



**Forum:** United Nations Environment Assembly of the United Nations Environment Programme

**Issue:** The Question of Medical Waste Disposal

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## **INTRODUCTION**

Medical waste poses numerous potential health and safety hazards. Over the past 10 years, it has become a major political, economic and environmental issue. In addition to their infectious and toxic characteristics, the highly variable and inconsistent nature of medical waste streams has increased public concern about storage, treatment, transportation, and ultimate disposal. Improper disposal may be dangerous if it leads to contamination of water supplies or local sources used by nearby communities or wildlife. Medical waste is potentially capable of causing disease and illness in man, either through direct contact or indirectly by contamination of soil, groundwater, surface water and air. Infection caused by direct contact is a result of wrongly disposed medical waste, including sharps, pharmaceuticals or various infected human tissues.

## **DEFINITION OF KEY TERMS**

Incineration: a high-temperature waste treatment process. It converts waste into ash, gas and heat by burning it. The gases created in the process may be hazardous to the environment and contain pollutants.

Sterilization: the process of destroying all microorganisms and their pathogenic products. It can be accomplished by any of various methods, including heat, gas plasma, irradiation, or a bactericidal chemical compound.

Pathological waste: any waste containing human (or animal) body parts, including organs, tissues, surgical specimens and body fluids.

Pharmaceuticals: drugs used to diagnose, treat, cure and prevent disease. They are artificially made chemicals that are used as medicine.

Waste minimization: it means to reduce the production of waste.

## BACKGROUND INFORMATION

Medical waste is defined as potentially infectious waste materials generated at health care facilities, such as hospitals, clinics, physicians' offices, dental practices, blood banks, and veterinary hospitals/clinics, as well as medical research facilities and laboratories. This definition includes:

- clinical waste: drainage bags, blood collection tubes, vials, culture dishes, other types of broken/unbroken glassware that were in contact with infectious agents, gauze, bandages or any other materials that were in contact with infectious agents or pathological waste;
- pathological waste: human tissues, organs, body fluids, body parts and contaminated animal carcasses
- sharps: syringes, needles, disposable scalpels and blades;
- chemicals: for example, solvents used for laboratory preparations, disinfectants, and heavy metals contained in medical devices (e.g. mercury in broken thermometers) and batteries;
- pharmaceuticals: expired, unused and contaminated drugs and vaccines;
- genotoxic waste: highly hazardous, mutagenic, teratogenic or carcinogenic, such as cytotoxic drugs used in cancer treatment and their metabolites;
- radioactive waste: products contaminated by radionuclides.

## DISPOSAL

90% of medical waste is incinerated. Incineration is a controlled burning of the medical waste in a dedicated medical waste incinerator. Incineration has the benefit of reducing the volume of the waste, sterilizing the waste, and eliminating the need for pre-processing the waste before treatment. The resulting incinerated waste can be disposed of with traditional methods, such as being brought to a landfill. The downside of incineration is potential pollution from emissions generated during incineration, as burning releases toxic materials into the surrounding community. Also, using open air burning as a method of destroying medical waste does not guarantee proper incineration, and releases toxic into the atmosphere from the burning of plastics and similar. Piles of refuse or landfill during its decomposition process generate several gases, the most important among which are methane (CH<sub>4</sub>), nitrogen (N<sub>2</sub>) and occasionally hydrogen sulphide (H<sub>2</sub>S). If burnt, carbon di-oxide (CO<sub>2</sub>) is released. CH<sub>4</sub> and CO<sub>2</sub> are greenhouse gases and have potential greenhouse effects. As the biggest percentage of medical waste is incinerated, the amount of these gases in the atmosphere drastically grows.

Worryingly not all medical waste is destructed. Expired drugs pilfering from a stockpile of waste drugs or during sorting may result in expired drugs being diverted to the market for resale and misuse and being shipped off to developing countries and rural areas. Such areas receive medical help from developed countries and charities, which send them expired medication and other equipment that may not be suitable for usage. Most pharmaceuticals that have passed their expiration date become less effective and a few may develop a different adverse drug reaction profile. The consequence of treating patients with partially degraded drugs may cause serious damage to the human body.

## DAMAGE

The following are environmental impacts associated with the improper disposal of medical waste:

- pollutants from medical waste are persistent in the environment;
- accumulation of toxic chemicals within soil, which lowers the soil's fertility;
- ground water contamination;
- decrease in drinking water quality;
- accumulation of toxic chemicals in organism's fat tissues;
- windblown dusts from indiscriminately dumping also have the potential to carry dangerous particulates;
- improper sterilization of instruments used in labour rooms may cause infection to humans;
- degradation of habitat, etc.

## MAJOR PLAYERS

### *United States of America*

They are one of the biggest producers of medical waste in the world. Every year, American hospitals produce approximately 6 million tons of it.

### *World Health Organisation (WHO)*

They developed the first global and comprehensive guidance document "Safe management of wastes from health-care activities". It addresses aspects such as regulatory framework, planning issues, waste minimization and recycling, handling, storage and transportation, treatment and disposal options, and training. The document is aimed at managers of hospitals and other health-care facilities, policy makers, public health professionals and managers involved in waste management.

### *Germany*

They have the biggest pharmaceutical industry in the world and are therefore one of the largest producers of medicine and consequently medical waste.

## POSSIBLE SOLUTIONS

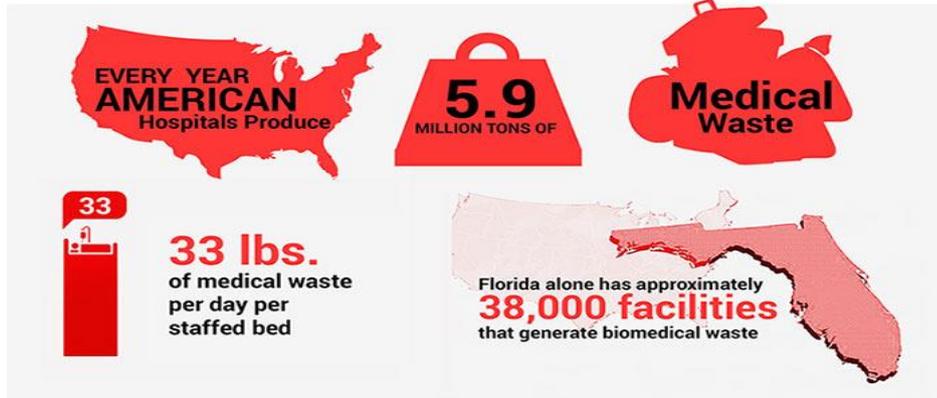
Key elements in improving health-care waste management are:

building a comprehensive system, addressing responsibilities, resource allocation, handling and disposal; raising awareness of the risks related to health-care waste, of safe practices and of selecting safe and environmentally-friendly management options to protect people from threats of collecting, handling, storing, transporting, treating or disposing of waste.

# Medical Waste Disposal Definitive Guide

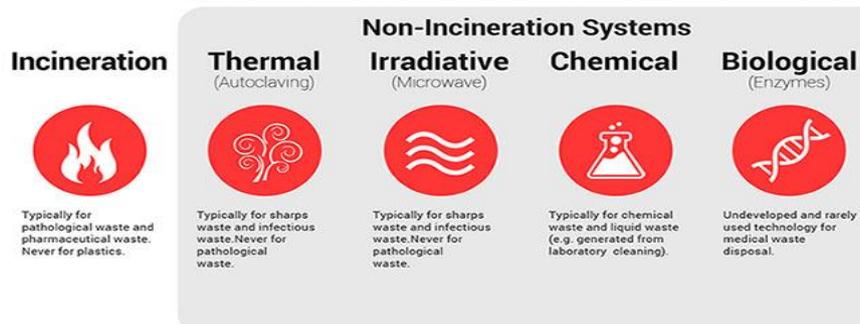


## How Much Medical Waste Is Produced?



SHARPS Red Sharps Container	BIOHAZARD Red Container or Red Liner in Container	TRACE CHEMO Yellow Container
<ul style="list-style-type: none"> <li>✓ Needles</li> <li>✓ Ampules</li> <li>✓ Broken Glass</li> <li>✓ Blades</li> <li>✓ Razors</li> <li>✓ Staples</li> <li>✓ Trocars</li> <li>✓ Guide Wires</li> <li>✓ Other Sharps</li> </ul> 	<ul style="list-style-type: none"> <li>✓ Infectious Waste</li> <li>✓ Blood Products (albumin, etc)</li> <li>✓ Contaminated Personal Protective Equipment (PPE)</li> <li>✓ IV Tubing</li> <li>✓ Cultures, Stacks</li> </ul> 	<ul style="list-style-type: none"> <li>✓ Empty vials, ampules</li> <li>✓ Empty Syringes, Needles</li> <li>✓ Empty IVs</li> <li>✓ Gowns</li> <li>✓ Gloves</li> <li>✓ Tubing</li> <li>✓ Aprons</li> <li>✓ Wipes</li> <li>✓ Packaging</li> </ul> 
RCRA HAZARD Black Container	PHARMACEUTICAL Blue Container	RADIOACTIVE Shielded Containers with Radioactive Symbol
<ul style="list-style-type: none"> <li>✓ Hazardous meds (RCRA)</li> <li>✓ Half/Partial doses (RCRA)</li> <li>✓ Hazardous bulk meds</li> <li>✓ P-listed drugs, packaging</li> <li>✓ Bulk chemo</li> <li>✓ Pathological Waste (Incineration Only)</li> </ul> 	<ul style="list-style-type: none"> <li>✓ Pills</li> <li>✓ Injectables</li> <li>✓ Antibiotics</li> </ul> 	<ul style="list-style-type: none"> <li>✓ Fluorine-18 (F-18). 110 minutes half-life.</li> <li>✓ Technetium-99 (T-99m). 6 hours half-life.</li> <li>✓ Iodine-131 (I-131). 8 days half-life.</li> <li>✓ Strontium-89 (Sr-89). 52 days half-life.</li> <li>✓ Iridium-192 (Ir-192). 74 days half-life.</li> <li>✓ Cobalt-60 (Co-60). 53 years half-life.</li> </ul> 

## 5 Ways of Treating Medical Waste



Properly Disposing Of Your Medical Waste Prevents Infections and Diseases From Spreading, And **Keeps Our Earth Clean.**

## **USEFUL LINKS**

- <http://ec.europa.eu/environment/waste/index.htm>
- <https://www.youtube.com/watch?v=srhFLz17SU>
- <https://www.epa.gov/>

## **NOTES FROM THE CHAIR**

This chair report is a summary of the theme. It will help you prepare yourself for the conference, so we shall be able to have a lively and diverse debate. I hope you will enjoy researching other data on the topic. Looking forward to hearing your speeches in April!