

Biological Waste Management for Laboratory Operations

CAPT Dave Ausdemore, PE, CIH

LCDR Jennifer Caparoso, PE

Why Special Management of Biological Wastes?

Medical Waste

Medical Waste is generally defined as any solid waste that is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals, including *but not limited to*:

- soiled or blood-soaked bandages
- culture dishes and other glassware
- discarded surgical gloves - after surgery
- discarded surgical instruments - scalpels
- needles - used to give shots or draw blood
- cultures, stocks, swabs used to inoculate cultures
- removed body organs - tonsils, appendices, limbs, etc.
- lancets - the little blades the doctor pricks your finger with to get a drop of blood

Medical Waste

- Federal EPA Restrictions
 - Hospital/Infectious/Medical Waste Incinerators
 - Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

Medical Waste (cont)

- State Regulations
- i.e. Georgia Environmental Protection Division Chapter 391-3-4, Solid Waste Management
 - Biomedical waste
 - Must be placed in containers impervious to moisture and resistant to ripping, tearing, or bursting
 - Must be red or orange in color & marked with “Biohazard”
 - Required to be treated prior to landfill
 - By-rule permits required for treatment
 - Sharps Disposal – placed in leakproof, rigid, puncture-resistant containers that are tightly sealed

Medical Waste (cont)

- Other Special Restrictions
 - WHO Collaborative Center agreements
 - CDC is WHO Collaborating Center for Poxvirus Diagnosis and Research
 - Required to incinerate all smallpox waste
 - Biosafety in Microbiological and Biomedical Laboratory (BMBL)
 - BSL-4 Waste – required to be decontaminated before disposal by an approved method

Mixed Medical Waste/Chemical Waste

- Inactivate biological agent, then dispose as chemical hazardous waste
- Letter may be required for treatment facility
- No red bags

Biological Waste Treatment

- Autoclaved
- Chemical Disinfection
- **Incineration**

Incineration

- Thermal treatment
 - Can destroy pathogens and toxins by high temperatures
- Reduce volume of original waste by 95+%
 - Significantly reduces amount of waste sent to landfill
- Waste converted into ash, flue gases, and heat
- Flue gases may be required to be cleaned of pollutants before released to atmosphere
- Incinerators need to be properly designed, constructed, operated, and maintained to protect environment and human health

Types of Incinerators

- Pathological
- Hospital/Medical/Infectious
- Field

Pathological Incinerator

- Type 4 Waste
 - Human and animal remains, anatomical parts and/or tissue, the bags/containers used to collect and transport the waste, and animal bedding
 - Heating value: 1000 BTU/lb
- Can burn up to 10% medical waste
- Less stringent monitoring requirements and controls compared to medical waste incinerator
 - Monitor temperatures (primary and secondary chamber) and weights (per charge and lb/hr)
- Incinerator requirements are dictated by air quality regulations

Hospital/Medical/Infectious Waste Incinerator

- More stringent requirements than pathological incinerator (regulated by air quality laws)
 - More monitoring and control points
 - Performance testing
 - Operator training
- Air Pollution Control Device (i.e., wet scrubber)
- Not restricted to amount of medical waste that can be burned

Field Incinerator

- Used in field during outbreak
- Made out of 55 gallon drum
- Diagram and instructions provided in Annex 12 of WHO “Guidelines for collection of clinical specimens during field investigation of outbreaks”

Incinerator “Best Practices”

- Monitor Waste Types
- Ensure Proper Operating Temperatures
- Optimize operation schedule

Questions?