Regulated Medical Waste Management

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- **Iowa Dental Professionals:** This course complies with the Iowa Dental Board for recertification in the area of infection control standards, as established by the Centers for Disease Control and Prevention (CDC).

Conflict of Interest Disclosure Statement

- Dr. Huber has done consulting work for Procter & Gamble and serves on the dentalcare.com Advisory Board.
- Dr. Terézhalmy has done consulting work for Procter & Gamble and has served on the dentalcare.com Advisory Board.

Short Description

Participants in this course will be introduced to evidence-based information related to the management of regulated medical waste, also referred to as infectious or biohazardous waste.

Course Contents

Overview

Participants in this course will be introduced to evidence-based information related to the management of regulated medical waste, also referred to as infectious or biohazardous waste. Emphasis will be on defining regulated medical waste and issues related to segregating, collecting, storing, treating, and disposing such waste in compliance with applicable regulations.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Describe the types of wastes produced in oral healthcare settings.
- Identify appropriate personal protective equipment to handle regulated medical waste.
- Segregate regulated medical waste into non-infectious and infectious categories.
- Collect each category of wastes in the proper container.
- Prepare infectious waste containers for proper disposal.
- Clean up safely after an accidental spill of regulated medical waste..

Introduction

The human immunodeficiency virus (HIV) epidemic of the mid 1980s raised public concerns about personal health risks resulting from improper management and disposal of medical wastes. In response, the U.S. Environmental Protection Agency (EPA) published "Guide for Infectious Waste Management" in 1986 and Congress enacted the "Medical Waste Tracking Act of 1988," which required the EPA to develop a program for managing and tracking medical waste.[1,2]

The EPA created a model program for Managing and Tracking Medical Waste (1989).[3] Specifically, it (1) defined medical waste subject to program regulations; (2) established a cradle-to-grave tracking system; (3) required management standards for segregation, packaging, labeling, and storing medical waste; (4) established record keeping requirements; and (5) defined penalties that could be imposed for mismanagement.

The model program regulated medical waste in four states (New York, New Jersey, Connecticut, Rhode Island) and Puerto Rico. From the information gathered, the EPA concluded that: (1) due to the biological instability of most microorganisms commonly regarded as human pathogens, the actual adverse environmental or public health consequences or risks were negligible, (2) the disease-causing potential of medical waste is greatest at the point of generation, and, therefore, (3) medical waste primarily represents an occupational health hazard.

The U.S. Department of Labor Occupational Safety and Health Administration (OSHA) is responsible for safe and healthy working conditions.[4] It also operates the job safety and health programs in 29 states. However, 21 states have their own programs, and in 3 states the programs only apply to state and local government employees. The State-by-State Occupational Safety and Health Resource Locator provides program information for specific jurisdictions (Figure 1).[5]

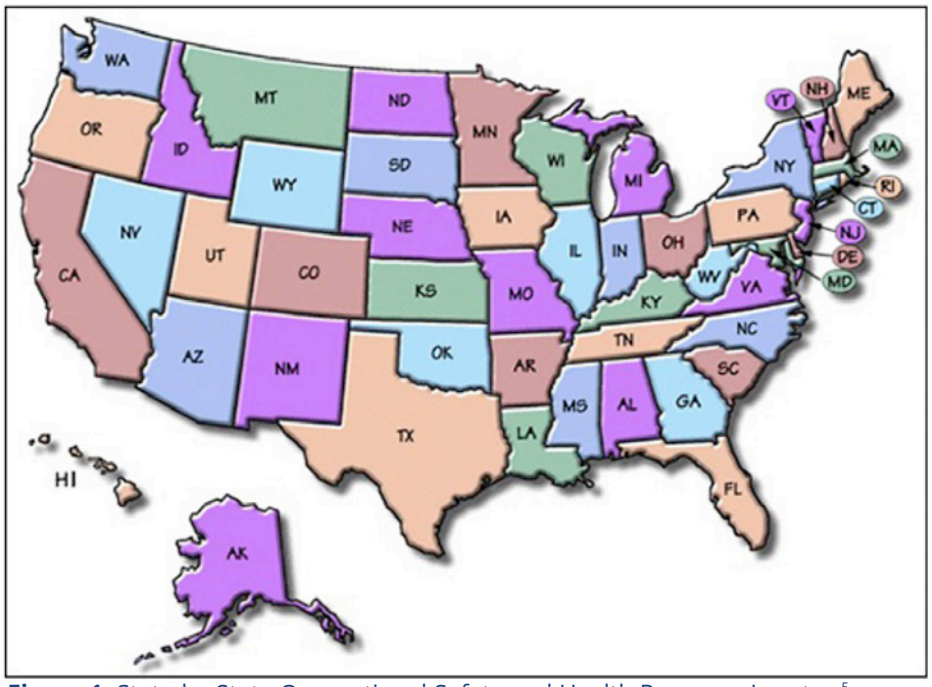

Figure 1. State-by-State Occupational Safety and Health Resource Locator.[5]
Source: https://www.envcap.org/srl/resourcelocator.php?id=25

The U.S. Centers for Disease Control and Prevention (CDC) and the National Institute for Occupational Safety and Health (NIOSH) have advisory (i.e., non-regulatory) responsibilities related to infection control. The CDC makes recommendations related to the prevention and control of disease. NIOSH conducts research and makes recommendations to prevent worker injury and illness (e.g., selecting, evaluating, and using sharps disposal containers).

The U.S. Food and Drug Administration (FDA) is responsible for setting and enforcing public health regulations to assure the safety and efficacy of medical devices (e.g., sharps containers). The U.S. Department of Transportation (DOT) has regulatory responsibility that affects transporters of regulated waste. The Healthcare Environmental Resource Center (HERC) funded by the EPA's National Compliance Assistance Centers program provides compliance assistance.[6]

The purpose of this document is to provide general guidance for the management of regulated medical waste (RMW) in oral healthcare settings. OSHA states that the disposal of RMW must be "in accordance with applicable regulations of the United States, States and Territories, and political subdivisions of States and Territories."[4] The State-by-State Regulated Medical Waste Resource Locator provides program information for specific jurisdictions (Figure 2).[7]

Regulated Medical Waste Management in Oral Healthcare Settings

Since all oral healthcare facilities generate some RMW, they must all have a RMW management program that meets jurisdictional requirements. The plan must include education and training objectives related to the safe handling of RMW during segregation, packaging, storage, transportation, treatment, and disposal; and the establishment of a recordkeeping system. It is also advocated that an Office Medical Waste Manager (OMWM) be appointed to administer the program (Table 1).

Education and Training

The creation and maintenance of a safe work-environment is predicated on the commitment and accountability of all healthcare personnel (HCP). Compliance with Standard and Transmission-based Precautions is significantly

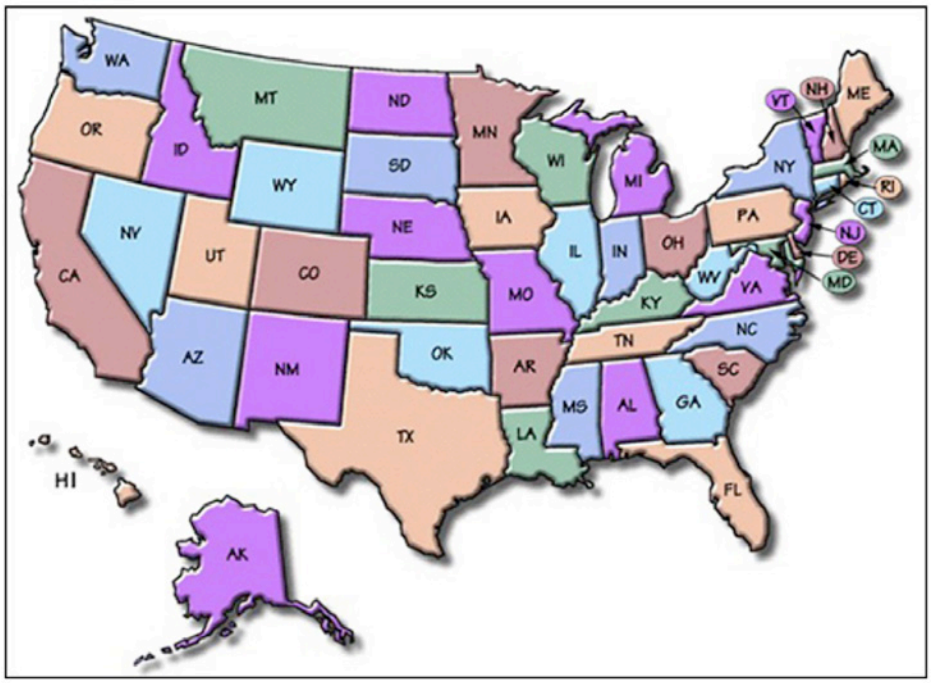

Figure 2. State-by-State Regulated Medical Waste Resource Locator.[7]
Source: *www.hercenter.org/rmw/rmwlocator.cfm*

Table 1. Responsibilities of an Office Medical Waste Manager.

The Office Medical Waste Manager should be:

1. Be familiar with pertinent federal, state and local requirements for RMW management.
2. Develop, implement, and maintain a written RMW management protocol that meets federal, state, and local requirements.
3. Ensure that appropriate containers are maintained in areas where RMW is generated and that replacement containers are available in a central location accessible at all times.
4. Act as advisor on RMW management matters to all office personnel.
5. Maintain liaison with the RMW disposal contractor (if applicable).

improved if HCP understand the rationale for written policies and practices. Participation in an education and training program is mandated prior to initial assignment of HCP to tasks in which exposure to blood and OPIM is possible, and annually thereafter.[4,8]

General objectives of the education and training program are to identify (1) exposure risks, (2) preventive strategies, (3) post-exposure evaluation and follow-up requirements, and (4) administrative controls. The program must reflect current best practice recommendations made by federal, state, and local agencies and professional organizations. Documentation of participation in a training program must be maintained for the most recent 3-year period.[4]

Training is a critical component of a successful RMW management strategy and should clearly and consistently address information regarding the need for waste segregation, pertinent regulations, health and safety impacts, and cost implications.[8] Training related to RMW management must be part of new employee orientation and staff must be re-trained when the definitions of RMW are changed or when policies or procedures are updated or revised.

Definition of Regulated Medical Waste

Waste generated in healthcare facilities may be categorized as office waste, hazardous waste, universal waste, and medical waste (Table 2).9 However, segregating waste into these categories can be challenging because jurisdictional definitions, especially for medical waste (e.g., non-infectious versus infectious medical waste), vary from state to state. The OMWM can consult the State-by-State Regulated Medical Waste Resource Locator for jurisdictional definitions of medical waste.[17]

OSHA defines RMW as "liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials."[4] Blood means whole blood, blood components, and products made of blood. OPIM includes all body fluids (including saliva), and anatomical and microbiological wastes.

Based on the OSHA definition, RMW generated in oral healthcare settings may include (1) liquid or semi-liquid blood and OPIM; (2) contaminated items that would release blood or OPIM in a liquid or semiliquid state if compressed; (3) items caked with dried blood or OPIM and are capable of releasing these materials during handling; (4) contaminated sharps; (5) pathological waste; and (6) microbiological waste.[4]

Table 2. Categories of Waste Generated in Healthcare Facilities.[9]

Office waste	• Common refuse • Recyclable waste
Hazardous waste	• Digital scanner, eraser, and phosphor plates • Lead apron • Laptop computer w/software
Universal waste	• Fluorescent lamps • Batteries
Medical waste	• Common (non-infectious) medical waste • Regulated (infectious) medical waste

Epidemiology

There is no evidence that solid or liquid wastes from hospitals, other healthcare facilities, or clinical and research laboratories are any more infectious than residential waste.[10] Indeed, several studies that have compared the microbial load and the diversity of microorganisms between hospital and residential wastes concluded that, although hospital wastes have a greater number of different bacterial species, residential wastes are more heavily contaminated.

Moreover, there is no epidemiologic evidence suggesting that traditional waste-disposal practices of healthcare facilities (whereby clinical and microbiological wastes were decontaminated at the point of generation before leaving the facility) have caused disease in either the healthcare setting or the general community.[10] However, this conclusion does not apply to occupational exposure to contaminated sharps in healthcare settings.

Occupational Exposure

Occupational exposure to RMW means reasonably anticipated skin, eye, mucous membrane, or parenteral contract with blood or OPIM that may occur during the performance of an employee's duties. Engineering controls (e.g., sharps disposal and other containers) must be available for the prompt and convenient disposal of RMW. Work practice controls (e.g., prohibiting the removal of needles and scalpel blades by hand) must be implemented and enforced.[4]

To further minimize occupational exposure, personal protective equipment (PPE) such as gowns (aprons), gloves, masks, and goggles/face shields must be worn when handling RMW.[11] PPE is considered appropriate for the task of handling RMW if it does not permit blood or OPIM to reach the employee's street clothes, undergarments, skin, eyes, and mucous membranes under normal conditions of use.[4]

Immediately, or as soon as feasible, following an exposure exposed HCP must wash their hands and other exposed skin with soap and water, and flush exposed mucous membranes (e.g., eyes or mouth) with water; and a confidential medical evaluation and follow up must be made available to exposed HCP. All percutaneous injuries from contaminated sharps must also be recorded in the facility's Sharps Injury Log.[4]

Waste Segregation

The various waste categories generated in oral healthcare facilities (office waste, hazardous waste, universal waste, and medical waste) must be separated at their points of origin. The process of segregating wastes into these categories requires an understanding of the definitions of each waste category. An overview of federal, state, and local hazardous and universal waste definitions and management regulations are available elsewhere.[9,12,13]

Office Waste

Most waste generated in oral healthcare settings is office waste.9 Office waste (i.e., common refuse and recyclable trash) is considered municipal waste. The standard methods of collecting, storing, transporting, and disposing of such wastes are regulated by state and/or local jurisdictions. Note that these rules may include mandatory requirements for recycling certain materials (e.g., newspapers, cardboards, plastics, glass containers, and aluminum cans).

There are no special requirements for the containment of office waste. The waste receptacle, lined with a plastic liner bag, should be of sufficient size and strength to accommodate the type and quantity of waste generated. Liner bags used for the containment of office waste may be clear, black, white, or gray. Liner bags may be made of low density (LD), linear low density (LLD), and high density (HD) polyethylene resins.[14-15]

LD polyethylene resins are used to manufacture lower-end utility liners. LLD liners are more puncture, stretch, and tear resistant than HD liners, but have lower load capacity. LLD liners are used for the containment of rough or sharp trash. HD liners, while less puncture, stretch and tear resistant than LLD liners, are more temperature resistant and have a higher load capacity. HD liners are appropriate for the containment office waste without rough or sharp edges.

Gauge is the term used to describe the thickness of a liner. LLD liners are measured in mils, while HD liners are measured in microns. One mil is one thousandth of an inch (0.001 inches). One micron is one thousandth of a millimeter (0.001 mm). One mil is 25.4 microns. Common LLD liners range from 0.30 to 3.00 mils in thickness. Common HD liners range from 6 to 22 microns in thickness.

Liner bags must be (1) of sufficient thickness and durability, (2) puncture resistant, and (3) have sufficient burst strength to prevent rupture and leaks. However, film thickness alone is not enough to determine bag strength. Advanced polymer formulations have allowed manufacturers to produce thinner, lighter bags that are stronger than the traditional thicker bags. Appropriate bag strength for the type and quantity of waste is best determined by "strength" of the bag (Table 3).

The bottoms of liner bags may be sealed by star, flat, or gusseted seal methods. The "star seal" is the most common design; it eliminates gaps along the seal and is virtually leak-proof (Figure 3). The star seal also allows the bag to more easily conform to the shape of the container, distributing the weight of the refuse more evenly and, therefore, maximizes the bag's carrying capacity. Star seal liners are sized in two dimensions, EX: 40 x 46 inches.[14]

The "flat seal" design is a straight seal along the bottom of the liner bag, which results in a 2-dimentional bag with a bottom seal, much like a pillow case (Figure 4). Although flat seals are strong, they have a tendency to leak wet trash from the corners. They are also clumsy to handle and they do not conform well to the shape of most trash receptacles. Flat seal liner bags are also sized in two dimensions, ex: 40 x 46 inches. [14]

Table 3. Lifting Strength of Liner Bags.

HDPE Static Weight Performance			LLPDE Statice Weight Performance		
Strength	**Gauge**	**Weight**	**Strength**	**Gauge**	**Weight**
Light	6.00 - 9.00 Mic	15 - 25 lbs	Light	0.30 - 0.49 Mil	10 - 20 lbs
Medium	10.00 – 12.00 Mic	26 – 50 lbs	Medium	0.50 – 0.60 Mil	21 – 30 lbs
Heavy	13.00 – 14.00 Mic	51 – 60 lbs	Heavy	0.61 – 0.74 Mil	13 – 40 lbs
Extra Heavy	15.00 – 17.00 Mic	61– 70 lbs	Extra Heavy	0.75 – 0.80 Mil	41 – 50 lbs
XX Heavy	18.00 – 20.00 Mic	71 – 80 lbs	Super Tuf	0.81 – 1.00 Mil	51 – 60 lbs
XXX Heavy	21.00 – 22.00 Mic	81 – 90 lbs	Super Heavy	1.10 – 1.20 Mil	61 – 65 lbs
			XX Heavy	1.30 – 1.90 Mil	66 – 70 lbs
			XXX Heavy	2.00 – 3.00 Mil	71 – 75 lbs

Table 3. Lifting Strength of Liner Bags. (Cont.)

HDPE Gauge Equivalents and Recommendations		
Small Cans	**Mid-Size Cans**	**Larger Cans**
Light: 6.00 - 9.00 Mic	Medium: 10.00 - 12.00 Mic	Extra Heavy 15:00 - 17.00 Mic
	Heavy: 13:00 - 14:00 Mic	XX Heavy: 18:00 - 22.00 Mic
LLDPE Gauge Equivalents and Recommendations		
Small Cans	**Mid-Size Cans**	**Larger Cans**
Light: 0.30 - .049 Mil	Heavy: 0.61 - .74.00 Mil	Super Heavy: 1.10 - 1.20 Mil
Medium: 0.50 - 0.60 Mil	Extra Heavy: 0.75 - 0.80 Mil	XX Heavy: 1.30 - 1.90 Mil
	Super Tuf: 0.30 - 0.49 Mil	XXX Heavy: 2.00 - 3.00 Mil

Figure 3. The "Star Seal" Design.

Figure 4. The "Flat Seal" Design.

Figure 5. The "Gusset Seal" Design.

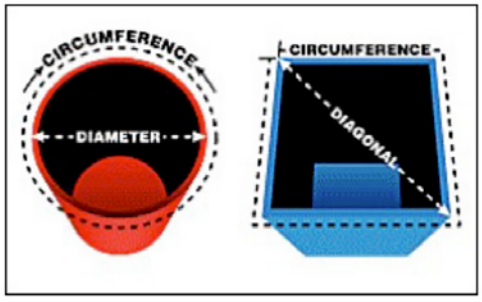

Figure 6. The shape and dimensions of the receptacle determine the width and height of the container liner.

The least common method to seal the bottom of liner bags is the "gusset seal." It is obtained by tucking in both sides of the bag to form gussets (Figure 5). Where indented, it has to be sealed through four layers of film while the middle of the bottom has only two sealed layers. This leads to an inherently weak bottom seal and the bags have the tendency to leak wet trash from the center at gusset points. Gusset seal liners are sized in three dimensions, e.g., 23 x 17 x 46.[14]

Finally, the receptacle must be matched with a liner bag of appropriate size to ensure (1) a snug fit, (2) correct length, and (3) proper overhang (Figure 6). To determine the width of the liner, measure the outer circumference of the receptacle and divide it by two. To determine the length of the liner, measure the height of the receptacle, add ½ of the diameter or ½ of the diagonal of the container, plus 3 inches for overhang.[15]

Medical Waste

The primary objective of medical waste management is to minimize the risk of disease transmission. In reality, a significant portion of medical waste is actually considered to be non-infectious. To reduce both the risk of infection and the cost of disposing of infectious waste, non-infectious waste must be segregated from infectious or RMW at the point of generation as determined primarily by state rather than federal regulations (Table 4).[9,16]

In general, guidance pertaining to non-infectious medical waste disposal falls under the same state and/or local regulations as office waste.[4,9,16,17] Liquid RMW generated by suctioning during surgical procedures must be collected in leak-proof, burst resistant suction canisters and disposed of into the sanitary sewage system in compliance with state and/or local regulations. Contaminated sharps must be placed into a sharps container and other RMW must be placed into a "biohazard bag" stored inside a container.[4,9,16,17]

Contaminated Sharps

The primary route of occupational exposure to blood and OPIM is accidental percutaneous injury, i.e., needlestick and other sharp injury. As many as one-third of all sharps injuries occur during the disposal process. Factors most often sited include (1) inadequate sharps disposal container design, (2) inappropriate sharps disposal container placement (3) inappropriate sharps disposal handling practices by HCP, and (4) overfilled sharps disposal containers.[18]

Sharps disposal containers are regulated as class II medical devices by the FDA[19,20] Class II medical devices are those devices for which general regulatory controls alone cannot assure safety and effectiveness. These devices are subject to special labeling requirements, mandatory performance standards, pre-marketing FDA notification, and post-marketing surveillance, i.e., the practice of monitoring the safety of medical devices after it has been released on the market.

OSHA mandates that sharps disposal containers be puncture resistant, the sides and the bottom be leak-proof, and they be closable (i.e., they have a lip, flap, door, or other means of closing the container).[4,17] The containers must be labeled with the universal biohazard symbol and the word "BIOHAZARD," and/or color-coded red. The label must be fluorescent orange or orange-red, with the symbol and lettering in a contrasting color (Figures 7 and 8).[4,17]

NIOSH recommends the placement of a container of sufficient size, i.e., one that accommodates both the volume generated and the largest sharp used, at each workstation.[18] It must also be readily accessible, i.e., without obstacles between the user and the container.[18] Horizontally, they must be located within easy arm's reach and the vertical height must be below eye level, i.e., the user must have a clear, unobstructed view of the container's opening (Figure 9).[18]

Sharps containers must be kept upright throughout use to keep the sharps and any liquid from spilling out.4 The fill status of the container must also be obvious under prevailing lighting conditions.[18] The container's opening must be identifiable and easily accessible by the user and must facilitate one-

Table 4. Examples of Medical Waste Generated in Oral Healthcare Settings.[9,17]

Wastes	Examples/Comments
Sharps contaminated with blood and OPIM	Needles, scalpel blades, suture needles, endodontic files, orthodontic wires, local anesthetic cartridges, and glass slides ✓ Disposed sharps, even if unused, must be considered RMW ✓ Require special handling by both OSHA and U.S. DOT
Contaminated disposable items ✓ Items that would release blood or OPIM in a liquid or semiliquid state if compressed ✓ Items caked with dried blood or OPIM and are capable of releasing these materials during handling	Disposable absorbent materials ✓ Generally, gauze, cotton balls or rolls, swabs, and used dressings containing small amounts of blood or OPIM are not considered RMW
	Disposable non-absorbent materials ✓ Generally, gowns, gloves, drapes, bracket table covers, rubber dams, patient bibs, and face masks, are not considered RMW
Pathological waste	Unfixed oral tissues removed during surgery, biopsies, and extracted teeth ✓ Teeth properly disinfected and returned to patients after extraction are not considered RMW ✓ Extracted teeth with amalgam restorations are considered both RMW and hazardous waste
Microbiological waste	All culture media, disposable culture dishes, and devices used to inoculate media are considered RMW
Liquid or semi-liquid blood and OPIM	Blood or OPIM in suction canisters collected during surgical procedures ✓ Discharge into a sanitary sewer is acceptable, unless considered as RMW by county or local laws or regulations

Figure 7. The universal biohazard label must be fluorescent orange or orange-red, with lettering and symbol in a contrasting color.

Figure 8. FDA-cleared sharps disposal containers, available in a variety of sizes, must be appropriately labeled or color-coded red.

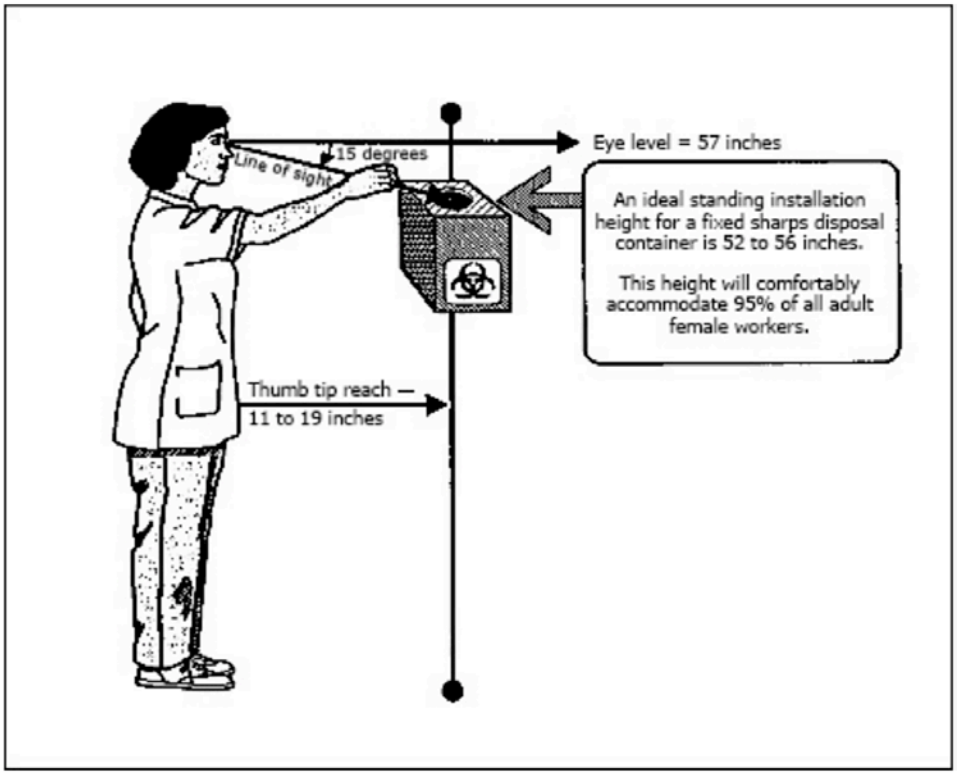

Figure 9. Ergonomic installation height for a wall mounted sharps disposal container.

handed disposal of sharps.[18] Contaminated broken glass (e.g., broken local anesthetic cartridges) must be placed into the container by mechanical means.[4,17]

Contaminated disposable needles must never be sheared or broken. If bending or removing a needle from the syringe is necessary, it must be accomplished with the use of a mechanical device or a one-handed technique. Recapping must be accomplished by the one-handed "scoop technique," i.e., using the needle itself to pick up the cap and then pushing the cap against a hard surface to ensure a tight fit over the needle.[4,17]

Sharps containers must be closed before removal from the workstation to prevent spillage or protrusion of contents during transportation within the user facility before final disposal. If there is a chance of leakage, the container must be placed in a secondary container. The secondary container must also be closable, constructed to contain all contents, and labeled with the universal biohazard symbol or color-coded red as noted above for the primary container.[4]

Other Solid Regulated Medical Waste

OSHA requires that solid RMW be placed in containers that are closable, constructed to contain all contents, and prevent leakage of fluids during handling, storage, transport, or shipping (Figure 10).[4] They must be labeled with the universal biohazard symbol and the word "BIOHAZARD," and/or color-coded red.4 The containers must be lined with biohazard bags made of LLD or HD polyethylene resins of sufficient strength to prevent rupture or leaks.

Biohazard bags used to collect RMW within a facility must be certified by the manufacturer to meet the American Society for Testing Materials (ASTM) ASTM D1709 Impact Resistance Of Polyethylene Film By The Free-Falling Dart Method. Some states specify exact bursting strength, minimum thickness, or durability.[7,21] The bags must also be labeled with the universal biohazard symbol and the word "BIOHAZARD," and/or color-coded red.

The OMWM should select a container of sufficient size to accommodate the RMW generated at each workstation.[9,10] The smaller the container chosen, the less likely that non-RMW will be thrown into it. Autoclavable biohazard bags are available and some feature an indicator that changes to read "AUTOCLAVED" during steam sterilization (Figure 11). RMW that has been decontaminated is considered office waste and does not need to be labeled or color-coded.[4]

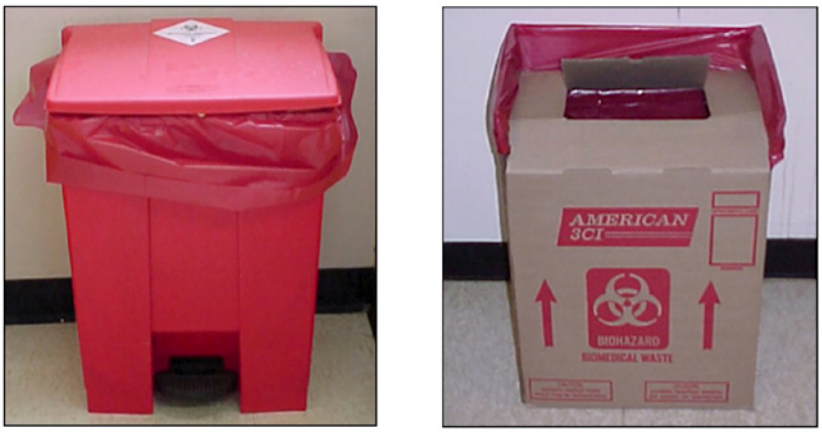

Figure 10. RMW Containers with Biohazard Bag Liners.

Figure 11. Examples of Small Autoclavable "Countertop" Biohazard Bags.

It is recommended to place a larger, general office waste container beside the regulated waste container. If non-regulated medical waste is accidentally placed in a biohazard bag, it must be left there. If RMW is accidentally placed in a non-regulated waste container, the regular office waste bag must be managed as RMW, the non-regulated solid waste must be placed into a biohazard bag while wearing appropriate PPE.

Infectious Liquid Wastes

Liquid RMW generated by suctioning during surgical procedures may be decanted directly into clinical sinks (not hand washing sinks), unless prohibited by state or local regulations.[7] If sink disposal is prohibited, liquid RMW must be placed into a rigid container, labeled or color coded red and double bagged using biohazard bags. The State-by-State Regulated Medical Waste Resource Locator is good resource for the OMWM to determine available options.[7]

Storing Regulated Medical Waste

The storage of RMW must be in accordance with applicable regulations of the United States, States and Territories, and political subdivisions of States and Territories. In preparation for storage, sharps containers must be closed. If there is a chance of leakage, the container must be placed in a secondary container.[4] Red biohazard bags must be "twist tied." If a bag seems especially heavy, it must be place inside another red biohazard bag prior to moving it to storage.

RMW must be stored in a designated, conveniently located storage area. The storage space must have limited access; must be well ventilated and must be inaccessible to pests. The universal biohazard symbol must be clearly visible on the access door to the storage area and state "authorized personnel only" (Figure 12).[4] Any refrigerator or freezer used for storage of RMW must also be clearly be marked with the universal biohazard symbol.

Disposal of Regulated Medical Waste

OSHA states that disposal of all RMW must be in accordance with applicable regulations of the United States, States and Territories, and political subdivisions of States and Territories.[4] Disposal may be accomplished on-site or the waste must be transported to an off-site location by a registered transporter of RMW. The State-by-State Regulated Medical Waste Resource Locator provides program information for specific jurisdictions.[7]

Figure 12. OSHA biohazard authorized personnel only sign.

On-site Treatment and Disposal

Most states require that RMW be treated before disposal. Such treatment can be performed on-site or at an approved facility.[17] The most common on-site treatment methods include (1) steam sterilization (autoclaving), (2) microwave sterilization, (3) chemical disinfection, and (4) sewer discharge for liquid RMW. Some states require permits for any type of on-site treatment. Other states leave it up to the generator to select a treatment method based on current best practices.[17]

If only a small amount of RMW is generated, with the exception of sharps, it may be conveniently treated on-site by steam-sterilization (Table 5). Once decontaminated, it is no longer considered infectious waste.[4] In some states, it may be disposed of with ordinary office waste. However, other states require that the treated RMW remain segregated and that a written notice must accompany the treated waste to its disposal location.[17]

Current guidelines for most healthcare clinical/research facilities working with infectious microorganisms recommend on-site decontamination using a method known to reduce the potential of exposure during the handling of infectious material. The OMWM can consult the State-by-State Regulated Medical Waste Resource Locator to identify acceptable methods for inactivating amplified stocks and cultures of microorganisms before disposal.[17]

Table 5. Steam Sterilization of Solid RMW in Oral Healthcare Setting.

- ✓ Open the neck of the biohazard bag to facilitate steam penetration
- ✓ Set the physical parameter of the sterilizer to 121°C (250°F) for a minimum of 90 minutes (longer for large loads)
- ✓ Include a *Bacillus stearothermophilus* spore biological indicator in each pack
- ✓ After sterilization, place biohazard bag into a non-biohazard polyethylene bag and dispose of in office waste

Off-site Treatment and Disposal

In nearly all states, transporters of RMW must have a transport permit to pick up and transport the waste to a treatment and disposal facility.[7] Some states allow small amounts of RMW to be transported without a permit. Disposal of RMW by a contractor is convenient but may be expensive. The contractor will usually supply shipping containers, which meet federal and state requirements, and provide the documentation needed for record keeping purposes.

OSHA requires that RMW containers be closed prior to removal from the workstation to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.[4] The United States Department of Transportation (USDOT) mandates that the biohazard bags used to line approved shipping containers for transport of RMW from the generator's facility to a treatment and disposal facility be certified by the manufacturer to meet USDOT standards.[22]

The USDOT requires tear resistance of 480 grams by the American Society for Testing Materials (ASTM) D1922 Standard Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method and impact resistance of 165 grams by the ASTM D1709 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method in both parallel and perpendicular planes with respect to the length of the bag.[21-23]

Consequently, USDOT-approved containers must be lined with a biohazard bag that is both ASTM D1709 and ASTM D1922 certified. If the biohazard bags used to collect and transport RMW within a facility meet impact resistance of 165 grams by the ASTM D1709 method, but not tear resistance by the ASTM 1922 method, the ASTM D1709-certified bag must be placed into an ASTM D1922-certified biohazard bag before placing it into a shipping container.[22]

Recordkeeping, Reporting, and Tracking

Some states require that generators maintain records of the quantity of RMW generated and its disposition. Some require the submission of an annual report.[7] The OMWM should maintain an Infectious Waste Log that includes: date, type of waste, amount (weight, volume, or number of containers), and disposition. If infectious waste is transported off-site, the receiving facility must provide the generator written documentation of proper treatment and disposal.

Some states require cradle-to-grave documentation of RMW disposal. For such cases, a multi-copy document where the generator, transporter, and treatment and/or disposal site each retain a copy is typically used.[7] Ultimately, once the waste is disposed of, the disposal site will return the final copy of the document to the generator. All documents must be maintained on file for three years.

Spills

There is no evidence that bloodborne pathogens (i.e., HBV, HCV, and HIV) have ever been transmitted from a housekeeping surface (e.g., floors, walls, countertops). Nonetheless, cleaning and disinfection of contaminated housekeeping surfaces must follow sound infection-control practices.[10,17] Infectious waste spills must be cleaned up immediately using appropriate PPE such as gloves, coveralls, mask, and goggles. The leaking or broken container must immediately be placed into a secondary leak-proof, properly labeled containers biohazard container.

Small spills are managed by removing visible organic matter with absorbent material (e.g., disposable paper towels discarded into a leak-proof, properly labeled containers biohazard container).[10,17] OSHA regulations require the use of an EPA-registered disinfectant from EPA List D (i.e., a hospital disinfectant with an HIV, HBV claim), or List E (i.e., a hospital disinfectant with a tuberculocidal, and an HIV and HBV claim), or List B (i.e., a hospital disinfectant with a tuberculocidal claim) to disinfect housekeeping surfaces.[24]

Summary

The primary objective of medical waste management is to minimize the risk of disease transmission. To reduce the risk of infection, all oral healthcare facilities must have a RWM management program that meets jurisdictional requirements. The plan must include educational and training objectives related to the safe handling of RMW during segregation, packaging, storage, transportation, treatment, and disposal; and the establishment of a recordkeeping system.

Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: *www.dentalcare.com/en-us/ce-courses/ce498/test*

1. Under the "Medical Waste Tracking Act of 1988," the EPA conducted a model waste management program and concluded all of the following, EXCEPT for one. Which one is the exception?

A. Due to the biological instability of most microorganisms commonly regarded as human pathogens, the actual adverse environmental or public health consequences or risks were negligible.
B. The disease-causing potential of medical waste is greatest at the point of generation.
C. Medical waste primarily represents an occupational health hazard.
D. The model program regulated medical waste in twelve states.

2. Which of the following federal agencies is responsible for safe and healthy working conditions?

A. EPA
B. OSHA
C. FDA
D. NIOSH

3. All of the following statements with respect to the responsibilities of an Office Medical Waste Manager are correct, EXCEPT for one. Which one is the exception?

A. Should be familiar with pertinent federal, state and local requirements for RMW management.
B. Is solely responsible for the creation and maintenance of a safe and healthy work environment.
C. Should develop, implement, and maintain a written RMW management protocol that meets federal, state, and local requirements.
D. Act as advisor on RMW management matters to all office personnel.

4. A defective lead apron is best characterized as _____.

A. office waste
B. universal waste
C. medical waste
D. hazardous waste

5. Based on the OSHA definition, RMW generated in oral healthcare settings may include all of the following EXCEPT for one. Which one is the exception?

A. Contaminated sharps
B. Contaminated items that would release blood or OPIM in a liquid or semiliquid state if compressed and items caked with dried blood or OPIM and are capable of releasing these materials during handling
C. Liquid or semi-liquid blood and OPIM; and pathological, and microbiological waste
D. Sanitary napkins

6. All of the following are considered preventive measures to minimize occupational exposure to RMW, EXCEPT for one. Which one is the exception?

A. Engineering controls
B. Work practice controls
C. Maintaining a Sharps injury Log
D. The use of personal protective equipment

7. All of the following statements with respect to waste segregation and office waste are correct, EXCEPT for one. Which one is the exception?

A. The various waste categories generated in oral healthcare facilities (office waste, hazardous waste, universal waste, and medical waste) must be separated at their points of origin.
B. There are very specific requirements for the containment of office waste.
C. Most waste generated in oral healthcare settings is office waste.
D. The waste receptacle, lined with a plastic liner bag, should be of sufficient size and strength to accommodate the type and quantity of office waste generated.

8. All of the following statements related to medical waste are correct, EXCEPT for one. Which one is the exception?

A. Needles, scalpel blades, suture needles, endodontic files, orthodontic wires, local anesthetic cartridges, and glass slides, even if unused, must be considered RMW.
B. Unfixed oral tissues removed during surgery, biopsies, and extracted teeth are not considered RMW.
C. Generally, gauze, cotton balls or rolls, swabs, and used dressings containing small amounts of blood or OPIM are not considered RMW.
D. Generally, disposable non-absorbent materials such as gowns, gloves, drapes, bracket table covers, rubber dams, patient bibs, and face masks are not considered RMW.

9. As many as one-third of all sharps injuries occur during the disposal process as a result of all the following, EXCEPT for one. Which one is the exception?

A. Inadequate sharps disposal container design
B. Inappropriate sharps disposal container placement
C. Inappropriate sharps disposal handling practices, including overfilling of sharps disposal containers by HCP
D. Failure to regularly shake the sharps container to settle the contents

10. OSHA mandates all of the following, EXCEPT for one. Which one is the exception?

A. Sharps disposal containers be puncture resistant, the sides and the bottom be leak-proof.
B. Sharps disposal containers be labeled with the universal biohazard symbol and the word "SHARPS-HAZARD," and/or color-coded red.
C. The labels on sharps disposal containers must be fluorescent orange or orange-red, with the symbol and lettering in a contrasting color.
D. Sharps containers must be closable (i.e., they have a lip, flap, door, or other means of closing the container).

11. NIOSH recommends all of the following, EXCEPT for one. Which one is the exception?

A. The placement of a sharps container of sufficient size, i.e., one that accommodates both the volume generated and the largest sharp used, at each workstation.
B. The sharps container is readily accessible, i.e., without obstacles between the user and the container.
C. Horizontally, sharps container is located within easy arm's reach and the vertical height must be below eye level, i.e., the user must have a clear, unobstructed view of the container's opening.
D. The sharps container is placed in an isolated secure location, such as the back of the central storage space.

12. All of the following statements about the sharps disposal container are correct, EXCEPT for one. Which one is the exception?

A. Sharps containers must be kept upright throughout use to keep the sharps and any liquid from spilling out.
B. The fill status of the container must be obvious under prevailing lighting conditions at the workstation.
C. The container's opening must be identifiable and easily accessible by the user and must facilitate one-handed disposal of sharps.
D. Intact local anesthetic cartridges may not be disposed of in a sharps container.

13. All of the following statements related to the safe handling of contaminated needles are correct, EXCEPT for one. Which one is the exception?

A. Careful two-handed recapping of the local anesthetic syringe is permissible.
B. If bending or removing of a needle from the syringe is necessary, it must be accomplished with the use of a mechanical device or a one-handed technique.
C. Recapping must be accomplished by the one-handed "scoop technique," i.e., using the needle itself to pick up the cap and then pushing the cap against a hard surface.
D. Contaminated disposable needles must never be sheared or broken.

14. All of the following statements related to solid RMW are correct, EXCEPT for one. Which one is the exception?

A. OSHA requires that solid RMW be placed in containers that are closable, constructed to contain all contents, and prevent leakage of fluids during handling, storage, transport, or shipping.
B. Biohazard bags used to collect RMW within a facility must be certified by the manufacturer to meet the American Society for Testing Materials (ASTM) ASTM D1709 Impact Resistance Of Polyethylene Film By The Free-Falling Dart Method.
C. Autoclavable biohazard bags are available and some feature an indicator that changes to read "AUTOCLAVED" during steam sterilization; but RMW that has been decontaminated still needs to be labeled or color-coded.
D. It is recommended to place a larger general office waste container beside the regulated waste container.

15. All of the following statements related to liquid RMW generated by suctioning during surgical procedures are correct, EXCEPT for one. Which one is the exception?

A. Liquid RMW generated by suctioning during surgical procedures may be decanted directly into clinical sinks unless prohibited by state or local regulations.
B. In the absence of a surgical sink, liquid RMW generated by suctioning during surgical procedures may be decanted into the hand washing sink.
C. If discharge into a sanitary sewer is prohibited, liquid RMW must be placed into a rigid container, labeled or color coded red and double bagged using biohazard bags.
D. The State-by-State Regulated Medical Waste Resource Locator is good resource for the OMWM to determine available options for the disposal of liquid RMW.

16. All of the following statements about storing RMW prior to disposal are correct, EXCEPT for one. Which one is the exception?

A. The storage of RMW must be in accordance with applicable regulations of the United States, States and Territories, and political subdivisions of States and Territories.
B. RMW must be stored in a designated, conveniently located storage area such as under the sink in the treatment room.
C. In preparation for storage, sharps containers must be closed, if there is a chance of leakage, the container must be placed in a secondary container.
D. Red biohazard bags must be "twist tied," if a bag seems especially heavy, it must be placed inside another red biohazard bag prior to moving it to storage.

17. All of the following statements relative to the disposal of RMW are correct, EXCEPT for one. Which one is the exception?

A. The disposal of RMW is regulated by specific OSHA mandates.
B. Most states require that RMW be treated before disposal and most states allow on-site treatment.
C. The most common on-site treatment methods include (1) steam sterilization (autoclaving), (2) microwave sterilization, (3) chemical disinfection, and (4) sewer discharge for liquid RMW.
D. Some states require permits for any type of on-site treatment; other states leave it up to the generator to select a treatment method based on current best practices.

18. All of the following statements relative to off-site shipping of RMW for treatment and disposal are correct, EXCEPT for one. Which one is the exception?

A. In nearly all states, transporters of RMW must have a transport permit to pick up and transport the waste to a treatment and disposal facility.
B. The United States Department of Transportation (USDOT) mandates that the biohazard bags used to line approved shipping containers for transport of RMW from the generator's facility to a treatment and disposal facility be certified by the manufacturer.
C. If the biohazard bags used to collect and transport RMW within a facility meet impact resistance of 165 grams by the ASTM D1709 method, it meets USDOT requirements for shipping RMW from the generator's facility to a treatment and disposal facility.
D. OSHA requires that RMW containers be closed prior to removal from the workstation to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

19. All of the following statements related to recordkeeping, reporting, and tracking of RMW are correct, EXCEPT for one. Which one is the exception?

A. Some states require that generators maintain records of the quantity of RMW generated and its disposition; some require the submission of an annual report.
B. The OMWM should maintain an Infectious Waste Log that includes: date, type of waste, amount (weight, volume, or number of containers), and disposition.
C. If infectious waste is transported off-site, the receiving facility must provide the generator written documentation of proper treatment and disposal.
D. If cradle-to-grave documentation of RMW of disposal is required, such documentation must be retained on file for thirty years.

20. All of the following statements related to spills of infectious material are correct, EXCEPT for one. Which one is the exception?

A. There are numerous documented examples of bloodborne pathogen transmission from housekeeping services.

B. Infectious waste spills must be cleaned up immediately using appropriate PPE such as gloves, coveralls, mask, and goggles.

C. Small spills are managed by removing visible organic matter with absorbent material (e.g., disposable paper towels) discarded into a leak-proof, properly labeled containers biohazard container.

D. OSHA regulations require the use of an EPA-registered disinfectant from List B, D, or E to disinfect housekeeping surfaces after a spill.

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Additional Resources

- No Additional Resources Available.

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