

Biohazardous Waste

There are 4 general categories of biohazardous wastes based on the physical form of the waste. Each form must be segregated, identified, decontaminated and disposed of in an appropriate manner for the form in order to minimize occupational exposure and environmental release risks.

Biohazardous waste in any form should not be left untreated and unsecured in areas that are accessible to the public (i.e., left in hallways). Only lab personnel should remove treated biohazardous waste from the lab area and transport it to waste holding areas for final disposal.

The Biohazardous Waste Categories are:

1. Solid Biohazardous Waste (non-sharps)

In the research lab or field environment, this includes any non-sharp item that is contaminated with human or animal diagnostic specimen material (i.e., body fluids, tissue debris), any microbiological culture material (including recombinant DNA).

Examples include but are not limited to:

- Gloves and other disposable PPE contaminated with specimen or culture material.
- Plasticware such as pipettes or pipette tips, culture plates, specimen vials, etc. that are contaminated with biological specimens, bacterial and cell culture material, or nucleic acids.
- Towels and bench paper that are biologically contaminated (Note: Bench paper that is used in areas where samples or cultures are opened and manipulated must be regarded as biologically-contaminated and therefore removed and managed as solid biohazardous waste)
- All culture or sample containers that are contaminated with biological materials
- Tubes of blood (Note: glass blood vials that could break easily upon disposal should be segregated as sharps waste; see below)

Storage

This type of waste must be collected for final treatment and disposal in a leak-proof container lined with an autoclave bag of moderate thickness to prevent punctures. The collection container must have a lid or other means of closure and the container must be labeled with the biohazard symbol regardless of the lab's operating biosafety level.

Bench top containers should be used for collection of small quantities of contaminated dry goods (i.e., pipette tips, centrifuge tubes, etc.). Small plastic containers or wire bag racks lined with a biohazard bag are suitable for bench top collection. These containers do not need to have a lid (unless waste is contaminated with a pathogen) but daily disposal of the bag into a larger collection container such as the one shown to the right is strongly recommended.



Wastes Requiring Special Considerations

Breakable Biohazardous Wastes

Tubes of blood or other breakable biohazardous waste can be troublesome to manage properly and safely for treatment and disposal. For small amounts of breakable biohazardous waste, these items may be placed in sharps containers for disposal. However, if your lab generates a large amount of breakable biohazardous waste, please contact the Biosafety Officer for assistance with finding solutions for safer waste management.

Serological Pipettes

All plastic pipettes, regardless of contamination status should be segregated from other lab wastes because they readily puncture waste and trash bags which increases spill potential. They should be packed in a rigid container such as the Pipet Keeper™ Container or something comparable.



Treatment and Disposal

The purpose of solid biohazardous waste treatment is biological inactivation in a manner that reduces hazardous exposure risk for lab personnel and the environment. This is generally achieved by autoclave treatment of waste or treatment and disposal through a medical waste disposal contractor (i.e., licensed medical waste hauler) who will autoclave or incinerate the waste. Under the TDEC regulations, wastes are to be “rendered non-infectious by sterilization techniques prior to disposal”. This means that all items contaminated with a potentially infectious material must be autoclaved or managed through a medical waste disposal contractor for disposal.

Disinfection of items such as serological pipettes contaminated with human cells does not preclude the need to manage these items as biohazardous waste for final treatment and disposal.

On-site Autoclave Treatment

At this time the Office of Research Safety does not recommend the on-site treatment of biohazardous waste using autoclaves (with the exception of waste generated in the RBL). Biohazardous waste generated at UTHSC is handled and disposed of by an approved vendor as Regulated Medical Waste. This is a conservatively protective practice intended to ensure the safety of the UTHSC community and the proper disposal of research materials.

Notes on biohazard bags:

- Biohazard bags are a one-way means of disposal. Do not “dump” the contents from one biohazard bag into another as this action spreads contamination and increases your exposure to this waste.
- Biohazard bags need to be contained at all times during the collection, treatment, and disposal process. Some lab items may puncture bags and this can lead to leaks and spills.
- Biohazard bags must not be used for collection of other hazardous wastes (i.e., ethidium bromide gels).
- If your lab works with human-derived materials or other materials that are an infectious disease risk for humans (i.e., BSL-2), you must use bags that bear the biohazard symbol.

2. Liquid Biohazardous Waste

This includes bulk quantities of blood, blood products, body fluids from human and animal research and contaminated culture media. Note: Disposable primary containers or sample containers containing small quantities of liquids (less than 5 ml) can be managed as solid biohazardous waste.

Storage



These liquids must be stored in closed, leakproof containers while awaiting treatment and disposal. Collection vessels should be secured so that they cannot be

tipped over. Secondary containment is strongly recommended and can be achieved by placing the vessel in a bucket or deep tray.

Storage vessels or the secondary container must be labeled with the biohazard label if the liquids will not be treated and disposed of within the shift. If disinfectant is added to the vessel, provide labeling so that the chemical hazard is identified as well. For instance, if your collection flask contains waste cell media and bleach, you should place biohazard label on the flask (or secondary container) as well as the words “bleach-treated cell culture materials” to properly identify both the chemical and biological hazard.

Treatment and Disposal

Liquid wastes may be treated and disposed of by either one or the other of the following methods:

- **Chemical treatment of liquids with disinfectant; disposal via lab sink.** Disinfectants may be used for treatment of liquid biological waste. Add household bleach to the collection vessel so that the bleach makes 10% of the final volume. Allow a contact time of at least 30 minutes. Carefully discharge the mixture to the sanitary sewer by way of the lab sink, then thoroughly rinse down the sink with water. Remember to wear splash goggles, gloves, and a lab coat for handling of bleach and bleach-treated liquids.

NOTE: Diluted bleach solutions may go down the drain in most cases. However, many chemicals used for disinfection cannot be discarded down the drain. Contact EH&S at 974-5084 to determine if sink disposal of disinfectants other than diluted bleach solutions is acceptable.

3. Sharps Disposal

A biohazardous sharp is any device that is sharp enough to puncture the skin and that is contaminated with a biological material that is an infectious disease transmission risk, or an environmental release risk (i.e., recombinant DNA). Examples include but are not limited to:

- Needles, disposable syringes, capillary tubes & scalpels contaminated with human or animal blood
- Microscope slides contaminated with unfixed human or animal specimen materials
- Pasteur pipettes contaminated with cell culture waste media
- Small glass/broken tubes of blood or microbiological cultures

SAFETY NOTE ON UNCONTAMINATED NEEDLES & MEDICAL DEVICES WITH A NEEDLE ATTACHED...

State waste regulations do not specifically address the disposal of hypodermic needles and medical devices with a needle attached (i.e., tuberculin syringes) unless these items are contaminated with blood or potentially infectious materials. However, it is strongly recommended that ALL needles and medical devices with a needle attached be disposed of in biohazardous sharps containers to protect those who may come in contact with these items during the disposal process. If such devices are contaminated with radioactive materials- follow Radiation Safety procedures for disposal of such items. If such devices are contaminated with hazardous chemicals, contact Research Safety Office at 448-6114 for guidance with disposal.

Biohazardous sharps containers are those containers which are specifically designed for the collection and disposal of biohazardous or medical sharps. (Recycled food or reagent containers are NOT acceptable for collection and disposal of biohazardous sharps!)

A biohazardous sharps container is:

- constructed of puncture-resistant material,
- leak-proof on the sides and bottom,
- marked with the biohazard symbol, and
- has a restricted opening to prevent items from coming back out of the container, and to prevent someone from sticking their hand inside.

To protect yourself and others in your work area, place biohazardous sharps in a properly assembled (i.e., lid installed) biohazard sharps container immediately after use. This can be achieved by placing sharps containers within arms-reach of where biohazardous sharps are used.

SAFETY NOTE: Do not recap needles. Do not bend or break sharp devices. Do not overfill sharps containers or use force to get an item into a sharps container.

Treatment and Disposal

All sharps containers must be permanently closed and disposed of when $\frac{3}{4}$ full or whenever items do not freely fall into the container.

Disposal of biohazardous sharps containers will be accomplished through a medical waste disposal contractor coordinated through the Office of Research Safety. Do not dispose of biohazardous sharps containers in the trash, regardless of treatment status.



Do you have long Pasteur pipettes that are contaminated with potentially infectious material or recombinant DNA? Tall sharps containers with an opening large enough to safely deposit these items are strongly recommended.

Sharps containers must be taped shut prior to disposal. Once filled and taped, sharps containers should be placed into a red biohazard bag and placed into a Stericycle shipping box that is prepared for shipment.

SAFETY NOTE ON BROKEN GLASS...

If broken glass is biologically-contaminated, it must be managed as a biohazardous sharp for disposal. However, some instances occur when the broken glass does not fit in a sharps container. In these events, please call the UTK/UTIA Biosafety Officer for assistance.

Broken glass that is not contaminated with a hazardous material should be placed in a suitable puncture-resistant container for disposal. (Storage of broken glass in trash bags is NOT acceptable!) Disposable and reusable broken glass containers are available through most lab supply companies.

Broken glass boxes are available for purchase through General Stores in the GEB.



4. Pathological Waste

This includes all unfixed human organs, tissues and body parts except for teeth. It also includes unfixed animal tissues and carcasses that have been:

- exposed to human-derived materials (i.e., cells),
- experimentally challenged with agents infectious to humans or recombinant organisms, and other circumstances as deemed appropriate through the biological risk assessment process.

Storage, Treatment and Disposal

This type of waste must be double-bagged in biohazard bags that bear a biohazard symbol. Bags must be stored in a manner that will minimize the potential for release of fluids during the storage and handling process. Storage of bags in a tray with sides, or secondary storage of bags in a sturdy

plastic zipper bag is strongly recommended. Remember that these items must be labeled with the biohazard symbol. The medical waste disposal contractor must be used for pickup and disposal of these materials. Contact the Institutional Biosafety Officer (448-2054) for further assistance with disposal of items in this category. For assistance with disposal of formalin-fixed or chemically preserved tissues, contact the Office of Research Safety at 448-6114

Final Note on Mixed Wastes

Some lab analyses may involve treatment or exposure of biological materials to chemical compounds or radioactive materials. Examples may include radioisotope labeling of genetic material in culture or cells, and exposure of cells or research animals to carcinogens or diagnostic processes involving radiation hazards. In these situations, mixed wastes are likely to be produced that will require special consideration for collection, handling and disposal. Biohazardous waste treatment and disposal techniques alone are not likely to be suitable for mixed wastes. When planning studies that will generate mixed wastes, please contact the appropriate safety office for assistance in determining your waste handling procedures.