



## Biosafety Considerations for a Biohazardous Waste Management Program

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## WARNING

The Following Presentation Contains  
Graphic Images of Animal Carcasses  
That Some May Find Disturbing

*Viewer Discretion is Advised*

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## Why Pay Attention to Medical Waste?



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## Overview

- Programmatic Issues
- Collection
- Transportation
- Disposal
- Training and Education
- Regulatory Compliance
- Waste Tracking

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## Programmatic Issues

- Institutional Responsibility
  - Environmental
  - Safety
  - Custodial
- Waste Definitions and Segregation Policy, e.g.:
  - Syringes
  - Pipettes
- Cost Recovery
  - Central overhead
  - “Pay as you go”

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## Waste Collection – Red Bags



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## Waste Collection - Sharps

- Sharps Containers
  - Autoclavable?
- Container Size & Location are **Critical**
  - Minimize handling of used sharps
- Avoid Overfilling
- Cautions:
  - Container substitution
  - Container reuse



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## Notes on Waste Containers

- Reusable Containers
  - Sharps
  - Red bag bins
- Location of Containers at Biosafety Cabinets
  - Minimize hand movement in/out of BSC
  - Decrease contamination potential
- Central Supply of Containers

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## Animal Waste

- Waste type
  - Carcasses
  - Bedding, etc
- Species
- Containers



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## Special Cases

- Pharmaceutical & Chemotherapy waste
  - Note differences between bulk chemicals and medical waste items contaminated with chemo agents
  - Medical waste contaminated with similar chemical agents (e.g., ethidium bromide)
- Other Mixed Wastes
- Mammalian Cell Culture Waste

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## Special Cases, ctd.

- BSL-3 Waste
  - Pass-through Autoclave in lab is common design approach
  - Suites of labs – central autoclave in suite
  - Autoclave outside of BSL-3:
    - Double-bagging at containment barrier
    - Transportation in closed cart

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## Waste Transportation

- Indoor
  - Enclosed vs. open carts
  - Rubber wheels!
- Outdoor (public roads)
  - Permitted vehicle
  - Shipping containers



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## Carcass Waste Transportation



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## Notes on Waste Transportation

- USDOT Hazmat Transportation Regulations Apply:
  - Container specifications, marking, labeling
  - Training Required:
    - Personnel who transport the containers
    - Personnel who *pack* the containers
- **Reusable Waste Containers are often themselves shipping containers**

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## Waste Disposal

- Several available technologies
- Critical Issues:
  - Well-engineered system
  - Consider environmental impacts, especially odors
  - Have several downstream disposal options



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## Intermediate vs. Final Treatment

- Intermediate Treatment
  - Usually performed for worker protection
  - Autoclaving most common method
  - Standard microbiology lab practice
  - Performed before transport to final treatment
- Final Treatment
  - Much more effort involved
    - Permitting
    - Monitoring
    - Recordkeeping
    - Reporting
    - Risk Management
  - Two options:
    - On-site treatment by facility staff
    - Off-site treatment by disposal contractor

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## Waste Treatment Options

- Cradle-to-grave responsibility applies
- Do it yourself ...
  - Standard practice for liquids
  - Autoclaves and other solid waste treatment devices generally require permitting, usually by local entity
  - Shredding probably required
- Have someone else do it ...
  - Very common, few contractors
  - Less liability but requires due diligence
  - Likely lower cost option unless quantities are large
  - Require your transporter to:
    - generate manifest of types and amounts of MW transported
    - provide certificate of destruction

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## Liquid Waste Disposal

- Drain Disposal (*Sanitary Sewer*)
- Autoclave following *validated* procedures
- Chemical inactivation
- Use Engineered Treatment System
  - In-lab
  - In-building



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## Notes on Waste Disposal

- Shipping RMW = waste *handling*
  - Spills, releases
  - Injuries
- Treating RMW onsite = better pandemic preparedness
- RMW treatment systems typically include both decontamination and grinding
  - Decontamination first makes grinder repairs safer
- Some carcass waste treatment systems require sectioning of large carcasses

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## Notes on Waste Disposal, ctd.

- Automated cart dumpers minimize waste handling & associated injury risks



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## Training and Education

Medical Waste Disposal Audit				
Auditor: _____				
Date: _____				
Item	Compliant	Non-Compliant	Comments	Corrective Action
1. Proper labeling of all waste containers				
2. Proper segregation of waste				
3. Proper storage of waste				
4. Proper disposal of waste				
5. Proper handling of waste				
6. Proper use of PPE				
7. Proper cleaning and disinfection of waste disposal area				
8. Proper maintenance of waste disposal equipment				
9. Proper training and education of staff				
10. Proper documentation of waste disposal				
11. Proper waste disposal records				
12. Proper waste disposal contracts				
13. Proper waste disposal permits				
14. Proper waste disposal fees				
15. Proper waste disposal insurance				
16. Proper waste disposal emergency plan				
17. Proper waste disposal incident response				
18. Proper waste disposal incident investigation				
19. Proper waste disposal incident reporting				
20. Proper waste disposal incident documentation				



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## Regulatory Compliance

- Know the agencies, laws, & regulations that apply
- Work closely with regulators involved
- Consider permits carefully
- Keep good records
- Use IT tools to support reporting



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## Waste Tracking System





2/1/2005  
Tech, John D.  
253-3337  
AHDL-BSE Testin  
RMW-Red Bag



- Compliance
- Cost Recovery
- Chain of Custody
- Safety

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