

# HEALTHCARE GUIDE TO MANAGING MEDICAL WASTE

## About This Guide

MedPro Disposal is nation's fastest growing medical waste disposal provider with more than 25,000 healthcare practices relying on their biohazard disposal services. As industry experts, we have put together a useful guide on everything you should know about biohazard waste disposal. From identifying what biohazard waste is to the management, collection, and treatment of it, MedPro Disposal provides all the important facts and answers to your questions.

Medical waste, often commonly referred to as biohazard waste, is waste contaminated with blood or other infectious materials, which pose a risk of spreading disease in humans, animals and the environment.

## Identifying Biohazard Waste

Biohazard waste is short for biohazardous waste and is also known as biomedical waste, or just simply medical waste. Biohazard waste is any biological waste that is potentially infectious. The Hazard Awareness and Management Manual (HAMM) of Environment Health & Safety (EHS) outlines the types of biohazard waste as follows:

- **human blood and its components**, in liquid or semi-liquid form, dried or not
- **human bodily fluids** (including cerebral spinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, and saliva), in liquid or semi-liquid form, dried or not

- **human pathological waste:** all human tissues, organs, and body parts
- **animal waste:** all animal carcasses and body parts
- **microbiological waste:** laboratory waste containing infectious agents (including discarded specimen cultures, stocks of etiologic agents, discarded live and attenuated viruses, wastes from the production of biologicals and serums, disposable culture dishes, and devices used to transfer, inoculate and mix cultures)
- **sharps waste:** sharp medical utensils such as scalpels, needles, glass slides, lancets, glass pipettes, broken glass that have been contaminated with potentially infectious material

Further to this list, any medical supplies or other equipment (such as gloves, towels, used bandages and dressings, tubes) that have come into contact with the above mentioned materials and consequently exhibit more than trace elements of these biological materials in them are themselves also classified as biohazard waste.



According to the World Health Organization, of all waste generated by healthcare activities, 85% is general, non-hazardous waste but the remaining 15% is hazardous and may be infectious, toxic, or radioactive. Biomedical waste may be generated by:

- healthcare facilities (hospitals, clinics, nursing homes, physician offices, dentist offices, home health care facilities)
- medical research laboratories / centers (including animal research & testing laboratories and schools & universities)
- mortuaries and funeral homes
- blood banks and collection services
- jails and prisons
- casinos
- veterinarian offices, animal shelters, and animal hospitals
- Biohazard waste can also be present at the scene of a violent crime, industrial accident, trauma, or suicide. [i] [ii]

## **Biohazard Waste Disposal Management**

The lifecycle of the management of biohazard waste is as follows: generation, accumulation, handling, storage, treatment, transport, and disposal. [iii] In the United States, biohazard waste management is regulated by the Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA), via Title 40 and Title 29, Subpart H – Hazardous Materials of the Code of Federal Regulations (CFR), respectively. Additionally, the Center for Disease Control (CDC) also provides guidelines for the management of biohazard waste. Finally, each state, university, center, company, facility, or organization has its own standards and practices. Non-hazard-

ous material or general healthcare waste should be separated from the biohazard waste and can be discarded with the rest of the non-hazardous material.

- If non-hazardous waste is mixed with hazardous waste, then the entire mixture should be considered hazardous and dealt with accordingly.
- Sharps must be placed in puncture-proof, tamper-proof container. Typically, the container is made of metal or a high-density plastic but dense cardboard with plastic lining can also work. Sharps containers must not be overfilled so the general rule is that once these containers are three quarters (3/4) full, they should be removed.
- Infectious waste is placed in leak-proof plastic bags / containers that are suitable for the type of material and that bear the international infectious substance symbol as seen on the right:
- Low-level radioactive infectious waste (swabs, syringes, etc.) can be included with the rest of the infectious waste provided this is meant for incineration during the biohazard waste disposal phase.
- If chemical or pharmaceutical waste is small in quantity, it can be collected along with the infectious waste.
- Highly infectious waste has to be sterilized at high temperatures and under high pressure, a process known as autoclaving, and must be placed in strong containers that can support this process.
- Large quantities of obsolete or expired pharmaceuticals can be returned to pharmacies for disposal. If the pills or drugs have spilled, leaked, or have been contaminated, they should be put into containers separate from other biohazard waste and labelled accordingly.
- Large quantities of chemical waste must be collected in a container that resists reaction with the type of chemical it hosts, labelled accordingly, never mixed with other chemicals, and sent to specialized treatment facilities (if available).
  - A high content of heavy metals (like cadmium and mercury) have to be stored separately.
  - Aerosol cans may be classified as non-hazardous if they are empty and provided the general healthcare waste is not being sent for incineration.
- Cytotoxic waste, that which has a toxic effect on living cells, must be gathered in strong, leak-proof containers that are clearly labelled as cytotoxic waste. These must also be stored completely separately from other types of biohazard waste.
- Highly radioactive waste must be sealed in a lead box that is labelled and bears the international ionizing radiation symbol seen here:

If the waste is in decay, the type of radionuclide, the date of packaging, and required storage conditions must be included in the labelling. All containers' labels should include a clear description of the waste contained therein along with the appropriate internationally recognized symbols,

the quantity of the waste (weight or volume), the name of the facility or organization that generated the waste, and the date of the container's production; and the labels should comply with all regulations of their local districts and all other applicable regulations. Also, as a general rule, waste bags should only be three quarters (3/4) filled. They should be sealed tightly, and never by stapling, suitable for transport to wherever their final destination, considering all environmental aggressors and normal conditions of handling & transport and some contingencies. And if the biomedical waste needs to be transferred within the facility of the waste producer, the vehicles of transport (wheeled trolleys, carts, etc.) need to be cleaned and disinfected before use, be easy to load / unload, and have no sharp edges that could damage the containers or bags that carry the biomedical waste.

All biohazard waste containers should be stored in an area / room / building separate from non-hazardous materials, appropriate for their contents, their quantities, and the frequency of their collection. Unless the waste is stored in a refrigerated room, for a temperate climate, it should not be stored for more than 72 hours in the winter and 48 hours in the summer, and for a warm climate, no more than 48 hours in the cool months and 24 hours in the hot months. Additionally, the storage facility should adhere to the following recommendations:

## HEALTHCARE WASTE CLASSIFICATION



### REGULAR WASTE

Clear or Black Bags

#### Includes:

- IV bags and tubing
- Empty medication vials or containers
- Trash / wrappers
- Dressings
- Chux / underpads
- Empty foley bags and other drainage bags
- Disposable patient items
- Sanitary napkins
- Gloves



### BIOHAZARDOUS WASTE

Red Bags, Red Containers, or Bags / Containers with Biohazard Symbols

#### Includes:

- Blood and all OIM (Other Infectious Materials)
- Blood tubing / bags / hemovacs / pleuravacs
- Soaked / dripping bloody dressings
- Contaminated waste from isolation patients
- Suction canisters or liners with bloody fluid or OIM



### SHARPS WASTE

Red Sharps Containers, marked with Biohazard Symbol

#### Includes:

- All sharps (except those contaminated with chemo)
- All empty syringes with attached needles, empty tubexes, empty carpjects
- Trocars, introducers, guide wires, sharps from procedures, specimen devices in endoscopy, etc.
- **Examples:** Needles, broken glass vials, blades, scapels, razors, pins, clips, etc.



### PHARMACEUTICAL WASTE

Blue Containers, often with Locking Mechanism

#### Includes:

- All syringes, tubexes, carpjects with residual (pourable) medication
- IV bags and tubing with residual medication
- Partially used / residual prescription or over-the-counter medication
- **Examples:** Vials, tablets, capsules, powders, eyedrops, etc.

UNOPENED / UNUSED OR EXPIRED MEDICATIONS:  
CONTACT MEDPRO DISPOSAL



### HAZARDOUS PHARMACEUTICAL WASTE

Return to Pharmacy; Black Containers

#### Includes:

- Hazardous R.C.R.A\*\* Pharmaceuticals: Return to Pharmacy
- **Examples:** Inhalers with residual (if empty - regular trash) unused nicotine gum or patches, epinephrine (sales not included), physostigmine, silvadence, etc.

- The storage area floor should be impermeable, have a good drainage system, and be easy to clean and disinfect.
- A water supply, cleaning equipment, protective clothing, waste bags and containers should be available and easily accessible.
- It should offer easy access to staff and waste-collection vehicles.
- It should be well-guarded to prevent unauthorized access.
- Animals, insects, and birds should not be able to get in.
- It should offer protection from the Sun.
- It should host good lighting and some ventilation.
- And it should not be located near food stores or food preparation areas.

## **Collection and Transportation of Biohazard Waste**







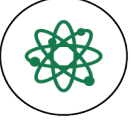


Biohazard waste should never be allowed to accumulate by the producer of the waste without a well-established plan for routine collection. Waste should be collected as frequently as possible. No containers should be picked up unless they are properly and completely labelled. The staff of the facility / organization that generated the biohazard waste should promptly replace containers so their own staff always follow safe practices when dumping the waste. And in addition to proper labelling, all arrangements and preparation for safe and steady transport should be made well in advance – dispatch documents, shortest route, fewest handling changes, reliable carrier, and in case of exportation / importation, all required legal documents, international standards, and local regulations.

The carrier transporting the biohazard waste should be registered with the waste regulation authority, and the biohazard waste disposal company should also hold a permit for their work. The waste should be accompanied by a consignment note from the point of generation to the place of disposal.







Biohazard waste transport vehicles should be closed and locked. They should be designed to minimize the damage to the container holding the bags / containers of biomedical waste. Empty bags and containers suitable for waste being transported, suitable protective clothing for staff, cleaning equipment, and special kits for dealing with spills / leaks should be available in the vehicle compartments. The carrier organization's name should be clearly visible on the transport vehicles. The international symbol for biohazardous material and / or radioactive material should be displayed on the vehicle along with an emergency telephone number. And if the transportation of the biomedical waste exceeds recommended storage duration limits, a refrigerated container must be used.

[iv]

## These **DO** go in the red bag:

-  Contaminated Gloves
-  Contaminated Gauze
-  Contaminated Bandages
-  Blood Saturated Items
-  Absorbed Blood or Bodily Fluids (No loose fluids)
-  Plastic Tubing
-  Trace Chemotherapy Waste
-  Sharps in Closed, Puncture-Proof Containers
-  Cultures & Stocks

## These **DON'T** go in the red bag:

-  Medication
-  Compressed Gas Cylinders
-  Loose Sharps
-  Hazardous & Chemical Waste
-  Radioactive Waste
-  Non-Infectious Garbage



### Treatment and Disposal of Biohazard Waste

Treatment of biomedical waste is used to reduce or eliminate its hazard to people and the environment. The treatment is performed by biohazard waste disposal companies registered with the regulating authorities of the locale so this is why this process usually doesn't take place until the very end of the biohazard waste management process. If the treatment and or disposal is not conducted professionally, efficiently, and using modern technology, it can have highly adverse effects on the environment, causing more harm than good. Upon treatment, waste can be transported to a landfill. Treatment is provided to facilitate biohazard waste disposal.

A common method of treatment is called incineration. Incineration is the application of high temperatures to biohazard waste to kill all organic substances (bacteria, viruses, and other pathogens) contained in the waste. Typically, the waste is converted into ash and gas that often needs to be further cleansed before it can be released into the environment. Upon the completion of the process, the biomedical waste is no longer hazardous. This type of treatment is usually conducted in an incineration plant that may even generate electric power from the heat of the incin-

eration.

“Incineration of waste has been widely practiced, but inadequate incineration or the incineration of unsuitable materials results in the release of pollutants into the air and of ash residue. Incinerated materials containing chlorine can generate dioxins and furans, which are human carcinogens and have been associated with a range of adverse health effects. Incineration of heavy metals or materials with high metal content (in particular lead, mercury and cadmium) can lead to the spread of toxic metals in the environment. Only modern incinerators operating at 850-1100 °C and fitted with special gas-cleaning equipment are able to comply with the international emission standards for dioxins and furans.” [ii]

Another treatment method that can facilitate the biohazard waste disposal process is autoclaving. An autoclave is a strong, highly-pressurized, steam-heated chamber used to sterilize biomedical waste. Autoclaves are also routinely used to sterilize medical supplies. Items such as plastics can be sterilized by autoclaving and completely melted down to ensure they are virtually pathogen-free; they can then be used to make new products.

**The waste truck hauls the waste off to a treatment facility to be treated in one of the following ways:**

### Autoclave



The waste is **steamed** under **high pressure** until a temperature of **249.8 degrees Fahrenheit** is reached

### Incinerate



The waste is **burned** in a **controlled environment** until it turns to ashes

### Chemically Treat



The waste is introduced to **chemical agents**

**Autoclave** is the preferred method and can be used to treat **90%** of medical waste.

#### **Did you know?**

Autoclaved or clinically treated waste is then **shredded** and **compacted** to reduce size.

Yet another method for disinfecting biohazard waste is the use of bleach. Bleaching refers to a process by which certain types of chemicals (often some compound including chlorine) initiate a chemical reaction with the chemicals of the biomedical waste that makes them gain or lose electrons, resulting in a chemical change in the waste, making it non-hazardous.

And finally, alkaline

hydrolysis (biocremation and / or resomation) is a funeral home service provided as an alternative to burial or cremation, reducing carbon dioxide and pollutant emissions from the traditional processes.

## References

[i] Hazard Awareness and Management Manual (HAMM): VI. Hazardous Waste Directory: 8.0 Biohazardous Waste. Fred Hutchinson Cancer Research Center. Retrieved from <https://extranet.fhcrc.org/EN/sections/ehs/hamm/chap6/section8.html>.

[ii] (November 2015). Media Centre: Fact sheets: Health-care waste. World Health Organization. Retrieved from <http://www.who.int/mediacentre/factsheets/fs253/en/>.

[iii] U.S. Congress, Office of Technology Assessment. (September 1990). Finding the Rx for Managing Medical Wastes. (OTA-O-459). Washington, DC: USGPO.

[iv] Safe management of wastes from health-care activities: 7 – Handling, storage, and transportation of health-care waste. World Health Organization. Retrieved from WHO.

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