Chapter 7: Waste Management
Chapter 7
Waste Management
Preparing for Delivery

Time

The *Waste Management* chapter is approximately 2 hours and 30 minutes of classroom training.

Follow the Lesson Plan for a guide to scheduling this course. Time allotments for specific topics are provided within the plan. You may devote more time to classroom and hands-on activities as needed, as the plan reflects the minimum suggested time allotments.

Staffing

The maximum participant – instructor ratio is 25:1.

During classroom activities, the recommended participant – instructor ratio is 10:1.

During hands-on activities, the recommended participant – instructor ratio is 5:1.

Materials Needed

For this chapter, you will need the following:

- A copy of the Infectious Disease Operations Participant Guide (PG)
- A flip chart or whiteboard and markers
- A computer and projector or monitor

The table on the following page lists the materials needed for this lesson.
## Chapter 7: Waste Management

### Preparing for Delivery (continued)

### Lesson Overview

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Tell participants that this chapter will cover content about handling, packaging, labeling, storing, and preparing infected waste for transport. Ask volunteers to think about their own experiences in working with hazardous waste, if any, and share them with the class. When finished, tell them they will now explore management of infected waste in more detail.

Display Slides 1 to 4. Introduce the chapter and review the chapter objectives. At the end of this chapter, participants will be able to:

1. Describe the role of the Department of Transportation’s Hazardous Materials Regulations that apply to infectious diseases and regulated medical waste management.
2. Explain on-site and off-site decontamination of regulated medical waste.
3. Describe regulations related to management of Category A infectious wastes, including the storage, transportation, and disposition of these materials.
4. List at least five best practices for protecting worker safety and health while handling infected materials and regulated medical waste.
5. List at least three engineering controls used to avoid hazards while handling waste.
6. List at least three administrative controls used to avoid hazards while handling waste.
7. Describe how the OSHA HAZWOPER Standard is applied to the transportation of regulated medical waste.
8. List at least three topics covered in a waste-handling plan.
9. Describe best practices for working with mechanical devices while handling waste containers.
10. Describe proper lifting techniques for manual handling of waste containers.
11. Describe proper packaging procedures for regulated medical waste.
12. Describe proper procedures for loading regulated medical waste for transport.

Invite questions about the objectives.
Chapter 7: Waste Management
Exercise 1: Introduction to Infected Waste Management

Objectives

1. Describe the role of the Department of Transportation's Hazardous Materials Regulations that apply to infectious diseases and regulated medical waste management.
2. Explain on-site and off-site decontamination of regulated medical waste.
3. Describe regulations related to management of Category A infectious wastes, including the storage, transportation, and disposition of these materials.

Display Slides 5 and 6. Open the lesson by asking, “Which government agency in the United States regulates and guides the handling, transport, and treatment of Category A infected waste?” (Answer: There is not one single agency that does this in the U.S. There are many different agencies that work together to establish regulations and guidelines, including the U.S. Department of Transportation (DOT), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Labor (DOL), the Centers for Disease Control and Prevention (CDC), and the Assistant Secretary for Preparedness and Response (ASPR).)

Ask participants to name the inter-agency document that came out to address the issue of transporting Category A waste, which they studied in Chapter 4. (Planning Guidance for the Handling of Solid Waste Contaminated with a Category A Infectious Substance.) Explain that there are different protocols for treatment, handling, packaging, transport, storage, and disposition of infected wastes, and they will be looking at these topics in more detail in the following activity.

Distribute Handout 34: Introduction to Infected Waste Management. Read the directions aloud. Have participants complete the handout in pairs. Tell participants to look at PG pages 7–7 to 7–12 as a reference. Then have each pair check their answers with another pair.

Check the answers with the class. (See the answer key on the following page.) Answer any questions that may have come up in the completion of the handout.

Conclude by saying that every work situation is different, and protocols for handling infected waste will vary, depending on the category of waste, and whether it has been inactivated or is being inactivated off-site.
Handout 34: Introduction to Infected Waste Management

Instructions: Complete the sentences about managing infected waste by matching the first half of each sentence with the second half below.

1. The overall handling of infectious or regulated medical waste begins with
2. Use of an autoclave cycle heats materials to a high enough temperature
3. Incineration is the best method for inactivating waste
4. If Category A wastes cannot be inactivated on-site, then
5. For any movement off-site, a detailed agreement or contract should be in place
6. Category B infectious substances that are discarded become regulated
7. Because of the hazards posed by Category A infectious substances, these materials
8. Materials with Category A infectious substances may only be transported in two scenarios:
9. In general, a Category A infectious substance must be triple packed in a primary
10. Transporting Category A waste from the point of generation to a secure holding area within the generating facility should be done
11. Holding areas for Category A waste storage should be separate from other waste,
12. Once an infectious waste has been properly inactivated, it is considered a solid waste and is handled, transported, and

A. the wastes will need to be transported off-site.
B. with covered push carts or bins or other leak-proof containers to prevent any release or spillage of the waste.
C. have more stringent packaging requirements than other infectious substances.
D. watertight receptacle, with watertight secondary packaging, and rigid outer packaging.
E. with an entity that has party status to a DOT/PHMSA special permit.
F. the creation of the waste, includes waste transportation, and ends at final disposition.
G. disposed of according to the regular protocols for solid waste management in the state.
H. for a long enough period of time to inactivate the organism(s) of concern in infected waste.
I. in large or bulky items, such as mattresses.
J. medical waste under both the federal DOT HMR and applicable state regulations.
K. located on impermeable surfaces and provide protection and security against spillage, weather, putrescence, pest infestation, and trespassers.
L. in full compliance with classification and packaging requirements of the HMR, or under the terms of a special permit.

Infectious Disease Operations
Chapter 7: Waste Management

Exercise 1: Protecting Worker Health and Safety

Objectives

4. List at least five best practices for protecting worker safety and health while handling infected materials and regulated medical waste.

5. List at least three engineering controls used to avoid hazards while handling waste.

6. List at least three administrative controls used to avoid hazards while handling waste.

7. Describe how the OSHA HAZWOPER Standard is applied to the transportation of regulated medical waste.

Display Slide 7. Open the lesson by asking participants to think about how work practices such as Standard Precautions and other controls might apply to working with infected waste. Have participants discuss in pairs and share their answers with the class. Note their ideas on the board.

Display Slide 8 and compare the list against the one that participants came up with. Explain that in the next activity, they will look at workplace controls that are specific to handling infected waste.

Divide the class into 3 groups.

Distribute Handout 35: Protecting Worker Health and Safety. Explain that each group will prepare and deliver a short presentation about some of the workplace controls and regulations regarding the treatment of infected waste, depending on which group they’ve been assigned. Tell them to prepare notes for their presentations on pieces of flip chart paper, and to practice their delivery. Give them about 10 minutes to prepare. They can look at PG pages 7–12 to 7–19 as a reference.

Have groups take turns giving their presentations to the class. Participants should listen as each group presents, and write notes in their handouts. (See answer key on the following page.) Answer any questions that may have come up in the completion of the handout.

Conclude by saying that Standard Precautions should always be followed when handling infected waste, and controls should be in place to eliminate or reduce workers’ exposure to infectious agents for all waste-related tasks.
Handout 35: Protecting Worker Health and Safety

Group 1

Instructions: Prepare and deliver a presentation about the following:

Engineering controls to eliminate or reduce worker exposure to hazards while handling infected waste

Use this space to prepare your notes, or to take notes as you listen to another group's presentation.

The work environment should be designed to eliminate or otherwise reduce worker exposure to hazards while handling waste. Engineering controls in waste operations serve as physical barriers between workers and pathogens, reducing the likelihood and amount of worker exposure to sources of infectious substances. Equipment that functions without worker actions (for example, continuous operation of a negative-pressure ventilation system in areas where waste is handled) provides the best protection.

Other engineering controls include using:

- Barriers (with windows or closed-circuit television monitors) between areas where waste processing equipment operates and where workers may control or observe the equipment.
- Needleless I.V. systems, retractable syringes and other devices designed to prevent needlestick injuries. These systems protect healthcare and waste workers.
- Rigid containers to package waste, including puncture-proof containers for sharps. Packaging must meet the requirements of OSHA’s Bloodborne Pathogens Standard and DOT’s HMR (or exceptions outlined in a special permit, if applicable).
- Equipment that ventilates outside the work area when treating contaminated waste.
- Suitable shelves, straps, or other equipment - especially in transport vehicles, where containers may move or shift - to secure stacked contaminated waste containers.
Protocols should be developed for handling, transporting, treating and disposing of waste that, when properly followed, reduce the likelihood of worker injury and illness. Workers should be trained in how to perform their jobs safely, following appropriate work practices and administrative controls:

- Package waste in accordance with OSHA’s Bloodborne Pathogens standard, CDC guidelines, and DOT’s HMR. Proper packaging from the outset minimizes repackaging or additional handling. If DOT has issued a special permit for the waste, follow its provisions.
- To prevent toppling and spillage, place containers of waste as low as possible on dollies, hand trucks, or carts and when stacking (including in transport vehicles). Be sure to follow instructions provided by the local health officials and/or DOT special permit. Additional regulatory limitations may apply.
- Select waste processing techniques that minimize worker exposure to pathogens, including by minimizing the need for workers to handle waste (including in packaging).
- Incinerate or autoclave entire unopened waste containers to eliminate exposure associated with handling and opening containers. For Category A waste, avoid reusable containers that must be emptied into an incinerator or autoclave and/or processed for reuse.
- Do not use open burning techniques, which could expose workers and other individuals to harmful air contaminants.
- Do not use waste management processes that involve shredding suspected or known contaminated waste, as these techniques may result in generation of bio-aerosols (aerosolized droplets containing infectious particles that can be inhaled). Shredders also may become clogged or jammed by atypical, porous waste materials (for example, linens, carpet, curtains, or other textiles) that must be discarded when decontamination is not possible.
- If workers use shredding equipment despite this guidance recommending otherwise, and if the shredding equipment becomes clogged, avoid entering clogged shredding machines to resolve mechanical problems. If a worker must do so, always ensure the machine is off, the worker correctly uses appropriate PPE, and the worker follows proper lockout/tagout procedures for controlling hazardous energy. To prevent worker exposure to infectious material in equipment that becomes clogged prior to completing treatment, use chemical decontamination methods prior to servicing equipment in addition to PPE.
- Handle inactivated, non-infectious waste as though it may continue to pose a hazard from sharps or other puncture injuries. In particular, autoclaved waste may contain needles, broken glass and other hazards, even though these items are sterile after treatment (assuming use of an effective inactivation protocol).
Routine contaminated waste handling, transport, treatment, and disposal operations typically do not fall under OSHA’s HAZWOPER standard (29 CFR 1910.120). However, HAZWOPER requirements may apply to incidents that release, or substantially threaten to release, a hazardous substance, including biological agents into the environment, which may occur during a transportation accident involving contaminated waste.

Employers, such as those with contracts to transport contaminated waste under a DOT special permit, should be familiar with the provisions of the HAZWOPER standard, including paragraph (q), and be prepared to comply as needed. For emergency response operations that fall under HAZWOPER, employers must have a written emergency response plan with certain basic and critical elements. They must appropriately train workers who will respond to an emergency before participation in an actual incident, implement medical surveillance for workers potentially exposed to hazardous substances during work, maintain exposure records, and provide appropriate PPE to workers.

Employers providing waste transportation services under a DOT special permit generally must have a spill response plan and provide hazardous materials training to workers, as required by 49 CFR § 172.704. Employers can plan and train for emergency response operations involving spills in a way that complies with the OSHA and DOT requirements at the same time. Specifically, employers must train workers on the special permit and its conditions.

Although not every employer’s operations fall under the scope of the HAZWOPER standard, developing emergency plans can ensure a safe, effective response when emergencies, including releases or substantial threats of releases of hazardous substances, do occur. Employers should evaluate their risk and develop plans for emergency events. Such plans should address worker safety and health considerations, state and local requirements, DOT/PHMSA training and security plan requirements, and the requirements of any DOT-issued special permits.
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Exercise 3: Infected Waste Handling Procedures

Objectives

8. List at least three topics covered in a waste-handling plan.
9. Describe best practices for working with mechanical devices while handling waste containers.
10. Describe proper lifting techniques for manual handling of waste containers.
11. Describe proper packaging procedures for regulated medical waste.
12. Describe proper procedures for loading regulated medical waste for transport.

Display Slides 9 and 10. Open the lesson by saying that every step of a waste-handling operation should be carefully planned before it begins, and this plan covers a range of topics. Have participants unscramble the words on the slide and use them to complete the topics.

Display Slide 11 to reveal the answers. Ask participants to give a few examples for each of the topics. Note their ideas on the board. Explain that participants are going to look at waste handling procedures in more detail in the next activity.

Distribute Handout 36: Handling Infected Waste. Ask, “What are you going to do with the statements?” (Read and mark them true or false.) “What do you need to do if a sentence is false?” (Correct the sentence so that it is true.)

Have participants work in pairs to complete the handout. Tell participants they may refer to pages 7–20 to 7–22 of the PG as a reference. Check the answers with the class. (See answer key on following page.) Answer any questions that come up in the completion of the handout.

Ask participants to raise their hands if they have been trained in safe lifting techniques.

Display Slide 12. Have volunteers talk through the steps involved in safe lifting. Encourage other participants to offer corrections if necessary. Ask, “When might safe lifting techniques come into play in handling infected waste?” (Suggested answer: Infected waste may be put into large containers for transport, and it may be necessary to move these containers manually to a load-out area or disposal site.)

Display Slide 13. Explain that there are specific waste disposal containers that are made for infectious waste. Point out the differences between the two types and note the labels and their placement.

Ask participants if they have ever overpacked waste. Have participants share their experience with the class.
Exercise 3: Infected Waste Handling Procedures (continued)

**Ask:** “What are some different ways to overpack?” Elicit answers from the class and note their answers on the board.

**Display** Slide 14 and have volunteers describe the different techniques shown (V-shaped method and upside-down method.)

**Conclude** by saying that there are many different regulations, guidelines, and best practices for managing infected waste. A waste-handling plan should spell out all of the requirements in detail before a job begins.
Chapter 7: Waste Management
Handout 36: Handling Infected Waste

Handout 36
Handling Infected Waste

Instructions: Write T for true or F for false. If the statement is false, correct it to make it true.

1. T Infected waste containers should not be reopened once they have been closed.

2. F If there are other potential hazards in a container (such as batteries or air filters, etc., that could contain hazardous waste), it should be noted on the outside of the innermost container. outermost

3. F When handling waste containers, you should always work in teams of at least four people (buddy system). two

4. T You should always perform a visual inspection before touching any waste container.

5. F You should never use mechanical devices for lifting, moving, and managing contaminated waste that is too heavy to manually handle. always

6. T All mechanical lifting and moving devices must be inspected regularly and repaired when necessary.

7. T You should always check for faulty or defective parts before lifting a load that is near the load capacity of mechanical equipment.

8. F When manually handling heavy material, you should pull loads rather than push them whenever possible. push / pull

9. T Inspect the area where you have to carry the load; it should be free of obstructions that could cause you to trip, slip, or spill the load.

10. T Packaging of infected waste may differ depending on whether the waste has been inactivated, or if it is confirmed to contain Category A infectious substances.

11. T Labeling hazardous materials for storage and shipping should be done within the appropriate regulations or guidelines established by the CDC, OSHA, DOT, and specifically within the Special Permit.

12. F Once materials are properly labeled, they must be stored on site in a refrigerated area that is secured against entry by unauthorized personnel. can / load-out

13. T If you are loading drums or containers onto trucks, they must be firmly secured to prevent them from shifting or breaking during transit.

14. F Containers should be loaded and secured by stacking them on top of one another in accordance with any additional requirements per the special permit, which may prohibit stacking containers.

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Distribute Chapter 7: Things to Remember.

Explain that the Things to Remember document is a take-home list of information that can be used for reference or self-study. Note that this document provides information about the chapter’s learning objectives and may be used as a study guide for the end-of-course assessment.

Display Slides 2 to 4 and briefly review the chapter objectives with the class. Review the information on the Things to Remember handout for each objective. Ask participants if they are comfortable with their knowledge about, or ability to do, each of the objectives, or if they need review or additional support on any of the items listed.

Ask the participants if they have any questions regarding any other topics of the chapter.

Address any questions or concerns.
1. The DOT’s Hazardous Materials Regulations (HMRs) regulate infectious substances and regulated medical waste (RMW) as a hazardous material. The HMRs apply to any material that DOT determines is capable of posing an unreasonable risk to health, safety, and property when transported. Any infectious substance and regulated medical waste must conform to all applicable requirements when offered for or actually transported by air, highway, rail, or water. But the overall handling of infectious or regulated medical waste begins with the creation of the waste, includes waste transportation, and ends at final disposition.

2. Once a patient is suspected to have, or has been diagnosed with, an infection caused by one of the Category A infectious substances, the facility treating the patient should activate their facility emergency waste management plan. This plan will indicate whether the facility will be using on-site activation (autoclaving or incineration, for example), or if it will need to follow all necessary requirements for transporting the waste off-site for inactivation.

3. Because of the hazards posed by Category A infectious substances, these materials have more stringent packaging requirements than other infectious substances and RMW. The transport of medical equipment, sharps, and used healthcare products contaminated or suspected of being contaminated with a Category A infectious substance must comply with the packaging requirements for infectious substances in the DOT HMR and, if applicable, the OSHA Bloodborne Pathogens Standard. Off-site transportation of this waste, which most often is for incineration, requires additional steps and compliance with specific regulations. Incineration of contaminated waste may be subject to federal, state and/or local laws or regulations. Inactivation or incineration of infectious or regulated medical waste may be subject to state, local and OSHA regulations.

4. Protecting workers during handling, treatment, transport, or disposal of suspected or known Category A contaminated waste begins before the waste is generated, through anticipation, assessment, identification, and planning for occupational exposure risk and appropriate control measures. A comprehensive protection program for waste workers relies on a Hierarchy of Controls; engineering, administrative controls and safer work practices; PPE; and training, medical exams and other elements that OSHA standards require. In all stages of the waste lifecycle, employers and workers should:
   • Limit the number of workers who handle Category A waste to essential staff.
   • Whenever gloves are removed or changed, wash hands with soap and water for at least 20 seconds, or use alcohol-based hand rubs if soap and water are not immediately available.
   • Avoid touching the face or other exposed parts of the body while wearing gloves or before washing/sanitizing bare hands.
   • Change clothing and shower as soon as possible if work clothing becomes soiled.
   • Discard soiled work clothing and PPE with other contaminated waste.
   • Wear dedicated washable footwear while on the job.
   • Consider vaccination to protect workers from diseases for which a vaccine exists.

5. Engineering controls that can be used to avoid hazards while handling hazardous waste include barriers between areas where waste processing equipment operates and where workers may control or observe the equipment; needleless I.V. systems, retractable syringes and other devices designed to prevent needlestick injuries; ventilation equipment; and rigid containers for packaging waste.
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Thomas  to Remember

6. Administrative controls that can be used to avoid hazards while handling hazardous waste include protocols for handling, transporting and disposing of waste. Workers should be trained in how to perform their jobs safely, following appropriate work practices and administrative controls:
   • Package waste in accordance with OSHA’s Bloodborne Pathogens Standard, CDC guidelines, and DOT’s HMR.
   • Select waste processing techniques that minimize worker exposure to pathogens.
   • Incinerate or autoclave entire, unopened waste containers to eliminate exposure associated with handling and opening containers.
   • Do not use open burning techniques, which could expose workers and other individuals to harmful air contaminants.
   • Handle inactivated, non-infectious waste as though it may continue to pose a hazard from sharps or other puncture injuries.

7. Routine contaminated waste handling, transport, treatment, and disposal operations typically do not fall under OSHA’s HAZWOPER standard. However, HAZWOPER requirements may apply to incidents that release, or substantially threaten to release, a hazardous substance, including biological agents, into the environment. Employers, such as those with contracts to transport contaminated waste under a DOT special permit, should be familiar with the provisions of the HAZWOPER standard and be prepared to comply, as needed.

8. For emergency response operations that fall under HAZWOPER, employers must have a written emergency response plan with certain basic and critical elements. They must appropriately train workers who will respond to an emergency before participation in an actual incident, implement medical surveillance for workers potentially exposed to hazardous substances during work, maintain exposure records, and provide appropriate PPE to workers.

9. You should always use mechanical devices whenever possible for lifting, moving and managing waste that is too heavy to manually handle. This may include the use of hand trucks/dollies, forklifts or jacks. You must be properly trained and authorized to operate these mechanical devices. Additional decontamination procedures should also be considered if these devices are used in contaminated areas. As a safety precaution, you should always check for faulty or defective parts before lifting a load that is near the load capacity of the equipment. Tags must clearly state the rated load capacity on all lifting devices and you should never lift more than the equipment can handle.
10. Proper lifting techniques for manual handling of waste containers consist of the following steps:
   - Firmly place your feet about 10” to 15” apart. Place one foot alongside the object being lifted and the other foot behind the object.
   - Use the kneel-bend or squatting position. Keep your back straight. Tuck in your chin so that your neck and head continues the straight back line.
   - Grab the object using the Palmer grip.
   - Tuck your arms and elbows into the side of your body and position your body so that the total weight of the object and your body is centered over your feet.
   - Start lifting with a thrust of your rear foot, keeping the object close to your body. Lift with your legs. Do not lift with your back.
   - Carry the load close to your body – not with extended arms. To turn or change position, shift your feet. Do not twist your back. Be sure to inspect the container for contamination prior to lifting and carrying the load close to your body.
   - To set an object on the ground, follow the same steps in the reverse order.

11. Infected waste may require special types of packaging, depending on whether the waste has been inactivated, or if it is confirmed to contain Category A infectious substances. In addition, overpack drums are required for confirmed cases of Category A waste. Overpacked drums should follow the instructions by the manufacturer or the special permit as applicable and as required.

12. Drums or containers being loaded onto trucks must be firmly secured to prevent them from shifting or breaking during transit. The wheels of trucks being loaded or unloaded should be blocked (chocked) to prevent movement of the truck. The packages should be loaded and secured in accordance with any additional requirements per the special permit (for example it may prohibit stacking of containers or limit the number of containers, etc.).