Biomedical waste Management

Biomedical waste must be properly managed and disposed of to protect the environment, general public and workers, especially healthcare and sanitation workers who are at risk of exposure to biomedical waste as an occupational hazard. Steps in the management of biomedical waste include generation, accumulation, handling, storage, treatment, transport and disposal.

On-site versus off-site

Disposal occurs off-site, at a location that is different from the site of generation. Treatment may occur on-site or off-site. On-site treatment of large quantities of biomedical waste usually requires the use of relatively expensive equipment, and is generally only cost effective for very large hospitals and major universities who have the space, labor and budget to operate such equipment. Off-site treatment and disposal involves hiring of a biomedical waste disposal service (also called a truck service) whose employees are trained to collect and haul away biomedical waste in special containers (usually cardboard boxes, or reusable plastic bins) for treatment at a facility designed to handle biomedical waste.

Generation and accumulation

Biomedical waste should be collected in containers that are leak-proof and sufficiently strong to prevent breakage during handling. Containers of biomedical waste are marked with a biohazard symbol. The container, marking, and labels are often red.

Discarded sharps are usually collected in specialized boxes, often called *needle boxes.*

Specialized equipment is required to meet OSHA 29 CFR 1910.1450 and EPA 40 CFR 264.173. standards of safety. Minimal recommended equipment include a fume hoodand primary and secondary waste containers to capture potential overflow. Even beneath the fume hood, containers containing chemical contaminants should remain closed when not in use. An open funnel placed in the mouth of a waste container has been shown to allow significant evaporation of chemicals into the surrounding atmosphere, which is then inhaled by laboratory personnel, and contributes a primary component to the threat of completing the fire triangle. To protect the health and safety of laboratory staff as well as neighboring civilians and the environment, proper waste management equipment, such as the Burkle funnel in Europe and the ECO Funnel in the U.S., should be utilized in any department which deals with chemical waste. It is to be dumped after treatment.

Handling

Handling refers to the act of manually moving biomedical waste between the point of generation, accumulation areas, storage locations and on-site treatment facilities. Workers who handle biomedical waste should observe *standard precautions.*

Treatment

The goals of biomedical waste treatment are to reduce or eliminate the waste's hazards, and usually to make the waste unrecognizable. Treatment should render the waste safe for subsequent handling and disposal. There are several treatment methods that can accomplish these goals.

Biomedical waste is often incinerated. An efficient incinerator will destroy pathogens and sharps. Source materials are not recognizable in the resulting ash.

An autoclave may also be used to treat biomedical waste. An autoclave uses steam and pressure to sterilize the waste or reduce its microbiological load to a level at which it may be safely disposed of. Many healthcare facilities routinely use an autoclave to sterilize medical supplies. If the same autoclave is used to sterilize supplies and treat biomedical waste, administrative controls must be used to prevent the waste operations from contaminating the supplies. Effective administrative controls include operator training, strict procedures, and separate times and space for processing biomedical waste.

For liquids and small quantities, a 1–10% solution of bleach can be used to disinfect biomedical waste. Solutions of sodium hydroxide and other chemical disinfectants may also be used, depending on the waste's characteristics. Other treatment methods include heat, alkaline digesters and the use of microwaves.

For autoclaves and microwave systems, a shredder may be used as a final treatment step to render the waste unrecognizable.