Long hair, loose clothing and jewelry are all hazards and must be confined, tied back, or removed when working in the laboratory. Unrestrained long hair, loose or torn clothing, and jewelry can all dip into chemicals or become ensnared in equipment or moving machinery. Clothing and hair can catch fire. Sandals and open-toed shoes should never be worn in a laboratory. Apparel that provides additional protection (e.g., nonpermeable laboratory aprons, fire resistant lab coats, long pants) is required for work with certain hazardous substances. The proper level of additional protection will be identified in the chemical's Safety Data Sheet (SDS). Most synthetic fabrics are flammable materials that will melt and possibly adhere to the wearer's skin, thus increasing the severity of a burn. Cotton is therefore the preferred fabric to be worn when you are working in the lab.

4.0 Chemical Waste Management

Unwanted chemicals in their original containers should not automatically be considered chemical waste. Chemicals that are unwanted in one laboratory or department may be considered usable in another laboratory or department (this does not include expired chemicals or peroxide formers, which should always be disposed). If you have unwanted chemicals, refer to Section 6.2 for chemical clean-out procedures.

Faculty, staff and students who work with chemicals in a laboratory will manage chemical waste consistent with EPA regulations to protect human health and the environment. The procedures outlined in this manual offer guidance based on current federal waste disposal regulations. Contact EHS if at any time you do not understand what is required of you.

DO NOT DISPOSE ANY CHEMICAL OR WASTE DOWN DRAINS!
ALL WASTE MUST BE COLLECTED, LABELLED AND PLACED IN THE LAB'S SAA

4.1 Hazardous Chemical Waste

A hazardous chemical is a substance which exhibits one of the four hazardous characteristics (corrosivity, ignitability, reactivity, toxicity) or is specifically listed as hazardous waste by the US

Environmental Protection Agency (EPA) or Rhode Island Department of Environmental Management (RIDEM).

Chemical waste must be characterized as non-hazardous or hazardous following the procedures outlined in this Waste Characterization Checklist.

Waste Characterization Checklist

These are general guidelines for characterizing hazardous waste generated in Rhode Island. ***Contact EHS if you have any questions or need assistance with Waste Characterization (401) 874-2592.***

4.1.1 Is this waste included in EPA's list of hazardous wastes?

- **4.1.1.1** F-Listed - Wastes from non-specific sources (e.g., spent solvents)
- **4.1.1.2** U-Listed - Discarded commercial chemical products (e.g., acetone, phenol, hydrofluoric acid)
- **4.1.1.3** P-Listed – Acutely hazardous discarded commercial chemical products (e.g., potassium cyanide, sodium azide, empty containers that held P-listed materials)

4.1.2 Is it ignitable or flammable?

- **4.1.2.1** Is it a liquid with a flash point below 93°C?
- **4.1.2.2** Is it a liquid with a vapor pressure above 40 psi at 38°C?
- **4.1.2.3** Is it a liquid or a gas that has a flash point above 23°C and a boiling point below 38°C?
- **4.1.2.4** Is it a liquid that ignites spontaneously in dry or moist air, or below or equal to 61°C?
- **4.1.2.5** Is it a solid or semi-solid that gives off flammable vapors below 38°C?
- **4.1.2.6** Is it a non-liquid capable of causing fire by friction, absorption of moisture or spontaneous chemical change?
- **4.1.2.7** Is it a flammable or ignitable compressed gas?
- **4.1.2.8** Is it an oxidizer that yields oxygen readily to simulate the combustion of organic matter?

4.1.3 Is it corrosive?

- **4.1.3.1** Is it an aqueous solution with a pH ≤2 or a pH ≥12.5?
- **4.1.3.2** Is the waste capable or corroding steel?

4.1.4 Is it reactive?

- **4.1.4.1** Does it react violently or become unstable with water or produces toxic gases or explosive mixtures?
- **4.1.4.2** Is it unstable or is it explosive, either readily or with a strong initiating source?

4.1.4.3 Does it contain cyanide or sulfides and generate toxic gases or explosive mixtures when exposed to a pH between 2 and 12.5?

4.1.5 Is it toxic or extremely hazardous?

4.1.5.1 Does it contain contaminants found in the EPA table of toxic substances in excess of the EPA standard?

4.1.5.2 Does it contain a Class 2, Division 2.3 or Class 6, Division 6.1 hazardous material as defined by USDOT?

4.1.5.3 Is it a known or suspected carcinogen?

4.1.5.4 Contains chemotherapy agents that are antineoplastic or cytotoxic?

If you answered "YES" to any of these questions, it <u>is</u> a hazardous waste Refer to the applicable section in this guidebook		**If you answered "NO" to any of these questions, it is <u>not</u> a hazardous waste** Refer to the applicable section in this guidebook	
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For further clarification, see EPA's *Defining Hazardous Waste: Listed, Characteristic and Mixed Radiological Wastes*

4.2 Hazardous Waste Containers

All hazardous waste material **must** be stored in an appropriate container.

Food, beverage, and detergent containers are NOT suitable for storing waste. Volumetric flasks with ground glass stoppers, beakers or other glassware covered with parafilm and containers that do not have a tight-fitting cap are also not acceptable as hazardous waste containers.

Hazardous Waste containers must be:

- Compatible with the waste being stored; check Safety Data Sheet (SDS)
- Sturdy and leak-proof
- An appropriate size
- Under the control of the person generating the waste
- Closed with a tight-fitting cap at all times except when adding waste
- Clearly identified with a URI hazardous waste label (see section 4.4)

Do not completely fill waste containers. There must be sufficient vapor headspace to allow for possible expansion of liquids during storage and shipment. Waste containers are supplied by EHS.

4.3 Incompatible Materials

Certain hazardous wastes **cannot** be safely mixed or stored with other materials because a severe reaction or explosion can occur, or an extremely toxic reaction product could result.

The chemical label and/or SDS should provide information on incompatibilities. In general, hazardous waste containers should be segregated by hazard class as listed below:

- Ignitable/Flammable
- Pyrophoric
- Explosive
- Toxic
- Reactive with Water
- Reactive with Air
- Peroxide Formers
- Oxidizers
- Corrosive
- Concentrated Acids
- Concentrated Bases
- Reducers

4.4 Hazardous Waste Labels

It is the responsibility of the Principal Investigator to ensure that the waste is properly labelled. You can request hazardous waste labels using the Hazardous Waste Pickup Request form at https://web.uri.edu/ehs/online-pickup/. Each waste container label must include:

- The words “Hazardous Waste”
- The identity of the hazardous waste with the chemical name written out in English longhand (no abbreviations or molecular formulas)
- If the waste is a mixture, all the components and the percentage of each is listed (these should sum to 100%)
- The primary hazards presented by the waste component(s) (e.g., “toxic”, “reactive”)
- The name of the person responsible for the waste, their location and phone number

5.0 Lab Hazardous Waste Satellite Accumulation Area (SAA)

Your Laboratory Hazardous Waste SAA is an area in the laboratory where small quantities of hazardous waste are temporarily stored prior to collection for disposal.

Hazardous waste accumulation areas (SAA’s) are regulated by both federal and state laws. To ensure compliance with these regulations and University requirements, the following conditions must be met:

- The SAA must be marked with the words "HAZARDOUS WASTE SATELLITE ACCUMULATION AREA." Yellow laminated signs are available from EHS.
- The SAA must be in the laboratory where the waste is generated and under the control of the person generating the waste.
- All containers must meet the container and labeling requirements outlined in sections 4.2 and 4.4 above.
- Incompatible substances are segregated; do not mix them in the same container or in the same SAA. If you need a second SAA contact EHS.
- All liquid waste containers must be in secondary containment. Grey secondary containment trays are provided by EHS. If you need a second grey tray to segregate incompatible wastes, contact EHS (trays for virgin chemical storage segregation and containment on shelves and in cabinets are, however, the responsibility of the lab).
- No more than 55 gallons of hazardous waste or one (1) quart of acutely hazardous (P-listed) waste can be stored in the lab at one time.
- Emergency telephone numbers for key laboratory personnel are posted on the Hazard Communication Door Sign. The Hazard Communication Door Sign template is available on the EHS website, the first entry under Forms, Signs and Labels. https://web.uri.edu/ehs/chemical/
- Must contain appropriate spill control kits for chemicals used in the laboratory.
- Signs identifying the location of emergency equipment such as safety showers and eyewash units are posted. Use the Lab Safety Orientation Checklist on the EHS website to communicate this information.

6.0 Pick-Up and Disposal

EHS is responsible for the retrieval, transport, and disposal of chemical hazardous waste from laboratories. This is contracted out to a hazardous waste contractor. When a waste container is almost full or the waste stream will no longer be generated, the laboratory must send EHS a Request for Hazardous Waste Pickup form to schedule a pick-up. Do not allow full waste containers to accumulate in the lab!

6.1 Waste Removal from the Laboratory

- Complete an online "Request for Hazardous Waste Pickup" form available at https://web.uri.edu/ehs/online-pickup/
- The hazardous waste disposal contractor will typically pick up the waste the following Wednesday. Refer to the EHS online calendar for any changes to the pickup schedule https://web.uri.edu/ehs/
- The laboratory is responsible for ensuring that the waste container is properly sealed, labeled and ready for disposal. Only waste containers listed on the pickup request will be removed.

6.2 Chemical Clean-Out

A chemical cleanout may be required under several conditions: a faculty member is retiring/relocating to a new lab or leaving the University; or the nature of the research has changed and chemicals that were previously needed are now redundant. See the University's Administrative Policies search page and type "Environmental Health & Safety" in the search bar in for details on this policy.

See also the *mandatory* URI Laboratory Move-In form and URI Laboratory Clearance form. Both are under Forms, Signs and Labels at https://web.uri.edu/ehs/chemical/

Chemicals that are still in their original containers and less than 3 years old can be reallocated for use by another lab. This excludes peroxide formers, chemicals with defaced or missing labels, containers that are damaged or exhibit dried accumulation around the cap, and expired chemicals. Label all containers as outlined in Section 4.4. Please fill out a request for hazardous waste pick up (link provided in Section 6.1 on this page) and place these containers in the SAA.

Begin planning your move/disposal with EHS well in advance of your anticipated departure date. Four weeks is the minimum needed for EHS to coordinate with the hazardous waste contractor, get a quote and schedule your project.

Do not move the chemicals from their appropriate storage locations.

1. Contact EHS regarding your pending chemical cleanout at 874-2592.
2. Inventory all chemicals to be removed. EHS can assist in providing a chemical inventory based on what has been previously barcoded. However, this will not include any in house reagents the lab may have made, newer materials that may have come in after EHS has gone through your lab, and/ or samples from your lab. You must include everything on the list that you plan to dispose.
3. For assistance with relocation and/or reutilization, submit your inventory to EHS on the Chemical Cleanout Request form. EHS will arrange for disposal of any chemicals that cannot be reutilized. Depending on the circumstances, disposal costs may be billed to the department.

7.0 Specific Handling Procedures

Certain chemical wastes require special handling due to regulatory or disposal requirements. Details are provided in this section.

7.1 HPLC Wastes

Solvent wastes generated by HPLC instruments are subject to hazardous waste regulations. However, due to the nature of the equipment, the procedures for collection and handling of HPLC solvent wastes are different than for other chemical wastes generated in laboratories.

Containers collecting HPLC waste must remain closed while the unit is in operation. It is not acceptable to have a waste line running from the HPLC unit into an open waste container nor is it acceptable to use foil or Parafilm as a means of closure. EHS provides threaded port caps to fit on the 5gal carboys, along with a carbon filter to capture vapor. This setup ensures proper closure at all times. If using another type of waste collection container, such as a 4L bottle, the lab may have to purchase a cap designed for liquid chromatography (LC) waste collection. Do not fill these containers more than ¾ full.

7.2 Mercury Waste

Mercury metal and mercury compounds must be collected for recovery and recycling. Due to its well-established toxicity and environmental persistence, these materials must not be released into the environment and must be handled as hazardous waste.
If your lab handles mercury, you must have a mercury-specific spill kit on hand. If a mercury thermometer or other mercury-containing device breaks or leaks, call EHS for assistance with the cleanup. The University encourages laboratories to switch to digital or spirit thermometers, when possible, to minimize mercury use and reduce the risk of breakage that could lead to an accidental exposure.

7.3 Photographic Wastes

Each photographic process's waste stream must be evaluated for disposal. Contact EHS for assistance at srm@etal.uri.edu

7.4 Radioactive Waste

Radioactive waste must be managed in consultation with the Radiation Safety Office (401) 789-9391.

7.5 Antineoplastic (Chemotherapy) Waste

Chemotherapy drugs are classified as hazardous and are managed as either chemical hazardous waste (bulk) or Regulated Medical Waste (trace). The proper designation – bulk or trace waste – depends on the weight of the chemotherapy drug being disposed.

Bulk chemotherapy waste is a waste material that contains more than 3% of the drug by weight. Bulk waste is collected in a black sharps container and managed as chemical hazardous waste. Containers are available from EHS.

Do not use this container for any other type of hazardous waste and don't leave it sitting in your SAA after you have finished your experiment. Send EHS an online Hazardous Waste Pickup Request.

Bulk waste includes capped containers and tubes with 3% or greater by weight of the chemo drug's original amount; unused or expired drugs; chemo drugs the lab will no longer use; and chemo spill cleanup material, such as pads or wipes.

Trace chemotherapy waste contains less than 3% of the chemotherapy drug's original weight and is disposed in a 17-gallon yellow sharps container provided by EHS. Trace waste includes empty sharps, syringes, and empty vials; used gloves, barrier lab coats/gowns and shoe covers; absorbent pads with minimal amounts of contamination.

When you have finished your experiment, pack the yellow container in a biohazardous waste box inside a heavy-duty red bag, two bags if they are translucent. Tie off the bag and seal the box per directions in Appendix H: Managing Biohazardous Waste SOP from the University's Biosafety Manual. Do not leave it sitting in the lab!

If the biowaste box has a "Chemotherapy drug" checkbox on the outside, be sure to mark this with a Sharpie. You can also request a "chemotherapy waste" label from EHS for your biowaste boxes.

If you are in Avedisian, CBLS or Fascitelli, take the box to the biowaste storage room for pickup by the University's contracted Regulated Medical Waste vendor. All other buildings: submit a Biohazardous Waste Pickup Request to EHS and have the box on your building's loading dock by 9:30 the morning of the scheduled pickup. The schedule is posted on the EHS main page.

7.6 Controlled Substances Waste

Disposal of unwanted controlled substances is the responsibility of the registered DEA license holder in control of the drugs. Disposal of unused, unwanted or expired pharmaceutical control substances is regulated by the *Secure and Responsible Drug Disposal Act of 2010*. Contact EHS if you need assistance with disposal of these drugs.

7.7 Unknowns

If you have a chemical or waste container with unknown contents:

1. Label it as "UNKNOWN".
   Attach a note detailing any information about what the chemical might be, who the user was, where it was found, and in what experiment it may have been used.
2. Each department is financially responsible for testing and disposal of unknown chemicals and compressed gases. Contact EHS for assistance and to provide a funding source for testing and disposal.

NOTE: If you find any unlabeled chemical that has crystallized, or there is any other indication that it may be unstable, **DO NOT TOUCH IT** and contact EHS for assistance immediately (401) 874-7993 or (401) 874-2592.

7.8 Gas Cylinders

Return gas cylinders to the manufacturer or distributor when empty. Contact EHS for assistance with disposal of unreturnable cylinders and lecture bottles. Order refillable/returnable cylinders instead of lecture bottles whenever possible as lecture bottles are very expensive to dispose. Disposal costs will be the responsibility of the PI and/or department.

7.9 Empty Chemical Containers

Contamination Type	Residue Amount	Container Type	Handling Procedure
Hazardous/ Chemical/ Pharmaceutical	Minimal/ None	Glass	Ensure there are no free liquids. Remove lid. Evaluate the risk of any residual material and rinse the container with an appropriate solvent if necessary. (Note: Rinse solutions may be regulated as hazardous waste.) Remove or deface all hazard warning labels. Put in box marked "Broken lab glass" and seal box. Dispose of box in regular trash.
		1 gallon Glass	When completely empty dispose directly to the Dumpster.
		Plastic	Ensure there are no free liquids. Remove lid. Evaluate the risk of any residual material and rinse the container with an appropriate solvent if necessary. (Note: Rinse solutions may be regulated as hazardous waste.) Remove or deface all hazard warning labels. Dispose in regular trash
		5 gallon Metal	Ensure there are no free liquids. Evaluate the risk of any residual material and rinse the container with an appropriate solvent if necessary. (Note: Rinse solutions may be regulated as hazardous waste.) Remove or deface all hazard warning labels. Dispose in regular trash or contact the recycling coordinator to dispose of as scrap metal..
		55 gallon Metal or Plastic	Ensure there are no free liquids. Evaluate the risk of any residual material and rinse the container with an appropriate solvent if necessary. (Note: Rinse solutions may be regulated as hazardous waste.) Remove or deface all hazard warning labels. Contact EHS for disposal options.
Acute Hazardous (P-Listed)	Any	All	Label and dispose of as hazardous waste (see section 4).
Biological	Any	All	Label and dispose of as biological waste or steam sterilize prior to disposal (see section 8).

For chemical containers that are included in the URI chemical inventory system, submit the bar code number to EHS at the following link whenever an empty container is disposed.

https://web.uri.edu/ehs/chemical-inventory-management-submit-barcodes/

7.10 Other

If you are collecting a waste stream and are unsure of the waste characteristics or the proper collection and handling procedures, contact EHS for assistance at srm@etal.uri.edu

8.0 Biological Waste Management

See Appendix H in the University's Biosafety Manual: Managing Biohazardous Waste (biowaste) for specific details as these can vary depending on which building you are in. The Biosafety Manual and Appendices can be found on the EHS Biosafety page.

While human blood, body fluids and tissues, infectious agents, cell cultures and contaminated lab plasticware are all biohazards, not all are managed through the Regulated Medical Waste Program. Only DRY waste is managed this way. See Infectious Liquid Waste below for disposal of human blood and body fluids (other than urine), and cell culture aspirates.

8.1 Infectious Liquid Waste (includes cell culture aspirates)

Decontaminate liquid waste by treating with freshly made 10% bleach for 20 minutes. Once decontamination is complete, determine the pH of the spent bleach. If it is outside the pH 5-9 window, it must be disposed as chemical hazardous waste. If the lab generates a lot of this waste stream, EHS can provide a 5-gal container. A clean 1-gal solvent bottle can be used for lesser volumes.

8.2 Infectious Solid Waste (Biowaste)

Biowaste includes sharps in sharps containers, contaminated lab plasticware, gloves and disposable lab coats. Biowaste is disposed as Regulated Medical Waste (RMW).

- Cardboard shipping containers (biowaste boxes), red bags and tape are provided by EHS and are stored in the waste rooms in Avedisian and CBLS. Supplies are also stored in room 075 Fascitelli. For other buildings that do not have a specific waste room, order any needed supplies on the Biowaste Pickup Request form on the EHS website.
- Dispose solid biomedical waste in a biowaste box lined with red biohazard bags; 2 will be required if the bags are translucent. Do not overfill. Ensure the weight of the full box does not exceed 50 pounds.
- Boxes must be closed except when adding waste. Use a cover provided by EHS.
- When the box is full, remove the air from the bag and seal the bag by tying a knot in the top; close the box and tape all seams. Box tabs cannot be interlocking, they must lay flat.
- Label the box with the PI's name using a Sharpie. Don't forget to do this!
- Take the full box to the waste storage area in your building. If you don't have a waste room, submit a Request for Biohazardous Waste Pickup form to EHS.
- For buildings other than Avedisian and CBLS: Leave the box(es) inside on the loading dock the morning of the pickup.
- A pdf version of the biowaste schedule can be found on the EHS page under "Forms".

NOTE: Do not dispose serological pipettes in a red bag/biohazard waste box as the tip can pierce the bag and cardboard box. Instead, collect them in a 31-gallon tote lined with a red biohazard bag for disposal as Regulated Medical Waste. Totes do not require packaging for shipment. If you only use a few pipettes at a time, sterilize them by either soaking them in a 10% bleach solution for 20 minutes or autoclaving them, and collect them in a cardboard box lined with a clear plastic bag. When the box is full, tie off the bag, seal the box and label it "Used Pipettes". Carry it out to the dumpster; housekeeping has been instructed not to remove this waste.

Pipet tips can be disposed in a biohazard waste box if the red bag is heavy-duty (i.e., is not transparent) or if two lightweight bags are used.

An autoclave can also be used to manage some biohazardous wastes. If autoclaved waste is to be discarded in the regular trash (e.g., agar plates from Microbiology labs) use heavy duty, clear plastic autoclave bags. Do not autoclave EHS-supplied red bags or red bags purchased from a lab supply vendor such as Fisher Scientific because they will melt inside the autoclave.

Red bags are only to be used for disposal of biohazardous waste through the Regulated Medical Waste Program. Do not dispose empty or damaged red bags in the regular trash. Dispose them in a biohazard waste box instead.

8.3 Animal Waste

Animal carcasses from research and teaching labs are disposed as Pathological Waste through the Regulated Medical Waste program.

Animal carcasses should be packaged, labeled, and handled in the same way as biomedical waste with the following added procedures:

- Animal carcasses must remain frozen until the morning of the pickup.
- Do not store full boxes under refrigeration as condensation may render the box unshippable when moved to a warmer temperature.
- Place a "Pathological Waste" or "Incinerate Only" label on the sealed box. Labels will be provided by EHS.
- Consult the University's Attending Veterinarian for assistance with disposal of large animals.

Animal bedding from experiments may also be collected and disposed as RMW. This waste is shipped as regular RMW, not pathological waste so additional labelling is not required.

8.4 Biological Specimens

Biological specimens may be preserved in a fixative such as Formalin or Carosafe, and stored long-term in pails or buckets of fixative; smaller samples may have the fixative poured off for disposal

(see below) and Ethanol added to specimen jars for long-term storage. Specimens are frequently used in Anatomy and Physiology teaching labs, but they may also be found in research labs as well, where they are an important part of a researcher's collection.

If specimens have been declared no longer useful (i.e. a waste), they must be disposed properly. These biological wastes are made up of two separate waste streams: chemical hazardous waste and biological waste (biowaste). The liquid waste must be dealt with first.

NOTE: Formalin can release Formaldehyde gas which is classified as a human carcinogen (causes cancer). Always wear safety glasses/goggles and use only in a chemical fume hood when pouring off to reduce the risk of an exposure. If you work with Formaldehyde or Paraformaldehyde, see the URI Formaldehyde Health and Safety Program for hazards and risk mitigation information.

- Carefully pour liquid waste off into a suitable container. Contact EHS at the link below if you need a container. Order any needed supplies at the bottom of the form.
- Add a URI hazardous waste label to the new waste container: correctly identify the contents with their concentration and include the hazard class (from the SDS).
- Make sure the lid is secure and place the container in your SAA. If you need another grey bin for waste storage, contact EHS at the link below.
- Complete a Hazardous Waste Pickup Request.

Once the liquid waste has been properly managed, it's time to deal with the biological waste.

- Collect the solid tissue in an opaque plastic bag. It has been fixed so there is no inherent biological hazard.
- Place the bag in a biowaste disposal box that had been lined with a red bag. There may be an open box for this Pathological Waste in CBLS or Avedisian. If you are at GSO or in another building and need a box, contact EHS at the link below. Request supplies at the bottom of the form.
- Make sure the box is properly labeled with a Pathological Waste or Incinerate label as this is the only way to ensure this waste stream is incinerated.
- If you are the owner of the box, send EHS a Biowaste Pickup Request.

9.0 Sharps

SHARPS are waste items that can easily cut or puncture the skin and include needles, syringes with attached needles, broken glass pipettes, Pasteur pipettes if used with biologicals, scalpels, broken vials, capillary tubes (glass or plastic), microscope slides, and cover slips.

- Order red OSHA-approved sharps containers that will fit easily inside a biowaste box. Do not order the largest size, they will not fit in the biowaste boxes.
- Sharps containers are available from lab supply vendors such as Fisher Scientific or

Wilkem and are purchased by the Principal Investigator (PI).
- Place sharps containers in the immediate work area.
- Put used sharps in the container immediately after using. Do not reach into a sharps container under any circumstances.
- Do not overfill the sharps container.
- When full, place in the lined biowaste box for final disposal as Regulated Medical Waste.

If using a sharps container only for disposal of microscope slides, note that glass is very dense. Take care not to exceed the 50 pound capacity of the biowaste boxes. Better to use one biowaste box per sharps container.

If sharps contain radioactive material, contact the Radiation Safety Office for assistance with proper disposal.

9.1 Broken Lab Glassware (non-biological, non-hazardous)

Includes broken lab glassware, such as reagent bottles, flasks, pipettes, tubes and vials that do not meet the criteria for hazardous, biological, or radioactive waste.

- Collect in a box lined with a clear plastic bag to contain stray glass chips.
- The box can be a standard cardboard shipping container from a vendor.
- When the box is almost full, tape it closed and label it "Broken Lab Glass" with a Sharpie.
- Lab staff are to carry the box out to the dumpster for disposal. Housekeepers have been instructed not to handle this waste.

10.0 Chemical Spill Emergency Response

Lab staff are trained to the OSHA Awareness level and can only clean up a bench top spill. If you have a spill of a hazardous chemical that is more than a bench top spill, follow the directions below.

10.1 EVACUATE

- Alert others in the area and direct or help them to leave the area.
- Without endangering yourself: Remove anyone who is injured to fresh air or remove contaminated clothing and flush contaminated skin and eyes with water for 15 minutes.
- If anyone has been injured or exposed to toxic chemicals or vapors, **call 911**.

10.2 CONFINE

- Open windows (if possible) if there is a strong odor; close doors to isolate the area.
- Prevent anyone from entering the spill area.

10.3 REPORT

- Report the emergency and be prepared to give the Police Dispatcher the following information:
    - Your name and phone number (include your area code)
    - Location of spill (include building and room number)
    - The chemical name and amount of the material spilled
    - The nature and extent of the injuries
    - The safest route to the spill
- Stay by the phone.
- Emergency personnel will respond to stabilize and clean up the spill.

10.4 SECURE

- Block off areas leading to the spill (lab or chemical storage room) until emergency response personnel arrive.
- Post personnel near commonly used exits/entrances to direct occupants to use routes away from the spill.
- Notify your supervisor who may be in an office or off campus, not in the lab.

11.0 Laboratory Pollution Prevention

Pollution: The discharge of harmful substances to environmental media (air, soil, or water) that results in concentrations that interfere or change natural processes.

Pollution Prevention: The reduction or elimination of pollution at the source when raw materials, energy, and other resources are efficiently utilized; when less harmful substances are substituted for hazardous ones; and when toxic substances are eliminated.

University laboratories often generate large quantities of wastes in their instructional and research activities. By using prudent pollution prevention practices, the University can reduce overall operational and environmental compliance costs while also reducing student and researcher exposureto hazardous materials. A win-win.

The University of Rhode Island has implemented a pollution prevention program using the EPA's hierarchy of preferred options: Source Elimination and Reduction, Recycling and Reusing, and Disposal with Disposal being the least preferred. Source Elimination and Reduction is the preferred approach to waste minimization and should be used whenever possible. Other options include substituting less hazardous chemicals, reducing the quantities of chemicals used and reutilization of excess chemicals.

12.0 Training

All University personnel who work in a lab with hazardous chemicals must attend annual Hazardous Waste Management training to refresh the material learned when initially posted to the lab. Training will include any regulatory updates.

Depending on your academic or faculty/staff status, you will either review the Initial Lab Safety and Hazardous Waste Management classes or Prudent Practices in the Laboratory (the Refresher) which includes a Risk Assessments module. A training matrix is available on the EHS website.

13.0 What You Must Do to Comply with Regulations

Below are the minimum steps you need to take to comply with federal and state regulations regarding waste handling and spill emergencies.

The Top 10 Guidelines for Environmental Responsibility

1. Attend annual lab safety and hazardous waste management training.
2. Properly label all waste containers.
3. Store waste in compatible containers.
4. Segregate incompatible wastes into separate bins.
5. Use secondary containment for liquid waste.
6. Keep waste containers closed except when adding waste.
7. Do not dispose of hazardous waste by evaporation, sewer, or trash.
8. Notify Public Safety Dispatch if you need help cleaning up more than a bench top chemical spill.
9. Use pollution prevention techniques when possible. (Reduce, Reuse, Recycle).
10. If you have any questions, contact EHS at srm@etal.uri.edu

13.1 Preventing Regulatory Violations

Federal and state agencies regularly visit URI to perform unannounced compliance inspections. Following is a list of commonly cited violations that the agencies find in URI research facilities:

- Improper labeling
- Improperly contained waste
- Incompatible wastes stored together
- Improperly trained personnel
- Chemicals improperly disposed of
- Waste incompatible with container

- Containers not closed
- Laboratory personnel unaware of proper emergency procedures

Please review this information carefully and correct any problems in your lab immediately. Violations can not only result in fines, but adversely affect URI's public image, as well as your own reputation.

EHS personnel also conduct regular laboratory inspections to monitor compliance. The Principal Investigator will be notified of any deficiencies and will receive a copy of the inspection report. There is also a laboratory self-audit checklist available on EHS website to help you minimize violations.