

**Texas Tech University  
Health Sciences Center  
Regulated Waste Disposal Manual**

MANAGEMENT AND DISPOSAL OF REGULATED WASTE  
AT TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER

## INTRODUCTION

The purpose of this document is to provide information, requirements, guidelines, and procedures for the handling and disposal of hazardous and non-hazardous waste for all the departments of the Texas Tech University Health Sciences Center (TTUHSC) and regional campuses.

In Texas, disposal of regulated waste is controlled by the Texas Department of State Health Services (DSHS) and the Texas Commission on Environmental Quality (TCEQ). Local regulations of the City of Lubbock, El Paso, Amarillo, Midland, San Angelo, Abilene, Dallas, and Odessa also apply.

**“REGULATED WASTE”** means any solid or liquid waste that is hazardous because of its physical, chemical, radioactive, or biological nature. All waste that contains infectious material or which, because of its biological nature, may be harmful to humans, animals, plants, or the environment is medical/special (biohazardous) waste. This includes: waste from infectious animals, bulk human blood or blood products, infectious microbiological waste (including contaminated disposable culture dishes and disposable devices used to transfer, inoculate and mix cultures), pathological waste, sharps, and hazardous products of recombinant DNA biotechnology and genetic manipulation. Generally it means discarded material from teaching and research laboratories and operations. It does not include household or office trash, waste from Food Services, Physical Plant, bedding, litter, or manure from noninfectious animals. Definitions for terms used in this document can be found in *Procedure for Disposal of Medical, Special, or Infectious Waste* (page 7).

Biohazardous waste generated at TTUHSC is treated by steam disinfection (autoclaved), to be deposited in the Municipal Landfill, or by incineration by a commercial vendor. Liquid biohazardous waste should be disinfected by the generator and discharged into the local sewer system. Personnel with the potential for contact with biohazardous material must be appropriately trained and equipped with appropriate personal protective equipment (PPE).

The key requirements for disposal of TTUHSC’s medical/special (biohazardous) regulated waste are that it must be:

- (1) *Segregated* from other waste,
- (2) *Treated* to eliminate the biological hazard,
- (3) Securely *packaged*,
- (4) *Transported* for disposal, and
- (5) *Documented* from “cradle to grave.”

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## RESPONSIBILITIES

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### Introduction

The disposal of hazardous material at TTUHSC is subject to regulations of

- The Environmental Protection Agency (EPA)
- Department of Transportation (DOT)
- Texas Department of State Health Services (DSHS)
- Texas Commission on Environmental Quality (TCEQ)
- Texas Bureau of Radiation Control (TBRC)
- City of Lubbock, El Paso, Amarillo, Odessa, San Angelo, Dallas, Abilene, Midland

The Environmental Safety division of Safety Services at TTUHSC complies with these regulations to dispose of all hazardous material in a safe and environmentally sound manner.

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### Safety Services' Environmental Safety Division

This office will:

- Administer the Regulated Waste Management Program at TTUHSC,
  - Identify waste as hazardous or non-hazardous,
  - Recommend to management appropriate treatment or disposal,
  - If necessary, contract with outside laboratories for analysis of waste,
  - Maintain records of all results as required by law,
  - Arrange for licensed contractors to transport and dispose of hazardous waste,
  - In conjunction with the contractor, verify that hazardous materials are contained and labeled in accordance with EPA, TRC, and DOT regulations,
  - Maintain disposal records as required by law, and
  - Submit monthly and annual reports of hazardous waste disposal as required by required by state regulations.
- 

### Generator

Generator (clinics, laboratories, support services, etc.) will:

- Identify all sources of potentially hazardous waste and report these to the Environmental Safety Division of Safety Services,
  - Report to the Environmental Safety Division of Safety Services any changes or discrepancies in the initial waste identified,
  - Report all new waste-generating operations,
  - Provide safety training for all employees required to handle regulated waste,
  - Collect and store hazardous waste in a safe manner as defined by written safety procedures ,
  - Be accountable for the waste generated in the respective areas managed, and
  - Segregate waste in accordance with the procedures contained herein.
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**RESPONSIBILITIES (continued)**

**Staff**

Staff will:

- Wear the required personal protective equipment (PPE) when handling waste (e.g., eye protection, apron, gloves, and closed-toe shoes),
  - Keep informed on the characteristics and hazards associated with the waste produced in the laboratories and clinics,
  - Collect waste in designated, approved containers,
  - Maintain records on the amount of waste generated and the method of disposal,
  - Record proper disposal information on the Request for Transfer of Chemicals Form (on-line, see Appendix 1). Form is located on the Safety Services web page.
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**TYPES OF REGULATED WASTE**


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The hazardous waste generated at TTUHSC includes chemicals, biological materials, and radioactive waste. Ref: RCRA 40 code of Fed. Reg. part 240 et seq. and TCEQ 30 Texas Administrative Code sec 335.1 et seq.

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**Toxic**

As defined by the Environmental Protection Agency (EPA), hazardous chemical waste is fatal to humans, even in low doses, or is capable of causing or significantly contributing to an increase in irreversible illness or incapacitating reversible illness. In the absence of human toxicity data, the following levels specify toxicity:

- Rat: oral - LD50 below 50 mg/kg  
inhalation - LC50 below 2mg/l
- Rabbit: dermal - LD50 below 200mg/kg

Examples of toxic waste include osmium tetroxide and chloroform.

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**Corrosive**

Corrosive waste (EPA Hazardous Waste Number D002)

- Has a pH less than 2 or greater than 12.5, or corrodes steel at a rate exceeding ¼ inch per year

Examples of corrosive waste include acids (acetic, chromic, hydrobromo, hydrochloric, hydrofluoric, nitric, perchloric, and sulfuric) and bases (ammonium hydroxide, potassium hydroxide, and sodium hydroxide).

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**Ignitable**

Ignitable waste (EPA Hazardous Waste Number D001)

- Is an oxidizer,
- Has a flash point less than 140°F (60OC),
- May cause a fire through friction,
- May cause a fire through absorption of moisture, or
- May cause a fire through spontaneous chemical change.

Examples of ignitable waste include ethanol, ether, acetone, xylene, isopropanol white spirits, naphtha, kerosene, petroleum distillates, ethylene dichloride, and most non-chlorinated solvents.

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**Reactive**

Reactive waste (EPA Hazardous Waste Number D003)

- Is unstable and readily undergoes violent changes or forms explosive mixtures with water,
- Detonates if heated or subjected to shock, or
- Contains cyanide or sulfide.

Examples of reactive waste include sodium, hypochlorite, organic peroxides, perchlorates, permanganates and sulfates, picric acid, acetyl chloride, chromic acid, and cyanides.

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**Extraction  
Product  
Toxic Waste**

Extraction Product (EP) toxic waste contains any of the following contaminants:

- Arsenic (EPA #D004),
  - Lead (EPA #D008),
  - Barium (EPA #D005),
  - Mercury (EPA #D009),
  - Cadmium (EPA #D006),
  - Selenium (EPA #D0010),
  - Chromium (EPA #D007),
  - Silver (EPA #D011), and
  - Certain pesticides
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**NOTE**

Almost all laboratory chemicals are considered to be hazardous.

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**Biohazardous**

Biohazardous waste includes:

- Sharps
  - Bulk blood, bulk human blood products, and bulk human body fluids (including semen, vaginal secretions, any body fluid containing visible blood, saliva in dental settings, amniotic fluid, cerebrospinal fluid, peritoneal fluid, pleural fluid, and synovial fluid),
  - Microbiological waste,
  - Pathological waste, and
  - Animal waste (from infectious animals).
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**Radioactive**

Radioactive waste is considered to be any waste product that contains or is contaminated by radionuclides. See TTUHSC Radiation Safety Manual for waste disposal instructions.

## REGULATED CHEMICAL WASTE CONTAINERS

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### Introduction

Empty chemical containers are considered to be hazardous if they are contaminated with any of the chemical agent that they previously contained. Keep chemical containers boxed and separated for pick-up, never put them in the trash. Reusable, empty, hazardous containers must be triple rinsed must be collected as hazardous chemical waste. Do **not** pour down the drain.

Call your **Safety Services Department** for pick-up.

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### Use

Before using empty glass, plastic, or metal chemical containers to collect hazardous waste for disposal, be sure that:

- The waste is compatible with the former contents of the container (if not, thoroughly rinse the container prior to re-use),
  - The waste is compatible with the type of container being used (example: never put corrosives in metal container),
  - All collection vessels have leak-proof seals, and
  - Thin-walled secondary glass containers, such as acetone bottles, are not used to collect heavy waste liquids (example: chromic acid).
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### Safety Solvent Cans

In some cases, safety-solvent cans and other containers may be provided by Safety Services Environmental Safety Division for the collection of continuous liquid waste streams; call **Safety Services** for more information.

**PROCEDURE FOR DISPOSAL OF REGULATED CHEMICAL WASTE**

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**Liquid  
Waste  
Streams**

When collecting liquid chemical waste for disposal make sure that:

- Any chemicals to be mixed are compatible,
  - The wastes are segregated into separate containers for: chlorinated solvents, non-chlorinated solvents, aqueous acidic, or basic solutions,
  - A record is kept of the volume and contents of each addition to the waste container,
  - When the container is to be disposed of, the volumes and concentrations each chemical are totaled, and
  - You have completed the Request for Transfer of Chemicals Form (on line, Appendix 1) and have attached a copy to the container(s).
- 

**Note**

*Request for Transfer of Chemicals* form (Appendix 1) should be submitted using the on-line system. This on-line form is located on the Safety Services website. Safety Services will print out a hardcopy for signatures when the chemicals are picked up. Copies will be made for the department upon request. Regional facilities in El Paso, Amarillo, Midland, Odessa, San Angelo, Dallas, and Abilene should use the online form. The form will be faxed to the appropriate facility safety manager when received in Lubbock.

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**Outdated or  
Unwanted  
Chemicals**

To dispose of outdated or unwanted chemicals, identify each completely (no abbreviations or trade names) on a Request for Transfer of Chemicals Form (Appendix 1) by listing each chemical and the approximate amount remaining in each container and submit the request using the on-line system located on the Safety Services web page.

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**Mercury  
Waste**

Liquid mercury and broken thermometers are considered to be hazardous, and **cannot** be discarded in the regular trash. Call Safety Services to report spills or to pick up mercury waste.

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**Important**

**DO NOT PUT THE FOLLOWING CATEGORIES OF WASTE ITEMS DOWN A DRAIN:**

- Pathogenic tissue specimens (certain pathogenic waste such as urine, may be flushed down the drain with the prior approval of Environmental Safety,
- Solutions of a pH less than 2 or greater than 12,
- Bulk blood or body fluids (only minimal amounts are allowed by the city),
- Solutions containing heavy metals,
- Reactive or unstable chemicals,
- Flammable liquids,
- Chlorinated solutions,
- Anything not miscible with water, or
- Formaldehyde

Please use the Request for Transfer of Chemicals Form and submit using the on-line system.



## PROCEDURE FOR DISPOSAL OF MEDICAL, SPECIAL, OR INFECTIOUS WASTE

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### Definitions §TAC 1.132

The following words and terms, when used under this undesignated heading, shall have the following meanings unless the context clearly indicates otherwise.

- Biological Indicators - commercially-available microorganisms (e.g., United States Food & Drug Administration-approved strips or vials of Bacillus species endospores) which can be used to verify the performance of waste treatment equipment and/or processes.
- Body Fluids – those free-flowing body substances other than blood, plasma, or serum identified under universal precautions as recommended by the United States Centers for Disease Control & Prevention, and includes, but not limited to:
  - Semen,
  - Vaginal secretions,
  - Any body fluid containing visible blood,
  - Saliva in dental settings,
  - Amniotic fluid,
  - Cerebrospinal fluid,
  - Peritoneal fluid,
  - Pleural fluid,
  - Pericardial fluid, and
  - Synovial fluid.
- Bulk - contained, aggregate volume of 100 milliliters (ml) or more.
- Bulk human blood, bulk human blood products, and bulk human body fluids - all free-flowing waste: human blood, serum, plasma, other blood components, and body fluids, including disposable items saturated (thoroughly wet such that liquid or fluid flows freely from the item or surface without compression) with blood or body fluids.
- Chemical Disinfection - the use of a chemical agent to reduce significantly the numbers of active microorganisms, but not necessarily their endospores, from the surfaces of inanimate objects.
- Chlorine disinfection/maceration - the process of shredding waste in the presence of a chlorine solution under negative pressure.
- Contagious - capable of transmission from human to human, animal to human, or animal to animal.
- Contaminated - the presence or the reasonably anticipated presence of blood or those body fluids as defined elsewhere in this section.
- Deposition in a sanitary landfill - deposition in a sanitary landfill in accordance with Title 30, Texas Administrative Code, Chapter 330.
- Discharge to sanitary sewer system - a discharge or flushing of waste into a sanitary sewer system which is done in accordance with provisions of local sewage discharge ordinances.
- Disinfection - a somewhat less lethal process compared to sterilization which destroys or inactivates viruses, fungi, and bacteria (but not necessarily their endospores) on inanimate surfaces.
- Grinding - that physical process which pulverizes materials, thereby rendering them as unrecognizable, and for sharps, reduces the potential for the material to cause injuries such as puncture wounds.

**Definitions**  
§TAC 1.132

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- Immersed - a term which denotes that a waste is submerged fully into a liquid chemical agent in a container, or that a sufficient volume of liquid chemical agent is poured over a containerized waste, such that the liquid completely surrounds and covers the waste item(s) in the container.
- Incineration - that process of burning SWFHCRF in an incinerator as defined in Title 30, Texas Administrative Code, Chapter 101 under conditions in conformance with standards prescribed in Title 30, Texas Administrative Code, Chapter 111 by the Texas Commission on Environmental Quality.
- Internment - the disposition of pathological waste by cremation, entombment, burial, or placement in a niche.
- Log 10 - logarithm to the base ten (10).
- Log 10 Reduction - a mathematically defined unit used in reference to level or degree of microbial inactivation. A 4 log<sub>10</sub> reduction represents a 99.99% reduction in the numbers of active microorganisms, while a 6 log<sub>10</sub> reduction represents a 99.9999% reduction in the numbers of active microorganisms.
- Microbial Inactivation - inactivation of vegetative bacteria, fungi, lipophilic/hydrophilic viruses, parasites, and mycobacterium at a 6 log<sub>10</sub> reduction or greater, and inactivation of Bacillus subtilis endospores or Bacillus stearothermophilus endospores at a 4 log<sub>10</sub> reduction or greater
- Microbiological Waste – microbiological waste includes:
  - Discarded cultures and stocks of infectious agents and associated biological products,
  - Discarded cultures of specimens from medical, pathological, pharmaceutical, research, clinical, commercial, and industrial laboratories,
  - Discarded live and attenuated vaccines, but excluding the empty containers thereof,
  - Discarded, used, disposable culture dishes, and
  - Discarded, used, disposable devices used to transfer, inoculate or mix cultures.
- Parametric Controls - measurable standards of equipment operation appropriate to the treatment equipment including, but not limited to pressure, cycle time, temperature, irradiation dosage, pH, chemical concentrations, or feed rate.
- Pathological Waste - pathological waste includes but is not limited to:
  - A. Human materials removed during surgery, labor and delivery, autopsy, embalming, or biopsy, including:
    1. body parts,
    2. tissues or fetuses,
    3. organs, and
    4. bulk blood and body fluids
  - B. Products of spontaneous or induced abortions, regardless of the period of gestation, including:
    1. body parts
    2. tissues or fetuses,
    3. organs, and
    4. bulk blood and body fluids
  - C. Laboratory specimens of blood and tissue after completion of laboratory examination, and
  - D. Anatomical remains.

## Definitions

§TAC 1.132

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- Saturated – thoroughly wet, such that liquid or fluid flows freely from the item or surface without compression.
- Sharps - sharps include, but are not limited to the following materials:
  - A. When contaminated:
    1. hypodermic needles,
    2. hypodermic syringes with attached needles,
    3. scalpel blades,
    4. razor blades, disposable razors, and disposable scissors used in surgery, labor and delivery, or other medical procedures,
    5. intravenous stylets and rigid introducers (e.g., J wires),
    6. glass Pasteur pipettes, glass pipettes, specimen tubes, blood culture bottles, and microscope slides,
    7. broken glass from laboratories, and
    8. tattoo needles, acupuncture needles, and electrolysis needles.
  - B. Regardless of contamination:
    1. hypodermic needles and
    2. hypodermic syringes with attached needles.
- Shredding - physical process which cuts, slices, or tears materials into small pieces.
- Special Waste – from healthcare-related facilities: a solid waste if improperly treated or handled may serve to transmit an infections disease or diseases and which is comprised of the following:
  1. animal waste,
  2. bulk blood, bulk blood products, and bulk body fluids,
  3. microbiological waste,
  4. pathological waste, and
  5. sharps.
- Steam Disinfection - the act of subjecting waste to steam under pressure under those conditions which effect disinfection. This was previously called steam sterilization.
- Unrecognizable - the original appearance of the waste item has been altered such that neither the waste nor its source can be identified.

### Clinic & Laboratory

**Responsibilities** Clinics and laboratories are responsible for the segregating the waste generated by their operation(s) into normal trash or infectious (biohazardous) waste.

### Waste

**Definition** Infectious (biohazardous) waste consists of body fluids, microbiological waste, pathological waste, and sharps as described in the previous definitions.

### Examples

Guides to waste examples is outlined as follows: it must be understood that the waste determination as to the definition rests with the generator.

### Clinic Waste

Type of waste:

- A. Special/infectious (biohazardous) waste:
  1. sharps,
  2. expired medications (may be placed in sharps container),
  3. blood soaked (saturated) material,

4. blood samples,
  5. body fluids
- B. Normal (non-biohazardous) trash (unless it is soaked or saturated with blood or body fluids or known to be infectious):
1. gloves (vinyl or latex),
  2. bandages,
  3. diapers,
  4. table examination paper,
  5. sanitary napkins,
  6. band aids,
  7. paper towels,
  8. paper cups,
  9. patient cast(s)
  10. food waste, and
  11. disposable gowns and foot covers.

**Procedure**

All special/infectious waste can be disposed of by incineration or by steam disinfection (refer to Appendix 2).

- Place all waste, **including small sharps containers**, into biohazardous fiber drums or red tubs for weekly pickup by custodial personnel,
- Keep drums covered at all times, always replace the lid after it is removed,
- Place all large (too big for drum) sharps containers on top or next to drum for pickup, and
- Do **not** remove plastic liners from drums for any reason or use.

**Laboratory Waste**

Type of waste:

- A. Special/infectious (biohazardous) waste:
  1. sharps,
  2. microbiological waste,
  3. pathological waste,
  4. animal waste,
  5. bulk blood, bulk blood products, and bulk body fluids.
- B. Normal (non-biohazardous) trash (unless it is soaked or saturated or known to be infectious):
  1. empty vaccine containers
  2. paper towels,
  3. empty boxes or wrappers,
  4. food waste,
  5. gloves (vinyl or latex).

**Procedure**

All special/infectious lab waste can be disposed of by incineration or by steam disinfection (refer to Appendix 2). Place all waste including sharps containers into biohazardous drums with red plastic liners. Make sure the liners are tied and lids are closed for weekly pickup by housekeeping personnel. Bio-Medical waste tubs may not exceed 50 pounds in weight. Problems with waste pick up should be directed to the Environmental Safety Manager in Safety Services.

**PROCEDURE FOR DISPOSAL OF PATHOLOGICAL WASTE****Methods**

TTUHSC "Regulated" SWFHCRF pathological waste will be disposed of in the following ways:

- cremation/incineration or
- commercial vendor

**Tissue Waste Disposal**

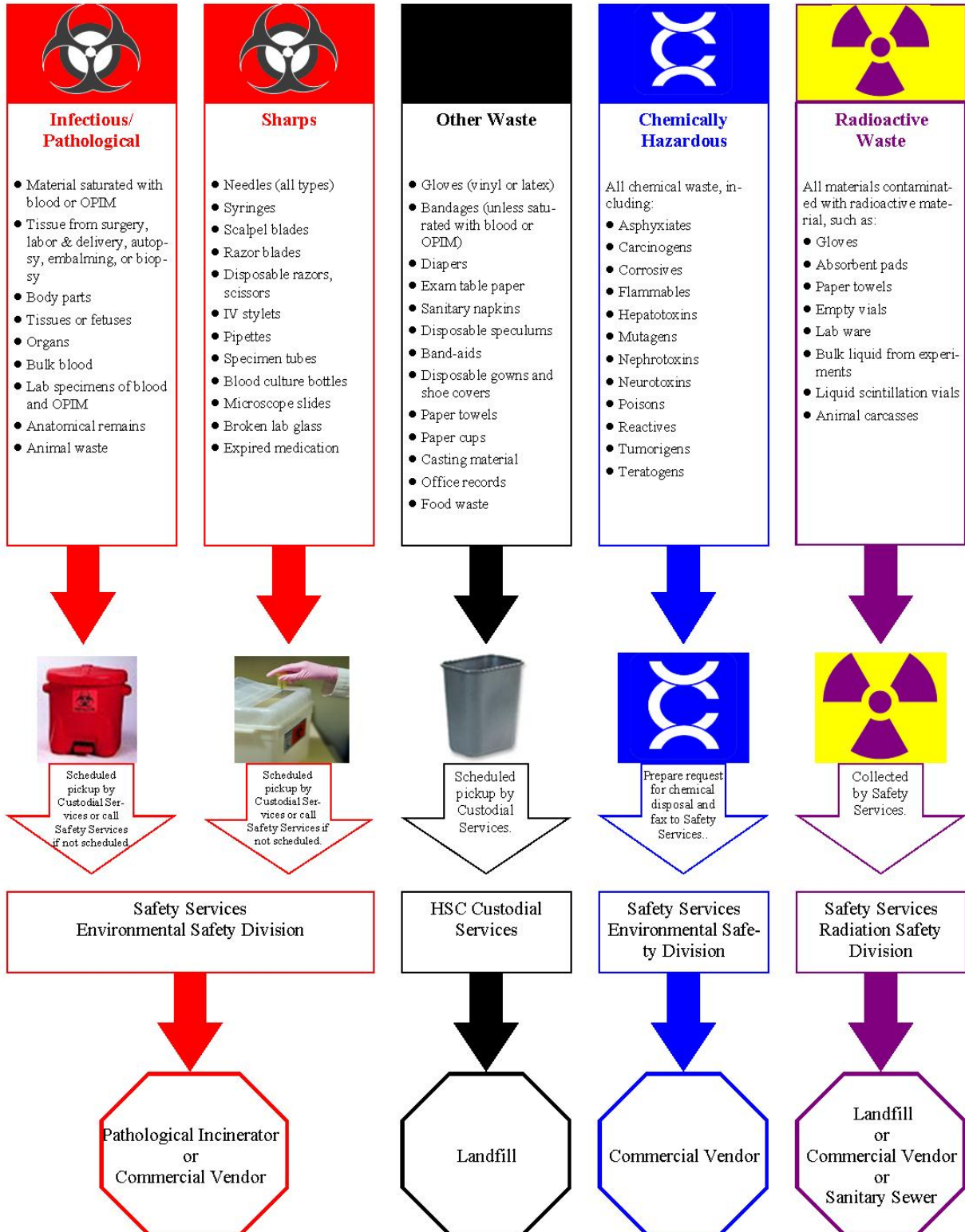
When collecting tissue waste for disposal by commercial vendor, make sure to:

- Place waste in proper containers (Gross Anatomy Personnel),
- Limit weight to vendors specifications of 40 lbs. (Gross Anatomy Personnel), and
- Place yellow incinerator shipping labels on each container.

**Note**

Incinerator use in cremation procedures is monitored by the Anatomy Department for proper air emission control according to State and Federal Regulations. Problems with waste pick up from commercial vendor should be directed to the Manager of Environmental Safety in Safety Services.

**Texas Tech University Health Sciences Center**  
 Clinic / Laboratory Infectious, Pathological, Hazardous and Radioactive Waste Streams



REFERENCES

*Municipal Solid Waste Management Regulations*, Texas Department of State Health Services, Subchapter L Hazardous Waste Management, February 1982.

Resource Conservation and Recovery Act, *Federal Register*, May 19, 1980, Vol. 45-98, Subpart D, Regulation 361.33, 40 CFR 260-265.

Definition, Treatment & Disposition of Special Waste from Health-Care Related Facilities, Texas Department of Health, Regulation 25 TAC subpart 1.131-1.137, January 1995

Solid Waste Management Rules for Medical Waste Management, Disposal, Transportation, Collection, Storage, and on Site Treatment on Mobile Vehicles, Texas Commission On Environmental Quality, Title 30 Texas Administrative code Chapter 330 (30 TAC 330), Subchapter A: General Information, 330.2 Definitions, 330.4 Permit Required, February 1995.

**APPENDIX 1  
TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER  
DEPARTMENT OF SAFETY SERVICES: ENVIRONMENTAL SAFETY  
REQUEST FOR TRANSFER OF CHEMICALS**

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER  
DEPARTMENT OF SAFETY SERVICES: ENVIRONMENTAL SAFETY  
**REQUEST FOR TRANSFER OF CHEMICALS**

Requestor:

Department:

Building/Room:

Phone:

Date:

Time:

Clear Form

<b>Chemical Description</b> Common Name	<b>CAS Number</b>	<b>Chemical Form</b> liquid, powder, etc.	<b>Container Type</b> glass, plastic, etc.	<b>Number of Containers</b>	<b>Hazard Characteristics</b> flammable, corrosive, reactive, toxic
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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Comments:

Note: All containers must be capped/sealed and **LABELED** or they will not be picked up.

Submit additional form if you have more than 7 chemicals to transfer.

Continue

**APPENDIX 2**  
**Records & Requirements for Autoclave**

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**Steam  
Disinfection**

Steam disinfection (autoclave) operations shall meet all the following requirements:

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**Procedure**

- A. To allow for sufficient steam access to or the penetration of the waste; the waste shall be:
    1. packaged according to the recommendations provided by the manufacturer and
    2. loaded into the chamber so as to not exceed the capacity limits set by the manufacturer
  - B. When subjecting waste to steam under pressure, the temperature in the chamber of the autoclave must reach at least 121 degrees Celsius and there must be at least 15 pounds per square inch gauge pressure for at least 30 minutes, and
  - C. The autoclave must be operated according to the manufacturer's instructions.
- 

**Labeling**  
that  
this

For proper disposal in the landfill, label autoclave bags with commercially available autoclave tape produces **“dark diagonal lines”** or the word **“autoclaved”** upon adequate thermal treatment. Apply tape across the biohazard symbol on the bag before autoclaving.

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**Records**

A written record must be maintained by each lab/clinic that shows the following information for each batch of waste treated:

- Date of treatment,
  - Amount of waste treated,
  - Method/conditions of treatment,
  - Name (printed) and initials of person(s) performing treatment, and
  - Written procedure for the operation.
- 

**Testing**

A minimum of 99.99 % reduction of active microorganisms shall be demonstrated on a weekly performance test of autoclaves. Testing should be with biological indicators that contain commercially available microorganism (i.e. strips or vials of bacillus species endospores or PyMaH Corp. SteriGage Steam Integrator).