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I. Purpose

The following describes policies and procedures that make up the Tufts University Biological and Regulated Medical Waste Plan. Included are procedures for collecting, handling and processing Regulated Medical Waste (RMW) for final disposal.

The objective of medical and biological waste regulations is to mandate the treatment of all potentially infectious materials and thereby minimize the risk of infection and injury from the mishandling of these wastes to staff, students, solid waste handlers and the public.

There are no federal regulations for processing and disposing of biological and regulated medical wastes. Each state has unique regulations and they vary considerably. In Massachusetts, the Department of Public Health regulated these wastes under 105 CMR 480 - MINIMUM REQUIREMENTS FOR THE MANAGEMENT OF MEDICAL OR BIOLOGICAL WASTE (STATE SANITARY CODE CHAPTER VIII).

Massachusetts regulations classify the following materials as medical and biological waste and require specific types of processing as well as documentation of that processing:

- Human blood and blood products
  Note: excludes feminine hygiene products

- Animals and animal wastes: if treated with or contaminated with an infectious disease agent presenting a risk to human health or infected with an agent that causes zoonotic diseases as listed in 105 CMR 300.140;

- Pathological wastes: human organs, tissues and body fluids from diagnostic procedures including specimens of such materials;

- Cultures of infectious agents: including live or attenuated human or animal vaccines

- Sharps: any object that can cause skin cuts or punctures including:
  needles, syringes, lancets, Pasteur pipettes, broken glassware, broken plastic ware, scalpels, blades, suture needles and dental wires.

- Biotechnology effluent materials: any waste materials made from microbes or their products including microbes and their products made from genetically altered living microbes (recombinant DNA). This regulation refers to liquid waste forms, not solid waste.

II. Responsibilities

Each individual generating medical and biological waste at Tufts University must identify such wastes, collect such wastes in a proper container, disinfect liquid wastes before discharge into the sink and sewer and arrange for the proper disposal of such wastes. Each laboratory or department has their own specific procedures.
III. Sink and sewer discharge of specific medical and biological wastes

The Massachusetts State Plumbing Code (248 CMR 10) defines any waste containing recombinant DNA as a special waste. Liquid wastes containing recombinant DNA molecules shall be sterilized or (otherwise) treated (decontaminated) at the point of generation (in the laboratory) before discharge into the sewer system.

On the Boston and Medford campuses, the Massachusetts Water Resources Authority (MWRA) restricts the release of pathogenic agents into the sewer. Hence, any liquids containing these agents must be collected and autoclaved or treated with a chemical agent effective at deactivating all pathogenic microbial agents before discharge into the sink and sewer. Then the chemicals must be treated as chemical waste per MWRA requirements.

Treat liquid waste containing BSL1 or BSL2 material with 10% bleach (final concentration) or other approved disinfectant for 20 minutes before sink disposal. There should be a residual of at least 1-10 ppm bleach after disinfection is complete. Flush the drain with water after disposal is complete.

*Bleach solutions must be Mercury-Free solutions. Check with the vendor for use of the product and contents being mercury free.*

IV. Collection of Regulated Medical Wastes

There are two procedures for disposing of dry, solid Regulated Medical Waste: on-site autoclaving of medical and biological waste and off-site treatment using a commercial vendor disposal site, usually using incineration, autoclaving or other approved method for final treatment and destruction. The method of collection of waste will vary depending on the final disposal method chosen.

Sharps are processed in a separate procedure.

A. On site treatment in an autoclave

RMW must be placed in a clear autoclave bag with no biohazard lettering or symbols. This bag must be placed in an approved container preferably with a lid (using a hands-free step pedal mechanism if available). The bag should not be moved through the hallway to the disposal area unless transported in the appropriate container or other secondary container to prevent spilling of materials or loss of control in the event of bag failure. Each bag of waste to be autoclaved must have a heat sensitive label provided by Tufts EHS that contains the laboratory source information and indicates that the correct temperature has been reached. The autoclave waste tags are filled out by the lab when attached to the bag prior to autoclaving.

The bags required for autoclaving on-site are CLEAR, POLYPROPYLENE Bags (high-temperature, autoclave) available through vendors (i.e. Fisher Scientific, VWR).

Dry solid waste being autoclaved should be in a bag, with the bag open at a minimum of one inch (1”) for steam to enter the bag. For completely dry waste a small amount of water should be added to the bag prior to the run for greater steam generation inside the bag.
Treatment of liquid waste by autoclave is done on a case by case basis. Test runs and sampling can be scheduled and performed as needed. The only autoclaves approved for treatment of liquid are the autoclaves in the Jaharis Basement Glass-washing facility. Anyone seeking to autoclave liquid waste should contact Regulated Medical Waste Manager Tufts EHS for guidance. Liquid waste to be autoclaved will require IBC approval prior to initiation. Specific sample collection and treatment is reviewed and specific handling of handling, placement and distribution of materials in the autoclave is required. Specific spore challenge testing in accordance with the liquid, volumes, and placement of materials is required for each waste run treated.

Check with your department if available autoclaves are used for waste treatment and the location. A list of autoclaves used for waste treatment can change at any time, also check the autoclave link here for a current list.

Items containing bleach **CANNOT** be autoclaved.

The State of Massachusetts requires that a Regulated Medical Waste Logbook be maintained at each autoclave and that each load be entered into the logbook. If there is no Logbook or it is completely filled out, contact the Campus EHS Manager on each campus for guidance.

Note: The use of clear bags permits the treated waste to be placed in the dumpster as trash; red bags indicate that the waste could be infectious hence should not be placed in the dumpster. All red bags are considered infectious at all times.

### B. Off-site treatment via incineration or other approved method

RMW destined for incineration must be placed in a strong, impervious red bag (see 105 CMR 480.100) in a cardboard box displaying the phrase biohazard and the biological safety symbol, or for destruction in a black, puncture resistant, recyclable box, (TB-01) displaying the phrase biohazard and the biological safety symbol.

### C. Sharps

Sharps are collected in 2, 3, 8 and 17 gallon recyclable sharp containers with a closed top. When these containers are 80% filled, the lid is closed and sealed and prepared for transport to the Storage Room or staging area. Sharps are processed in a commercial facility and the container is disinfected and returned for reuse.

Procedures for off-site disposal of Regulated Medical Wastes are campus and school specific as follows:

**Boston**

*Human Nutrition Research Center* - Laboratory staff set up covered containers and when filled to 80% of capacity, close and seal cardboard box and transport to a Storage Room where the boxes are shipped via the waste contractor. Sharps containers are collected by a contracted waste vendor for off-site treatment.
School of Dental Medicine - RMW and sharps containers are collected by TMC Environmental Health and Safety staff for off-site treatment.

School of Medicine - RMW is generally treated by both procedures dependent on the department and arrangements made using an autoclave or with the commercial vendor. For the Department of Laboratory Animal Medicine (DLAM) animals and animal wastes are placed in red bags and cardboard boxes for off-site incineration. Sharps containers are collected by a contracted waste vendor for off-site treatment.

Grafton

Biological Research Laboratories - Routine red bag waste and sharps containers are stored at the point of generation. Vendor representative collect and transport to off-site disposal facilities.

Regional Biosafety Laboratory and Building 20 BL3 Suite - Biological waste is first autoclaved, stored on-site or in a Storage Room and transported off-site for final treatment and destruction. Animal waste are placed in a digester for final disposal.

Laboratory Animal Medicine Services (LAMS) – Uninfected animal waste is discarded in routine waste streams. Animal bedding and waste from infected animals is placed in autoclave bags and treated on site. Once autoclaved the waste is placed into the routine solid waste stream. Animal carcasses are placed in red bag waste containers and are stored at the point of generation. Vendor representatives collect and transport to off-site disposal facilities.

Medford

Note: Sharps are collected in 2, 3 or 8 gallon recyclable sharp containers. When 80% filled, these containers are transported off-site by a contractor.

Biology Department - RMW are generally treated by both procedures dependent on the department and arrangements made using an autoclave or with the commercial vendor. Autoclave waste is treated and disposed in trash. RMW shipped off-site is sent by vendor for final treatment and destruction.

Hooper Health Center - Red bags are placed in cardboard boxes and sharps are collected in recyclable sharps containers. These containers are placed in Storage Rooms until removed by off-site disposal contractors.

Chemistry Department - Sharps are placed in recyclable sharps containers until filled. When filled each container is removed for off-site disposal by contractors. RMW is destined for destruction incineration is placed in a strong, impervious red bag (see 105 CMR 480.100) in a black, puncture resistant, recyclable box, (TB-01) displaying the phrase biohazard and the biological safety symbol, or the supplied cardboard box with the biohazard and biological safety symbol.

Psychology Department - Sharps containers are closed and sealed and placed in Storage Room for off-site disposal by contractors.

Biomedical Engineering - RMW is placed in clear autoclave bags which are contained in labelled, leak proof containers. When filled, these containers are transported to the autoclave for treatment. Final disposal of treated waste is into the trash dumpster.
**Chemical Engineering** - RMW is placed in clear autoclave bags which are contained in labelled, leak proof containers. When filled, these containers are transported to the autoclave for treatment. Final disposal of treated waste is into the trash dumpster.

V. **Signing medical and biological waste manifests**

Manifests listing medical and biological wastes must accompany any off-site shipment of waste. These manifests are legal documents and must be signed by authorized persons ONLY. To become authorized, you must attend a hazardous waste shipping course offered regularly by Tufts Environmental Health and Safety.

VI. **Autoclave operations**

All individuals who are or plan to operate an autoclave to treat Regulated Medical Waste on site must receive training covering the operation of the autoclave, the routine testing of the autoclave using biological tests (bacterial spore strips or spore vials) and maintaining a bound log book of all items autoclaved (link). Contact the autoclave vendor or maintenance firm for training on the use of the department specific autoclave. Tufts Environmental Health and Safety provides the autoclave logbooks mandated by the State of Massachusetts, autoclave tags and provides spore testing services for autoclaves used for treatment of regulated medical waste.

In Massachusetts, medical and biological wastes are regulated by the Department of Public Health (105 CMR 480), the Massachusetts Water Resources Authority (Boston and Medford) and the Massachusetts Plumbing Code.
VII. References

105 CMR 480 - State Sanitary Code Chapter VIII: Storage and Disposal of Infectious or Physically Dangerous Medical or Biological Waste

Biosafety Support
http://publicsafety.tufts.edu/ehs/biosafety-support/

Regulations - Standards - 29 CFR, PART 1910 Occupational Safety and Health Standards
Attachment 1: Medical and Biological Waste Poster

**TUFTS UNIVERSITY**

**MEDICAL and BIOLOGICAL WASTE**

<table>
<thead>
<tr>
<th>AUTOCLAVE WASTE</th>
<th>INCINERATION</th>
<th>BIOLOGICAL LIQUID WASTE</th>
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<tbody>
<tr>
<td><strong>CONTAMINATED NON-SHARP SOLID WASTE</strong></td>
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**ONSITE AUTOCLAVE**

- 1. Non Sharp Items Contaminated with OPIM - Other Potentially Infectious Materials
- 2. Nutrient Agar used for the growth of Biological Agents
- 3. Any Material Contaminated with Intact Human Cell Lines
- 4. Any Items or Material Used in the Clean-Up of Spills of Infectious Material
- 5. Gloves and Other PPE - (Personal Protective Equipment) Contaminated with OPIM
- 6. All Soft Transfer Pipettes
- 7. Waste Research Materials Containing Recombinant DNA or any Infectious Agents
- 9. Human blood and blood products

**ITEMS THAT GO INTO THIS CONTAINER**

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- 1. Non Sharp Items Contaminated with OPIM - Other Potentially Infectious Materials
- 2. Nutrient Agar used for the Growth of Biological Agents
- 3. Any Material Contaminated with Intact Human Cell Lines
- 4. Any Items or Material Used in the Clean-Up of Spills of Infectious Material
- 5. Gloves and Other PPE - (Personal Protective Equipment) Contaminated with OPIM
- 6. All Soft Transfer Pipettes
- 7. Waste Research Materials Containing Recombinant DNA or any Infectious Agents
- 9. Tips Contaminated with Biologicals
- 10. Human blood and blood products
- 12. Waste research materials from BSL-3 labs.

**NOTE:** Autoclave treatment must be conducted in compliance with the record keeping and biological testing (spore ampoules) as required by Mass. DPH 105 CMR 430.

**NOTE:** Clear polypropylene plastic bags must be used in collection container.

**NOTE:** All material to be autoclaved must be transported in secondary container with autoclave tag attached.

**ITEMS THAT GO INTO THIS CONTAINER**

- 1. Fluids from Tissue Culture - Blood, Serum, etc.

**NOTE:** Chemical treatment involving the above listed fluids must be chemically disinfected with mercury-free bleach or other approved disinfectant before it can be poured down the drain.

Ex: Austin's A-1 bleach

**SHARP WASTE**

**ITEMS THAT GO INTO THIS CONTAINER (shipped off-site)**

- 1. Glass Pasteur Pipettes
- 2. Needles and Syringes
- 3. Blades and Scalpels
- 4. Slides and Cover Slips
- 5. Glass Tubes
- 6. Plastic Pipettes
- 7. Ethidium Bromide Tips
- 8. Broken Contaminated Glassware or Plasticware