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EBOLA VIRUS DISEASE WASTE MANAGEMENT IN THE MEDICAL TREATMENT FACILITY

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STANDARD OPERATING PROCEDURE

EBOLA VIRUS DISEASE WASTE MANAGEMENT IN THE MEDICAL TREATMENT FACILITY

Prepared by

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Aberdeen Proving Ground, MD 21010

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SECTION 1

INTRODUCTION

1.1 PURPOSE. To assure safe collection, removal, transport, and disposal of Ebola Virus Disease (EVD) waste from all medical treatment facilities (MTFs) generation areas in manner that is safe to personnel and the environment and in compliance with all applicable regulations.

1.2 REGULATORY BACKGROUND. The U.S. Department of Transportation (DOT) categorizes Ebola and any waste generated during care of a patient diagnosed with EVD as a Category A Infectious Substance Affecting Humans. All DOT transportation requirements for a Category A Infectious Substance specified in the Title 49 Code of Federal Regulations (CFR), Parts 171-180 for domestic transport must be followed. United States medical waste contractors are not authorized to transport this waste. Exceptions to these transportation requirements are issued by Special Permit (DOT-SP) only.

1.3 APPLICABILITY. This regulation applies to all personnel assigned, attached, or otherwise employed by the MTF and its supported clinics.

1.4 REFERENCES. **R**eferences are listed in Appendix A.

1.5 ABREVIATIONS AND TERMS. Abbreviations and terms used in this SOP are defined in Appendix B.

1.6 CONTACTS. Questions pertaining to the content of this SOP can be directed to the following:

1.6.1 U.S. Army Public Health Command (USAPHC), Army Institute of Public Health (AIPH), Environmental Health Engineering Portfolio, Waste Management Program, 410-436-3651.

1.6.2 MTF Preventive Medicine Service:

1.6.3 MTF Infection Control Officer:

1.6.4 EVD Waste Management training can be requested from the USAPHC, AIPH Waste Management Program Training Team at 410-436-3651/5228.

SECTION 2

RESPONSIBILITIES

2.1 HOSPITAL COMMANDER. Ensure that EVD waste is identified and managed according to the policies and procedures provided in this SOP, and ensure that personnel follow applicable regulations and permit specifications. Because safe management of EVD waste requires training, discipline, and familiarity with complicated procedures, minimize the number of personnel handling EVD waste. Designate trained and competent personnel to implement procedures. Appoint and certify select individuals in writing to sign EVD waste shipping papers. See section 6.5 for training requirements for signing manifests.

2.2 INFECTION CONTROL TEAM. The Infection Control team is comprised of Infection Control, Safety, Preventive Medicine, Industrial Hygiene, and other applicable subject matter experts. The Infection Control Office will lead this effort.

1. Designate and approve all Personal Protective Equipment (PPE) used for EVD waste management in the MTF.
2. Oversee exposure control processes and ensure personnel are closely monitored for exposures.
3. Develop hands-on training to provide designated personnel with practice training on: donning PPE, doffing PPE and waste collection in each applicable area (wards, clinics, EVD waste storage, cart disinfection, and so forth).
4. Designate disinfection areas for equipment, and develop hands-on training to provide applicable personnel with disinfection practice training on cart disinfection, equipment disinfection, emergency vehicle disinfection, and so forth).
5. Train personnel on the proper use (donning and doffing) of PPE, waste collection, equipment disinfection, and movement routes through the MTF.
6. Periodically, visually monitor all personnel (including night shift) on proper PPE use.
7. Develop a procedure to disinfect personal effects from EVD patients that come in on the patient.
8. Determine which personal effects will be disposed as EVD waste and which effects may be returned to the patient (see Section 3.3.7).

2.3 PREVENTIVE MEDICINE SERVICES.

1. Develop local EVD waste management policies based on local requirements as they are issued by governing authorities.

2. Submit funding requirements for EVD waste disposal to the U.S. Army Medical Command (MEDCOM) Environmental Compliance Program Office.

3. Monitor all phases of the EVD waste management including collection, storage, transportation, treatment, and disposal.

4. Provide technical advice and training to applicable personnel on this SOP (see Section 11).

5. Support Logistics with site assessments, storage capacity determinations, decontamination locations, EVD waste storage area requirements, and procurement support.

6. Review and support contract proposals and specifications pertaining to EVD waste management and EVD patient transport services.

2.4 LOGISTICS.

1. Establish a dedicated storage area for EVD waste storage that is secured and segregated from other biomedical waste.

2. Coordinate with Infection Control, Safety, Facility Management, Preventive Medicine (Industrial Hygiene and Environmental Health) and all other applicable parties to establish designated movement routes through the facility for EVD waste.

3. Notify the Preventive Medicine Environmental Science and Engineering Officer of projected funding requirements for the collection, storage, transportation, and disposal of EVD waste.

4. Arrange for and supervise the collection, storage, transportation, and disposal of EVD from all areas generating EVD waste.

5. Contact MEDCOM G44 (Mr. Bruce Mulford: 210-221-6701 or Mr. Peter Larson: 210-211-8686) and the supporting regional contracting office to issue an immediate task order for Ebola disposal support.

6. Designate personnel to manage the movement of EVD waste from the generation sites through the MTF to the EVD storage area. Check housekeeping contracts to verify existing contracts cover all medical waste management, including Category A infectious substances. If not, modify contracts or designate Civilian/military staff for this function.

7. Designate personnel to manage and control the EVD waste storage area.

8. Select personnel who are properly trained to sign shipping papers (see Section 6.5) and obtain formal appointments from the commander to sign the shipping papers.

2.5 PATIENT CARE PROVIDERS (CLINICIANS, NURSES, SUPPORT STAFF). All personnel will follow waste management segregation and management procedures specified in this SOP to ensure the waste is safely handled, decontaminated, packaged, and removed from the MTF.

1. Supervisors of isolation room/anteroom areas will select and designate personnel to conduct EVD waste segregation, collection, and disposal procedures (see Section 3) in conjunction with the Infection Control Team. Personnel will also be selected to assist and monitor removal of PPE and placement into EVD waste bags. They may be the same or different people as those designated to perform actual EVD waste collection in the isolation rooms and anterooms.

2. Clinical personnel will manage EVD waste cleanup (liquid body fluids and solid wastes) in the isolation room areas and ensure all cleanup materials are managed as EVD waste according to the procedures in this SOP.

3. Supervisors of areas where an initial patient contact and diagnosis will be made (emergency room, clinics, family practice, laboratory, and so forth) must designate personnel to don/doff PPE and manage the EVD waste generated and ensure they receive preparatory training.

2.6 HAND HYGIENE. Hand hygiene is fundamental in protecting workers from infection/disease. The MTF personnel must perform hand hygiene frequently, including before and after all patient contact, contact with potentially infectious EVD material, before putting on PPE, and after removal of PPE including gloves. Hand hygiene supplies must be readily available and all applicable areas. This should include both soap and water stations, as well as, an abundance of hand sanitizers.

SECTION 3

WASTE SEGREGATION AND COLLECTION

3.1 WASTE CLASSIFICATION.

3.1.1. Classification. Wastes generated from EVD patients are classified as a Category A Infectious Substance as EVD Waste is highly infectious. This classification is more stringently regulated than routine medical waste generated during normal patient care in the facility. Therefore, all highly infectious waste generated from EVD patient care will be classified as EVD Waste and must be kept separate from other regulated medical waste (RMW) generated in the MTF.

3.1.2. Definition. EVD waste includes urine, feces, vomit, and other body fluids; materials containing body fluids; and any items generated during patient care that are selected for disposal instead of disinfection for reuse, including PPE.

3.2 DISPOSAL OF BODY FLUIDS. Liquid wastes may be disposed of in the sanitary sewer as prescribed below.

3.2.1. Equipment and Supplies. Bleach was selected as the best choice disinfectant for waste water treatment plant purposes.

- PPE
- Clorox® Bleach – off the shelf 5% or greater sodium hypochlorite. (Clorox® is a registered trademark of The Clorox Company.)
  - Diluted bleach solutions should be prepared no more than 24 hours in advance to prevent loss of potency over time
  - A 1:10 bleach solution in a spray bottle for outer surfaces
  - A straight bleach solution in a container for use directly in the toilet
- Receptacle for waste
- Disposable commode bucket liners as necessary
- Bedside commode as necessary
- Disposable patient underpad or other absorbent covering
- Trash cans lined with red bags
- Disinfectant wipes—approved for use in EVD patient care areas

3.2.2. Fluid Dump and Flush Procedure. This procedure is for waste not collected directly into the toilet by the patient. It should be applied in any location where an EVD patient excretes liquid wastes into a collection vessel other than a fixed toilet. Auto-flush toilet valves must be disabled to ensure manual flushing only.

1. Proceed to designated area and don PPE according to hospital procedure for PPE in isolation rooms for EVD patients.
2. Cover receptacle (bed pan, collection container) with disposable patient underpad or similar covering as needed to prevent spills.
3. Remove the receptacle containing the waste from the patient area to the patient's lavatory.

4. Apply straight bleach (5%) solution around the bowl in the same manner as liquid/gel toilet bowl cleaner (i.e. apply to the inside top of the bowl and allow to run down into the bowl). Use one cup of bleach.
5. Empty waste into toilet and lower toilet lid. If toilet lacks a lid, place a barrier over it.
6. Allow 15 minutes of contact time then flush toilet.
7. After flush, apply 1:10 bleach solution with a spray bottle to other surfaces of the toilet (seat, handle, lid, inside bowl, outside of bowl, back, etc).
8. Wipe the surfaces with a disinfectant wipe to ensure complete surface contact. The purpose of the wipe is to spread the spray and can be any type of wipe available. Dispose of the used wipe as EVD waste.
9. Dispose of empty waste container and patient underpad in EVD waste container (see Section 3.3)
10. Dispose of PPE in the EVD waste container according EVD solid waste procedures in Section 3.3.

3.2.3 Patient Flush Procedure. This procedure is for waste excreted directly into the toilet by the patient. It should be applied in any location where an EVD patient excretes liquid wastes into toilet. Auto-flush toilet valves must be disabled to ensure manual flushing only.

1. Place two containers of bleach in the restroom—one to clean the bowl (straight bleach) and a spray bottle for other surfaces (1:10 solution of bleach).
2. Instruct the patient not to flush the toilet after use.
3. Before patient use, staff in appropriate PPE will apply bleach solution around the bowl in the same manner as liquid/gel toilet bowl cleaner. Use one cup of bleach.
4. Allow 15 minutes of contact time then flush toilet.
5. After flush, apply bleach solution with a spray bottle to other surfaces of the toilet (seat, handle, inside bowl, outside of bowl, back, and so forth).
6. Wipe the surfaces with a suitable disinfectant wipe to ensure complete surface contact. The purpose of the wipe is to spread the spray and can be any type of wipe available.

3.2.4 Liquid Effluent from Laboratory Equipment. Use of automated lab equipment that produces liquid effluents may be required for patient care. For treatment prior to disposal, the waste can be discharged into a container with straight bleach pre-added to the container. Allow 15 minutes contact time and pour down the drain. All personnel who are managing the collection and discharging of the bleached waste must have appropriate PPE as directed by Infection Control.

3.2.5 Patient Shower.

1. Just prior to patient entering the shower, apply to shower floor drain three tablespoons of granular calcium hypochlorite (65%–70% available chlorine). This is a widely available (and cheap) swimming pool water treatment chemical. It should be stored in an air tight container to avoid contamination by moisture. This amount shouldn't clog the drain or cause a big pile of granules in the shower to trip over but will stay in the drain until the shower water starts, whereas liquid bleach would quickly flow down the drain.

2. Immediately after the shower, apply to shower floor drain one cup bleach (5% sodium hypochlorite).

3. After shower, apply 1:10 bleach solution with a spray bottle to shower surfaces, wipe with bleach wipe to ensure contact with all areas of surface, and allow to air dry.

3.3 COLLECTION OF SOLID EVD WASTE. Contract removal is the primary choice for EVD waste disposal. Consequently, many of these collection and segregation steps incorporate guidance issued by the DOT and Stericycle® for transport and disposal of EVD Waste under special permit requirements. Failure to meet the requirements could prohibit contracted waste disposal from the MTF. (Stericycle® is a registered trademark of Stericycle, Inc.)

3.3.1 General.

3.3.1.1 Red Bags. All red bags used to collect EVD waste will be leak-proof, puncture resistant, red plastic bag lined receptacles. Title 49 CFR Section 173.197(e)(1)(i) requires that bags used for transport be marked and certified by the manufacturer to meet the 165 g Impact Strength ASTM® D 1709-01 and 480 g Tear Strength ASTM D 1922-00a standards. (ASTM® is a registered trademark of the American Society for Testing and Materials.)

3.3.1.2 Disinfectant. Spray bleach or an U.S. Environmental Protection Agency (EPA) registered, hospital approved disinfectant (for use on viruses such as norovirus or rotavirus as recommended by the U.S. Centers for Disease Control and Prevention (CDC)) will be used on red bags.

3.3.1.3 Removal from Room. Designated personnel (clinical care providers) will remove waste from the patient's room at least every three hours or when the biohazard waste container is 2/3 full, whichever comes first. Sharps containers must be changed out when they are 2/3 full or when the manufacturer's indicated "full line" is reached, whichever comes first.

3.3.1.4 PPE. Selection and use of PPE in all areas will comply with hospital infection control standards for EVD treatment. All personnel handling wastes and/or monitoring waste management will wear approved PPE specified by the Infection Control Team.

3.3.1.5 Segregation. Manage waste collected from EVD patients and suspected EVD patients separately from all other patient care wastes.

3.3.1.6 Handling. Only pickup bags by the neck and never throw or compress the bags. Do not carry a bag over the shoulder where it could drip and create an exposure. Carry the bag by the neck of the bag and away from your own body. Do not drag a bag on the floor.

3.3.2 Isolation Room Waste. All solid waste generated in the isolation room will be disposed as EVD waste using the following steps:

1. Line trash receptacles with approved red bags
2. Place all waste in either red bags or sharps containers, as appropriate.
3. Fill red bags to 2/3 capacity.
4. Do not compact bags.
5. Sharps containers must be placed in approved red bags when changed out for disposal.
6. Prior to removal from the room, spray bleach or EPA-registered, hospital approved disinfectant (for use on viruses such as norovirus or rotavirus as recommended by the CDC) into the primary red bag to sufficiently cover the surface of materials

contained in the bag. If a sharps container is in the red bag, sufficiently cover the exterior of the sharps container.

7. Balloon tie, or tape, or zip tie (required by the DOT Special Permit) the red bags to prevent the release of any material from the bag if inverted (goose-necking with tape or zip ties is permitted). The closure method must not tear, puncture or otherwise damage the bags.
8. While holding the red bag over the container it was in, treat the exterior of the primary bag with approved bleach/disinfectant. If it was not in a container or is too heavy, place an absorbent pad down to capture drips from the sprayed bag, place the bag on the pad and spray. Dispose of the absorbent pad as EVD waste.
9. Move primary red bag to anteroom.

3.3.3 Anteroom Waste. An anteroom is considered a room specifically designated for entrance and exit from the patient isolation room where staff members can don and remove PPE. The latest CDC guidance recommends that separate rooms be used for donning and removing PPE. Therefore, collection of the PPE waste will be conducted in the area designated for PPE only.

3.3.3.1 Dedicated Collection Cart. An enclosed, leakproof cart as defined in Section 4 must be prepositioned to collect secondary red bags from the Anteroom.

3.3.3.2 Primary Red Bags From Isolation. Tied, primary red bags removed from the isolation room will be brought to the anteroom for secondary red-bagging only after they are sprayed with disinfectant using the following steps:

1. Line a large trash can with an approved red bag. This bag will become the secondary red bag.
2. Place primary bag into secondary bag and balloon tie, or tape, or zip tie (required by the DOT Special Permit) the red bags to prevent the release of any material from the bag if inverted (goose-necking with tape or zip ties is permitted). The closure method must not tear, puncture or otherwise damage the bags.
3. Remove the bag from the trash container and while holding the bag over the trash container, treat the exterior of the secondary bag with an approved disinfectant/bleach. Allow the disinfectant to air dry. If necessary, set the red bag on an absorbent pad to capture drips off the bag—do not spray more disinfectant than necessary to lightly mist the bag. Dispose of the absorbent pad as EVD waste.
4. Mark the secondary red bag with the words “EVD Waste” using a label, printed paper, etc.
5. Place the disinfected secondary red bag into the collection cart. The bag may now be moved through the MTF to the storage area.

3.3.3.3 Collection of PPE and other waste generated in the Anteroom—Complete double-bagging procedure. Waste generated in the anteroom must also undergo a double red bag procedure. Multiple bags of waste will be generated each time the staff changes PPE so prepare to manage more than one red bag using the following steps:

1. Designate a person(s) to assist with collection of PPE as it is removed from staff members.
2. Line a large trash can with an approved red bag. This bag is the primary red bag.

3. Place all PPE and other EVD wastes generated in the anteroom in the primary red bag. If a sharps container is used in the anteroom, place it in the red bag when removed for disposal.
4. Spray bleach or EPA-registered, hospital approved disinfectant (for use on viruses such as norovirus or rotavirus as recommended by the CDC) into the primary red bag to sufficiently cover the surface of materials contained in the bag. If a sharps container is in the red bag, sufficiently cover the exterior of the sharps container.
5. Balloon tie, or tape, or zip tie (required by the DOT-SP) the red bags to prevent the release of any material from the bag if inverted (goose-necking with tape or zip ties is permitted). The closure method must not tear, puncture or otherwise damage the bags.
6. Remove the primary bag from the trash container and while holding the bag over the trash container, treat the exterior of the primary bag with an approved disinfectant/ bleach.
7. Reline the large trash can with an approved red bag. This bag is the secondary red bag.
8. Place primary red bag into secondary red bag
9. Balloon tie the secondary red bag closed to prevent the release of material from the bag when inverted
10. Remove the secondary bag from the trash container and while holding the bag over the trash container, treat the exterior of the secondary bag with an approved disinfectant/bleach. Allow the disinfectant to air dry. If necessary, set the red bag on an absorbent pad to capture drips off the bag—do not spray more disinfectant than necessary to lightly mist the bag. Dispose of the absorbent pad as EVD waste.
11. Mark the secondary red bag with the words “EVD Waste” using a label, printed paper, permanent marker, and so forth.
12. Place the disinfected secondary red bag into the collection cart. The bag may now be moved through the MTF to the storage area.

3.3.4 Laboratory Waste. Laboratory specimens waste (blood tubes, sharps, urine cups) from EVD patients must be collected separately in dedicated red bags or sharps containers from all other RMW.

3.3.4.1 Label the sharps container or red bag with the words “EVD Waste”.

3.3.4.2 Ensure no other routine lab specimen wastes are placed in the EVD waste container.

3.3.4.3 When it is time to remove the waste from the lab, the waste must undergo the same double red bagging procedure specified in 3.3.3.3 (Collection of PPE and other Waste Generated in the Anteroom) and then be moved to a dedicated EVD waste storage area.

3.3.5 Initial Diagnostic Care Waste (Emergency Room, Family Practice, Clinics).

3.3.5.1 If the patient is first treated in a routine patient care area, establish a separate collection container and segregate all wastes into that container as soon as EVD is suspected.

3.3.5.2 If a non-EVD diagnosis is received, all collected wastes will be reclassified as RMW.

3.3.5.3 If a positive diagnosis is received, when it is time to remove the EVD waste from the treatment area, the waste must undergo the same double red bagging procedure specified in 3.3.3.3

(Collection of PPE and other Waste Generated in the Anteroom) and then be moved to a dedicated EVD waste storage area.

3.3.5.4 See Section 4 for EVD waste transportation to the MTF storage area.

3.3.6 Filters from Dedicated Ventilation Systems/Isolation Rooms. Isolation areas typically have specially designed, negative pressure ventilation units with filters.

3.3.6.1 Filters from the supplied air side will be disposed of as solid waste because they only filter outside air prior to the patient care area.

3.3.6.2 Filters from the exhaust air side or from portable filtration units (if they have them) will be disposed of as EVD Waste. The filters must undergo the double red bagging procedure in 3.3.3.3 (Collection of PPE and other Waste Generated in the Anteroom) and then be moved to a dedicated EVD waste storage area. Special handling may be required based on the size of the filters:

1. The filter size must be evaluated to see if it will fit into the outer 55-gallon shipping drum without modifying it in any way. If it does, double red bag per Section 3.3.3.3 and manage according to Sections 4, and 5. The best way to evaluate this would be to use a clean filter to test it.

2. If the filter size is too large to fit in the DOT approved drum, manage according to the large item packaging specifications in Section 6.

3.3.7 Personal Effects from EVD Patients.

3.3.7.1 Background. Patients who are admitted to the hospital are given a plastic bag for their personal items such as wallet, purse, clothing, and so forth. These items are then secured until the patient has been released to return home. When Ebola is suspected, the personal effects bag should be quarantined.

3.3.7.2 Decision to Disinfect or Dispose. The Infection Control Team will decide what personal effects will be disinfected and returned to the patient and what will be treated and disposed as EVD waste. Money, passports and many important documents can be autoclaved safely at 272 °Fahrenheit for 10 minutes. Plastic identifications (IDs) and other non-porous items can be bleach-dunked. Electronics (phones and cameras) require additional special disposal techniques and may not survive disinfection.

3.3.7.3 Items Selected for Disposal. All untreated items selected for disposal will be managed with the EVD waste generated during the patient's care according to Sections 3.3 and 3.3.5.

3.3.7.4 Items Selected for Disinfection. The AIPH has published a Technical Information Paper, (Handling Personal Effects from Ebola Infected Patient) that addresses disinfection of personal effects. It is posted on the PHC Ebola website for your reference at:
http://phc.amedd.army.mil/topics/discond/diseases/Pages/EbolaVirusDisease.aspx

SECTION 4

MOVEMENT THROUGH THE MTF

4.1 EVD WASTE COLLECTION CART.

4.1.1 Dedicated Use. A cart(s) will be dedicated strictly to the movement of EVD waste throughout the facility. Do not put RMW bags or any other type of waste into the cart. Label the cart with "EVD Waste".

4.1.2. Cart Specifications. The cart(s) used to transport EVD waste will be constructed of non-porous, readily cleanable material; plastic; or stainless steel. The cart will be equipped with a lid. The lid will be kept closed when transporting EVD waste through the MTF. If the EVD waste is in a small clinic, a trash can with a lid may be utilized as the transport cart. The cart will be sized to allow easy loading, unloading, and cleaning. A spill kit for EVD waste will be attached to the cart.

4.1.3 Disinfection.

4.1.3.1 The cart will be disinfected with bleach or an EPA-registered, hospital approved disinfectant (for use on viruses such as norovirus or rotavirus as recommended by the CDC). The cart will be thoroughly disinfected using spray or wipe methods on the outside and inside of the cart. Wipe down the entire cart, paying special attention to all surfaces in touch with the EVD waste bags and contact surfaces touched to move the cart. Allow the cart interior to air dry before closing the lid. Disinfection will be done each time waste is removed and placed into the EVD storage area.

4.1.3.2 Disinfection will be conducted in an area specified by logistics and approved by the Infection Control Team. The area will be secured to prevent access by unauthorized personnel and will not be utilized for storage of materials except those necessary for disinfection of the EVD waste cart. An emergency eyewash device must be located in the cart cleaning area; the device must be functional and maintained according to American National Standards Institute (ANSI) Z358.1-2009, American National Standard for Emergency Eyewash and Shower Equipment, and Department of the Army Pamphlet (DA Pam) 40-506 (The Army Vision Conservation and Readiness Program).

4.1.3.3 Personnel who clean the cart and/or transport EVD waste in the cart must wear PPE. Selection, use, and donning/doffing locations for PPE will adhere to hospital infection control standards for EVD as specified by the Infection Control Team.

4.1.3.4 Spills will be cleaned immediately (see Section 10) with bleach or an EPA-registered, hospital approved disinfectant (for use on viruses such as norovirus or rotavirus as recommended by the CDC) and Infection Control will be provided with the location of the spill. Additional disinfection may be performed if directed by infection control depending on the spill location. Spill cleanup materials will be managed as EVD waste according to Sections 3, 4, and 10.

4.1.3.5 Cart disinfection waste will be managed as EVD waste. The disinfection area should be equipped with the supplies and equipment necessary to perform the double red-bagging procedure in Section 3.3.3.3. An outer packaging barrel may be positioned in the disinfection room to completely seal the disinfection wastes. Once the disinfection wastes are completely sealed in the barrel, it may be transported to the EVD waste storage area using a drum handler. Do not move the barrel to the storage

area without performing the notification step (
sSee 4.2.2) and donning proper PPE to enter the EVD waste storage area.

4.2 APPROVED MOVEMENT

4.2.1 Designated Routes. Movement routes will be designated from isolation units, laboratories, and applicable initial patient care areas to the EVD waste storage area. High traffic areas should be avoided. Freight elevators will be used if possible. Only move EVD waste through the facility using designated routes.

4.2.2 Notification. Personnel transporting the cart must notify Chief, Environmental Services, or Environmental Services supervisor on duty, (list phone # here) of impending transport of EVD waste to the storage area to arrange for access to the storage area.

4.2.3 PPE. Appropriate PPE (determined by Infection Control) must be worn to handle EVD waste and transport EVD waste to the storage and cart cleaning areas.

4.2.4 Preparations to Move into Patient Care Areas. Put on PPE. If the cart is stored in the disinfection area or a separate clean area and it has already been disinfected, it may be taken into the MTF without additional disinfection. If the cart is stored in the EVD waste storage area, wipe the outside of the cart with approved disinfectant wipes prior to moving the cart into the MTF for waste pickup, paying special attention to all contact surfaces touched to move the cart.

4.2.5 Handling the Red Bags. Carefully place bags into the cart. Only pickup bags by the neck and never throw or compress the bags. Do not pickup a bag unless it has been double bagged at the generation site and marked to indicate it is EVD waste.

4.2.6 Lid. Close the lid on the cart prior to moving from the generation site. Do not overfill the cart with EVD waste to the point where the lid will not close. The cart lid will be kept closed at all times (except when adding/removing waste, undergoing disinfection, or when air drying after disinfection). The lid should be able to close without compressing the waste.

4.2.7 Movement from Patient Care Area. Wipe the outside of the cart with approved disinfectant wipes prior to moving the cart from the patient care area to the storage area. Place the disinfectant wipes in a red bag and hand the red bag to an assisting person (wearing proper PPE) in the anteroom for placement into the anteroom EVD waste bag. During movement, public areas will be closed by security until cart movement is complete and floors are wiped with a disinfectant mop. Transport the EVD waste in the cart directly from the patient care area to the storage area and unload. Once unloaded, move the cart to the designated disinfection area and disinfect according to 4.1.3.

4.3 CART STORAGE. If possible, store the clean cart in a clean; secure area until it is removed for EVD waste transport within the MTF. If storage in a clean area is not possible, store the cart in the EVD waste storage area. If the cart is not stored in a clean area, it must be disinfected prior to use in the MTF.

SECTION 5

EVD WASTE STORAGE AREA

5.1 STORAGE AREA REQUIREMENTS.

5.1.1 Dedicated EVD Waste Storage Area. EVD waste must be kept in separate, secure storage from all other MTFs wastes, including the routine RMW waste storage area.

5.1.2 Location. Identify a location on or near the Logistics loading dock. The location must provide security and access control. Temporary storage options are discussed below since EVD waste is not expected to become a routine MTF waste stream and the storage requirement will cease when EVD patients are no longer expected at the MTF. The location must be free from pests (insects and rodents) and protected from inclement weather.

5.1.3 Security. The EVD waste storage area must be secured at all times except when authorized personnel are accessing the area to place waste inside and/or retrieve the EVD waste cart.

5.1.4 Hazard Indicators. Mark the entrance of the EVD waste storage area with the words "Isolation Waste Storage Area—EVD Waste" and the universal biohazard symbol. Marking can be on a formal sign, stenciled paint, and so forth but must be visible upon approach at minimum distance of 15 feet. Other information may be added at the discretion of the MTF or as required by other applicable regulatory requirements.

5.1.5 Conditions. The EVD waste storage area will be maintained in a clean, putrid-free state. If spills occur in the storage area, they will be disinfected with bleach or an EPA-registered, hospital approved disinfectant (for use on viruses such as norovirus or rotavirus as recommended by the CDC) and Infection Control.

5.1.6 Storage Time. The MTF may not be able to control storage time depending on regulatory approval of a special transportation permit. If waste is expected to be stored longer than 1 week, utilize an area inside a building with air conditioning or a refrigerated storage connex (if outside).

5.1.7 Estimated Storage Size. A connex measuring 20 ft x 8.5 ft x 8 ft is 1360 cubic feet (cf). Ebola waste generation rates will vary with the severity of the patient illness (more waste is generated as the patient becomes more critical). Emory University generated approximately 40 bags of Ebola waste daily for two patients. Assuming the waste bags were 35-gallon bags, it is estimated that a critically severe patient generates 20 bags a day (94 cf/day). The Nebraska Medical Center reported three to four 20-gallon biohazard boxes (36" x 18" x 18") a day (6.75 cf/day) were generated for one Ebola infected patient.

Emory University's generation rates were used as the maximum. The University of Nebraska Medical Center's generation rate was used as the minimum.

	Minimum patient/day	***Maximum patient/day***
Generation	80 gallons / 6.75 cu ft / 0.25 cu yd	700 gallons / 94 cu ft /3.5 cu yd
CONNEX (1360 cu ft) storage	201 patient/day storage	14 patient/day storage

A 1,360 cf CONNEX could store approximately 14 patient/days of Ebola infectious waste. Add 10–15% to the waste/patient/day generation to allow for waste generated incidental to decontamination or transport.

5.2 TEMPORARY OPTIONS. Temporary storage area options include:

1. Renting a refrigerated tractor trailer and parking it on the Logistics loading dock (can rent from Stericycle).

2. Obtaining a milvan or shipping CONNEX of appropriate size and locating on the Logistics loading dock.

3. Designating space inside logistics in a dedicate area not utilized for material storage.

[Note: Temporary storage trailers/containers can be decontaminated once no longer needed according to the guidance provided in the AIPH Technical Information Paper (Decontamination of Equipment Used in the Area of Operations (AO) Impacted by Ebola Virus Disease (EVD)) that addresses decontamination of equipment used in areas impacted by EVD. Though the paper is titled for deployment areas, it provides detailed guidance for equipment decontamination which can readily be used for a MILVAN/Connex. It is posted on the USAPHC Ebola website for your reference at: http://phc.amedd.army.mil/topics/discond/diseases/Pages/EbolaVirusDisease.aspx.]

5.3 OUTER SHIPPING BARRELS. If contract removal is conducted under special permit (see Section 6) special 55-gallon drums must be used to pack the red-bags in for transport. Supplies of drums will be required to keep up with EVD waste generation rates. These drums should be stored in or adjacent to the EVD Storage area because the process of placing the red bags in the drums will be done in the EVD storage area.

SECTION 6

CONTRACT REMOVAL UNDER SPECIAL DOT PERMIT

6.1 BACKGROUND. EVD waste is regulated more stringently than routine RMW. .

The DOT categorizes Ebola and any waste generated during patient care as a Category A Infectious Substance Affecting Humans. All DOT transportation requirements for a Category A Infectious Substance specified in the Title 49 CFR Parts 171-180 for domestic transport must be followed. The U.S. medical waste contractors are not authorized to transport this waste. Exceptions to these transportation requirements are issued by Special Permit (DOT-SP) only. Two emergency special permits (DOT-SP 16266, expiration date 30 Nov 2014 and DOT-SP 16278, expiration date 30 Nov 2014) were issued to Stericycle, Inc., specifying transport provisions for Ebola highly infectious waste in Texas. On 17 October 2014, a third special permit (DOT-SP 16279, expiration date 31 March 2015) was issued to Stericycle for use in all States as directed by State and local authorities, after notifying the Pipeline and Hazardous Materials Safety Administration (PHMSA).

The best course of action identified for MEDCOM MTFs is to seek contract modification of the existing MEDCOM-wide Stericycle contract through their Contracting Officer Representative and higher headquarters. Modification of the current contract with Stericycle includes requesting Stericycle seek to pick up the waste according to SP 16279 (or other applicable DOT special permits) and to allow all applicable DOD medical facilities with EVD waste to utilize Stericycle for disposal.

6.2 DOT-SP 16279 PACKAGING REQUIREMENTS. The DOT-SP requires transportation with conditions that special packaging procedures be utilized to meet Category A Infectious Substances Affecting Humans transportation regulations. These packaging requirements include use of 55-gallon drums and alternate sized packages for items that will not fit into a drum, such as mattresses, that required special packaging permission from the PHMSA. The drums approved under DOT-SP 16279 are the outer packaging step of a triple packaging requirement. The primary and secondary steps were addressed in Section 3. The outer drum packaging is addressed in Section 6.3. Large item packaging is addressed in Section 6.5.

Stericycle will provide the drums upon request through the MTF Stericycle representative. When a positive EVD patient is identified, contact Stericycle and request overnight delivery of a sufficient number of Category A “Green Drums” and drum labels. If Stericycle is unable to provide the drums, the MTF may attempt to request purchase of the drums through the installation Department of Public Workssupplier as long as the drums meet these specifications as extracted from DOT-SP 16279:

1. A rigid United Nations (UN) Standard or DOT-Approved non-bulk packaging with a maximum capacity of 55 gallons. The packaging must be tested and certified at a minimum to the PG-II level for solids or liquids. The packaging must be certified to maximum gross mass greater than or equal to the mass of the packaged waste;

2. If the outer packaging is fabricated from corrugated fiberboard, it must be a minimum of triple-wall corrugated fiberboard and contain a polyethylene liner with a minimum thickness of 6 mils (0.006 inch). The liner must be sealed and securely closed according to the manufacturer’s instructions to prevent the release of any material from the bag if inverted. Fiberboard outer packagings may not be reused under the terms of the DOT-SP.

6.3 PACKAGING STEPS FOR STERICYCLE TRANSPORT.

6.3.1 55-Gallon Drums. Once the EVD waste is delivered to the EVD storage area, complete the following packaging steps to prepare the waste for approved Stericycle pickup:

1. Line the drum with the 6-mil liner if not already lined.
2. Place absorbent spill pad or absorbent material inside the 6-mil drum liner.
3. Place the double-bagged red bags into the lined drum.
4. Securely tie the liner, and close the container per the packaging instructions provided with the drum.
5. Affix the special Category A DOT Waste labels provided by Stericycle.
6. Keep the drums secured in the dedicated EVD waste storage area until Stericycle picks up the waste.

6.3.2 Large Articles. The packaging system for large articles is required for all Category A Ebola-contaminated wastes that are not capable of being packaged according to the 55-gallon drum packaging requirements due to sizes that will not fit into the 55-gallon packaging. Category A Ebola contaminated waste will only be packaged according to this packaging scenario if it can be documented that packaging in a 55-gallon drum is not possible. The PHMSA must be notified if this packaging method is to be used. If you have a large article, contact Stericycle to request special packaging for the item.

1. Disinfect the entire surface of the article with an EPA–registered hospital disinfectant with a label claim for a non-enveloped virus (i.e., norovirus, rotavirus, adenovirus, poliovirus) that is recommended by the CDC for use as a disinfectant for the Ebola virus.

2. Double bag the article in inner bags meeting the requirements for Category A shipment in 55-gallon drums for inner bags (see Section 3.3.1.1) and fill and seal the bags according to the requirements of Section 3.3.3.3. If bags are not an option, enclose the item in two layers of plastic sheeting that is marked and certified as passing the tests prescribed for the inner red bags (see Section 3.3.1.1) and follow steps 3-7 below.

3. The large article must be sealed inside the first sheet with the opening (ends) twisted closed. All seems must be sealed with at least two wraps of duct tape. All other openings must be sealed with at least two wraps of duct tape or 2 ZIP-TIEs® to insure closure of the wrap. Disinfect the outer surface of the wrapped article with a U.S. EPA – registered hospital disinfectant with a label claim for a non-enveloped virus (e.e., norovirus, rotavirus, adenovirus, poliovirus) that is recommended by the CDC for use as a disinfectant for the Ebola virus. (ZIP-TIE® is a registered trademark of ZIPTEL, LLC.)

4. Repeat step three with the second sheet of plastic.

5. If practical, package the wrapped article in a 95-gallon, UN1H2-salvage drum certified at a minimum PG II performance level. After it is filled, seal and securely close the drum. After closing, apply tape to the drum to secure the lid and prevent tampering.

6. If the item is too large to package in a 95-gallon salvage drum, seal the wrapped article in a 6-mil polyethylene sheet and completely enclose the item. Securely seal all seams with tape so material cannot escape; disinfect the outer surface of the sheet with an

EPA–registered hospital disinfectant with a label claim for a non-enveloped virus (i.e., norovirus, rotavirus, adenovirus, poliovirus) that is recommended by the CDC for use as a disinfectant for the Ebola virus.

7. Repeat step 6 with a second sheet.

6.4 DOT SHIPPING DESCRIPTION. The hazardous material shipping description for shipment of EVD Waste is—

UN2814, Infectious substances, affecting humans (Ebola Waste), 6.2

The number and types of packages as well as the total quantity of the material being shipped must also be added to the shipping description according to Title 49 CFR Part 172.203.

This shipping description must be used on all EVD shipping papers.

6.5 TRAINING REQUIREMENTS FOR SIGNING MANIFESTS. Only personnel who have successfully completed the DOD-approved USAPHC Transport of Biomedical Materials Course (or 80-hour Defense Hazardous Material Packaging for Transport Course) and have been appointed in writing by their commander to sign manifests for EVD waste, may do so. The USAPHC Medical Waste Transport course does not meet the requirements for signing these manifests.

SECTION 7

ONSITE TREATMENT FOR ROUTINE CONTRACT REMOVAL

7.1 BACKGROUND. Stericycle is the RMW transporter and treatment contractor for all Army MTFs. Both Emory University and the University of Nebraska Medical Center also contract with Stericycle, and experienced push-back from the company regarding removal and disposal of EVD waste during their EVD patient care experiences. Stericycle and other such vendors could not transport untreated EVD waste. Consequently, the universities used on-site autoclaves to downgrade the EVD waste classification from Category A infectious substance to routine RMW. Once treated, the downgraded classification allowed Stericycle to remove the waste and transport it for final disposal.

7.2 AUTOCLAVE TREATMENT FOR ROUTINE RMW TRANSPORT. This is a course of action available to an MTF if the preferred contract removal with DOT-SP option cannot be obtained. Autoclave treatment is also an approved treatment technique at locations with currently installed RMW autoclaves and shredders.

7.3 AUTOCLAVE CONSIDERATIONS.

7.3.1 Site Considerations. Medical waste autoclaves require water, electricity, and space. The following considerations must be made before siting an autoclave (permanent or mobile). Do not use portable autoclaves with external reservoirs because reservoir contamination during gravity charging is theoretically possible.

- Additional equipment purchases such as carts, ramps, PPE
- Training needs for operators
- Who will operate the autoclave (check housekeeping contracts)
- Electricity
- Water requirements and water drainage
- Water treatment if necessary
- State or local water discharge requirements
- Steam supply
- Transportation route of infectious waste to autoclave
- Security and access control
- Back-up generator
- Treatment capacity

7.3.2 Estimating Treatment Capacity. Medical waste autoclaves vary in capacity from 7.5 to 20 cf. Emory University generated approximately 40 bags of Ebola waste daily for two patients. Assuming the waste bags were 35-gallon bags, it is estimated that a critically severe patient generates 20 bags a day (94 cf/day). The University of Nebraska Medical Center reported that three to four 20-gallon biohazard boxes (36” x 18” x 18”) a day (6.75 cf/day) were generated for one Ebola-infected patient. Emory University’s generation rates were used as the maximum. The University of Nebraska Medical Center’s generation rate was used as the minimum to estimate required autoclave treatment capacity.

	Minimum patient/day	***Maximum patient/day***
Generation	80 gallons / 6.75 cu ft / 0.25 cu yd	700 gallons / 94 cu ft /3.5 cu yd
7.5 cu yd autoclave	28 patient/day per load	2 patient/day per load
20 cu yd autoclave	80 patient/day per load	4-5 patient/day per load

7.4 AUTOCLAVE WASTE MANAGEMENT.

7.4.1. Autoclavable Waste. Autoclavable waste includes all EVD waste appropriately bagged for medical waste treatment. Check with the autoclave manufacturer if autoclave bags must be open for complete disinfection, and adjust this procedure as necessary. Monitor the full red bag sizes to ensure the bags can fit into the autoclave.

7.4.2 Equipment.

7.4.2.1 PPE. Selection and use of PPE while handling EVD waste for autoclaving will comply with hospital infection control standards for EVD treatment as specified by the Infection Control Team.

7.4.2.2 Red Bags. All red bags used to collect EVD waste must be leak-proof and puncture-resistant and meet ASTM D 1709-01 and ASTM D 1922-00a standards.

7.4.2.3 Autoclave Test Strips. Used to indicate the autoclave process effectively treated the waste and for daily quality assurance of autoclave function.

7.4.2.4 Autoclave Bags. Required for use in some autoclaves as the outer packaging.

7.4.2.5 Autoclave Tape. Required to seal red bags and autoclave bags prior to treatment.

7.4.2.6 Isolation Waste Labels. Self-adhesive labels with the words “Isolation Waste” on them to indicate the EVD hazard.

7.4.2.7 EVD Collection Cart. An enclosed, leakproof cart defined in Section 4, must be utilized to move EVD waste from the storage area to the autoclave. See section 4 for cart procedures.

7.4.3 Collection of Solid EVD Waste. Collection and segregation procedures specified in Sections 3, 4, and 5 will be followed for all autoclave waste. All sharps containers will have been double red-bagged according to the procedure in Section 3; therefore, only red bags will be referred to in this section.

7.4.4 Autoclave Waste Management Steps. Autoclave specific procedures will be conducted once the EVD waste is placed in the designated EVD waste storage area. All EVD waste will be removed from the storage area and autoclaved using the following steps:

1. Proceed to the EVD waste storage area and don PPE according to hospital procedures.
2. Bring the EVD waste collection cart to the EVD storage area.
3. Seal the red bags with autoclave tape. If required, place red bags in autoclave bags and then tape loosely with autoclave tape.
4. Complete the Isolation Waste label by writing the treatment date on it and affix to the outside of each bag
5. Carefully place the taped bags into the EVD waste cart. Only pick up bags by the neck and never throw or compress the bags. Do not pick up a bag unless it has been double–bagged at the generation site and marked to indicate that it is EVD waste.
6. Close the lid on the cart prior to moving from the EVD waste storage area to the autoclave site.
7. Wipe the outside of the cart with approved disinfectant wipes prior to moving the cart from the EVD waste storage area to the autoclave treatment area.
8. Secure the EVD waste storage area.
9. Notify the Chief, Environmental Services, or Environmental Services supervisor on duty, (list phone # here) of the impending transport of EVD waste to the autoclave site.
10. Transport the EVD waste directly from the EVD storage area to the autoclave treatment area using a predetermined, approved route.
11. At the autoclave, carefully place the bags into the autoclave. Do not overload autoclave. Only pick up the bags by the neck, and never throw or compress the bags.
12. Once unloaded, move the cart to the designated disinfection area and disinfect according to 4.1.3. Do not use the EVD waste cart for autoclave-treated waste even after cart disinfection. Use a separate cart.
13. At end of the autoclave process, ensure that autoclave pressure, temperature, and time were achieved and that indicators and autoclave tape color change confirm disinfection. Place treated waste bags into a clean cart, and move them to the RMW storage area for regular RMW waste transport. If autoclave is the normal MTF treatment method, move the bags to the established waste disposal container for routine disposal after treatment.
14. Once unloaded at the RMW storage area, move the cart to the designated disinfection area and disinfect according to 4.1.3.
15. If the bags still have visible EVD Waste markings on them after autoclaving and they are going out for contract RMW treatment, add a new marking/label that states “Autoclaved waste for RMW treatment”.

SOP No: _____
Effective Date:_____

SECTION 8

TRANSPORTATION ON INSTALLATION FROM CLINICS TO MTF

8.1 BACKGROUND. Patients who are ill may seek initial care in their supported clinics instead of reporting directly to the hospital. Clinics with isolation areas will hold the patients in the isolation room while a rapid EVD identification test is performed. If a positive EVD result is received, all patient waste in the room will be managed as EVD waste according to Section 3.3.3.3 (complete double bagging procedure). The waste will then require transportation from the clinic to the hospital to be placed in the EVD storage area.

8.2 TRANSPORT OF EVD WITH PATIENT. Transport of the EVD patient will be conducted in a dedicated vehicle according to patient transport protocols. If there is room in the vehicle, transport the EVD waste in the patient care area to the hospital with the patient.

1. The PPE required to treat an EVD patient will be sufficient to move bags of EVD waste that were managed according to the procedures in Section 3.3.3.3. Personnel will don appropriate PPE. The patient must don a protective surgical mask and impervious outer protective wear over personal clothing prior to movement from the EVD isolation area.

2. Personnel transporting the patient must notify Chief, Environmental Services, or Environmental Services supervisor on duty, (list phone # here) of impending transport of EVD waste to the storage area to arrange for access to the storage area.

3. Move the waste to the patient-transport vehicle using the same route through the clinic that was used to move the patient.

4. Place the waste in the patient care area, out of the way of patient care personnel. Secure the waste in a manner that the waste will not roll or slide around during transport a trash can or other type of nonporous container may be used if it will fit in the vehicle.

5. After the patient has been removed from the vehicle into the hospital, maintain PPE and transport the waste directly to the EVD Storage area. Once someone from Logistics arrives to unlock the EVD Storage area, place the EVD waste into the EVD storage area.

6. Proceed to the area designated to decontaminate the vehicle and personnel. Once in that designated area, decontaminate the vehicle and remove PPE according to established procedures for PPE removal and vehicle decontamination (see Section 12).

8.3 TRANSPORT OF EVD IN DEDICATED WASTE TRANSPORT VEHICLE. If transport of the waste is required after patient transport, secure the EVD in the isolation room and coordinate waste pickup in a dedicated transport vehicle.

1. Do not transport EVD waste in a vehicle that is transporting supplies for patient care or any other type of waste. Dedicate the vehicle strictly for the transport of EVD from the clinic direct to the EVD storage area at the hospital.

2. Select a government vehicle that can be readily decontaminated (preferably a truck or van with no porous materials such as carpeting). If porous materials are present, cover them with industrial plastic sheeting and secure the plastic with tape to prevent contact of the waste with any porous materials.

3. Personnel transporting the waste must notify Chief, Environmental Services, or Environmental Services supervisor on duty, (list phone # here) of impending transport of EVD waste to the storage area to arrange for access to the storage area.

4. Ensure that personnel are trained and provided with appropriate PPE. Wear appropriate PPE at all times when handling EVD waste and during vehicle decontamination.

5. Move the waste to the transport vehicle using the same route through the clinic that was used to move the patient.

6. Place the waste in the vehicle and secure in a manner that the waste will not roll or slide around during transport—a trash can or other type of nonporous container may be used if it will fit in the vehicle. If preferred, the outer packaging barrels (see Section 6) may be used if all packaging instructions in 3.3.3.3 and Section 6 have been followed.

7. Transport the waste directly from the clinic to the EVD storage area at the hospital. Once someone from Logistics arrives to unlock the EVD Storage area, place the EVD waste into the EVD storage area. Keep all PPE on.

8. Proceed to the area designated to decontaminate the vehicle and personnel. Once in that designated area, decontaminate the vehicle and remove PPE according to established procedures for PPE removal and vehicle decontamination (see Section 12).

SECTION 9

MORTUARY AFFAIRS AND AUTOPSY WASTES

9.1 EVD WASTE GENERATION FROM HANDLING HUMAN REMAINS. The Ebola virus can spread postmortem through direct handling of human remains. Keep movement and handling of persons who died of EVD to a minimum. Strict adherence to infection-control procedures is a necessity.

9.1.1 PPE. Use of full PPE is required when handling EVD human remains. Splashes from blood or other body fluids (including bodily excretions, secretions, feces, vomitus, saliva, mucus, urine) can spread EVD from the deceased to those handling the deceased if they are unprotected. Dispose of all PPE used in handling EVD human remains as EVD waste.

9.1.2 EQUIPMENT AND SUPPLIES. Instruments used on the deceased or materials that came in contact with the deceased (e.g. sheets, mattresses, bed pans, gowns, personal hygiene items) can also spread the disease to healthcare workers and housekeeping staff who come in contact with them. These materials must also be disposed of as EVD waste.

9.1.3 WASTE MANAGEMENT. Manage all EVD solid waste (including PPE and disposable instruments) and accumulated liquid waste according to Sections 3, 4, and 5 and the guidance documents in Section 9.2.

9.2 GUIDANCE.

9.2.1 CDC. Personnel handling persons who died of EVD must follow all safety and health guidelines and adhere to standards published by the CDC—

CDC Guidance for Safe Handling of Human Remains of Ebola Patients in U. S. Hospitals and Mortuaries (2014, http://www.cdc.gov/vhf/ebola/hcp/guidance-safe-handling-human-remains-ebola-patients-us-hospitals-mortuaries.html) and

Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus (http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html).

9.2.2 OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA). Workers must also adhere to safety standards published by OSHA in their 29 CFR 1910.1030 in addition to the CDC guidelines above.

9.2.3 DEPARTMENT OF DEFENSE (DOD). DOD personnel must additionally follow USAPHC Technical Guide (TG) 195 (Safety and Health Guidance for Mortuary Affairs Operations: Infectious Materials and CBRN Handling, 4th Edition). The AIPH has published a Technical Information Paper (Handling EVD Human Remains in an MTF) that addresses management of EVD patients who become diseased in the MTF. It is posted on the USAPHC Ebola website for your reference at: http://phc.amedd.army.mil/topics/discond/diseases/Pages/EbolaVirusDisease.aspx.

SECTION 10

MANAGEMENT OF SPILLS AND UNCONTROLLED PATIENT RELEASES

10.1 GENERAL. Spills may occur when handling EVD waste in the MTF. The potential also exists for uncontrolled releases of human excrement (vomit and feces) by patients as they move from initial diagnosis points to isolation areas for care. In both cases, the contaminated areas must be promptly cleaned and disinfected as detailed below to ensure all in the MTF are protected from exposure.

10.2 NOTIFICATION. If either a spill or uncontrolled release of excrement from a patient occurs, immediately create a cordon around the waste, then contact Infection Control and the Environmental Services Chief to request cleanup by designated, trained personnel.

10.3 APPROVED PROCEDURES. The Infection Control Team will approve policies and procedures for spill response and cleanup of involuntary patient releases of human excrement.

10.4 DESIGNATED SPILL RESPONDERS. Only personnel who have been designated and trained to respond to spills and releases will conduct the cleanup activities. Ideally, personnel in clinical areas will be designated and trained to respond in their areas. If not, Logistics and Infection Control will appoint/direct appropriate personnel to the scene for cleanup.

10.5 PPE. Selection, use, and donning/doffing locations for PPE will adhere to hospital infection control standards for EVD waste cleanup as specified by the Infection Control Team. All personnel involved in cleanup and site supervision will use PPE specified by Infection Control.

10.6 DISINFECTANTS. Spills and releases will be cleaned with bleach or an EPA-registered, hospital-approved disinfectant (for use on viruses such as the norovirus or rotavirus as recommended by the CDC) as directed by the Infection Control Team. Additional disinfection may be required if directed by Infection Control depending on the spill/release location and type of contaminated materials (porous or nonporous). If bleach is used, mix a 1:10 part bleach to water solution for site disinfection.

10.7 ISOLATE THE AREA. Immediately remove unprotected staff and patients from the spill/release area, and take measures to block access to the site. Ensure that only designated personnel in appropriate PPE approach the spill/release. The area should remain isolated after disinfection until no wet surfaces remain.

10.8 CLEANING SUPPLIES AND EQUIPMENT. Use disposable cleaning supplies and equipment (such as absorbent pads, mops, wipes, scoops, and so forth) to clean spills and releases. Spill responders must bring required EVD waste red bags to the area before beginning the cleanup process. Do not use wet vacuums to avoid the potential for aerosolization of the waste and creation of excess liquid wastes that must be treated and released down the drain. Unless the EVD waste will be autoclaved, the use of liquid solidifiers such as Isolyser® may be the preferred approach to allow solidification of the excrement. Solidified materials must then be gently scooped or swept up. After the solids are cleaned up, disinfect the area according to Section 10.6. Because some solidifiers are incompatible with autoclaving, do not autoclave EVD waste containing solidifiers. (Isolyser® are registered trademark of WCM, Inc.)

10.9 WASTE DISPOSAL. Cleanup materials (such as absorbent pads, mop heads, wipes, and so forth) and PPE will be disposed of as EVD waste. The waste must be double-bagged in red bags according to the procedure in 3.3.3.3, and then transported to the EVD waste storage area according to Section 4. Infection Control will specify where and how the PPE will be removed for disposal as EVD waste.

10.10 DECONTAMINATION GUIDANCE. The AIPH has published a Technical Information Paper, (Decontamination of Equipment Used in the Area of Operations (AO) Impacted by Ebola Virus Disease (EVD)) that addresses decontamination of equipment used in areas impacted by EVD. This may be referenced if decontamination of various porous and nonporous items in the MTF is required. It is posted on theUSAPHC Ebola website for your reference at: http://phc.amedd.army.mil/topics/discond/diseases/Pages/EbolaVirusDisease.aspx.

SECTION 11

TRAINING

11.1 GENERAL. Training is a crucial step toward ensuring EVD waste is properly segregated and managed to prevent occupational exposures. Personnel must be informed of their designated responsibilities and the procedures required to execute those responsibilities. They must be provided opportunities to practice in non-infectious situational training prior to actual EVD situations to establish techniques necessary to protect themselves and others.

11.2 IDENTIFICATION. The Infection Control Team will identify training requirements for all personnel with designated rolls pertaining to EVD waste management including—

- Isolation room/anteroom personnel tasked with EVD waste management.
- Spill/release responders and cleanup personnel.
- Personnel who move EVD waste through the MTF (pickup and transport from wards/rooms to storage area).
- EVD Cart Disinfection.
- EVD Waste Storage Area Managers.
- Autoclave Treatment.
- Transport of EVD Waste from clinics to the MTF EVD Storage Area.
- Mortuary Affairs.
- Laboratory Specimen Handlers.
- Clinic personnel who will manage EVD Waste from initial diagnoses.
- Personnel tasked with emergency vehicle/waste transport vehicle decontamination.
- Personnel responsible for decontamination of reusable medical equipment.
- PPE assistants and site monitors.

11.3 PPE. PPE requirements and procedures will be established and communicated to all designated personnel with EVD waste management roles and responsibilities. Once the procedures are established, personnel will be provided practice training on: donning PPE, doffing PPE, and waste collection in each applicable area (such as wards, clinics, EVD waste storage, cart disinfection, and so forth).

11.4 FUNCTIONAL TRAINING. Develop functional hands-on training exercises to enable all personnel with EVD roles and responsibilities (Section 11.2) to practice their procedures while wearing appropriate PPE to rehearse for the real EVD situations. Appoint monitors to observe the training exercises and identify weaknesses that require additional training. The Infection Control Team will develop training with input from relevant supervisors and personnel with subject matter expertise.

11.5 EXPOSURE CONTROL PLAN. Personnel with the potential to have occupational exposure to EVD waste will be evaluated under the MTF's exposure control plan and will receive a Bloodborne Pathogens Standard (Title 29 CFR Part 1910.1030) refresher course.

11.6. DOCUMENTATION. Supervisors will maintain written documentation of all training for 3 years. Training records will include a summation of the designated EVD waste management responsibilities, training content summary, dates, length of training, trainer, and training location (onsite, classroom, and so forth).

11.7 INFECTIOUS SUBSTANCE SHIPPERS. Only personnel with training specified in Section 6.5 will sign shipping manifests for EVD waste.

SECTION 12

VEHICLE AND TRANSPORT EQUIPMENT DECONTAMINATION AREA

12.1 DESIGNATED AREA. Vehicles used to transport EVD patients and EVD waste from clinics to the hospital will require decontamination in a designated area. If the MTF has a mass-casualty decontamination facility with a waste water collection tank, it may be the best potential vehicle decontamination site. If not, an alternative decontamination area must be designated. The area should provide the ability to capture liquid disinfection solutions used and be secured to prevent access from unauthorized personnel.

12.2 PPE. Selection, use, and donning/doffing locations for PPE will adhere to hospital infection control standards as specified by the Infection Control Team. All personnel involved in vehicle decontamination and site supervision will use PPE specified by Infection Control.

12.3 WASTE. Liquid and solid wastes generated during vehicle and equipment decontamination will be managed as EVD waste according to Sections 3, 4, and 5.

12.4 DECONTAMINATION PROCEDURES. Contaminated vehicles and equipment will be decontaminated according to the guidance provided in the AIPH Technical Information Paper (Decontamination of Vehicles and Equipment Used for Transportation of Potential Ebola Virus Disease (EVD) Patients or Related Equipment) that addresses decontamination of equipment to transport EVD patients. It is posted on the USAPHC Ebola website for your reference at: http://phc.amedd.army.mil/topics/discond/diseases/Pages/EbolaVirusDisease.aspx.

12.5 WASTE WATER MANAGEMENT AND TANK CLEANING.

12.5.1 Mass Casualty Facility Design. Most MTF mass-casualty decontamination facilities are designed with a drain to an underground waste water holding tank(s). The tank is designed with a pump that can pump the fluid to the sanitary sewer system if deemed acceptable (or once appropriately disinfected and deemed acceptable for discharge to the sanitary sewer). The function of the facility is most likely determined by the CBRNE team, so plans to utilize the facility must be coordinated through appropriate CBRNE personnel.

12.5.2 Disinfection of Collected Waste Water in the Tank(s). Once decontamination activities have ended (or the tank fills up), the waste water collected from vehicle decontamination must be treated prior to discharge into the sanitary sewer system.

12.5.2.1 A ratio of 500 parts per million (or ppm) disinfectant/water solution to one part virus for 15-minutes contact time will kill Ebola (see World Health Organization (2014)).

12.5.2.2 To achieve the desired concentration, add approximately 1 part household bleach (a bit over 5% sodium hypochlorite) for every 99 parts of water. For Example: to treat a 1000-gallon tank, mix 10 gallons household bleach and 990 gallons of wastewater. This level of disinfection is suggested for body fluids and grossly contaminated items/surfaces; therefore, it will be an overly conservative ratio, considering the decontamination water would presumably be mostly water (which is chlorinated for potable), have some disinfectant already in it, and a bit of contamination or body fluids. Avoid splashing while adding bleach to the tank.

12.5.2.3 After the minimum contact time of 30 minutes, add dechlorination pellets to reduce the effects of the bleach prior to discharge into the waste water treatment plant (WWTP). The effects can be checked with pH paper. As the pellets start to work, the pH should get closer to the neutral value of 7. This will prevent corrosion of sewer pipes and the tank. If possible, allow the solution to sit for an extended period of time (12 hours) to dissipate the chlorine and to further reduce the potential for corrosion and interference at the WWTP.

12.5.2.4 Prior to discharge, contact the DPW and WWTP operator to provide notification of the intended discharge of treated waste water. [Note, DPW may prefer to contact the WWTP.] Provide the pH value and a description of efforts taken to neutralize the chlorine (dechlorination pellets and contact time) to DPW and the WWTP.]

12.5.2.5 If advanced notice is given that decontamination will take place, add 1 to 2 gallons of bleach to the tank prior to filling the tank with decontamination waste water. This will facilitate better mixing and disinfection of the water as it enters the tank. Only pre-place the bleach if the tank will be used within 4 hours of placing the bleach in the tank. Otherwise, the bleach can damage the tank if water is not added.

APPENDIX A

REFERENCES

Section I
Required References

ANSI Z358.1, Standard for Emergency Eyewashes and Shower Equipment

ASTM International Standards: http://www.astm.org/Standard/standards-and-publications.html

CDC. 1974. Office of Biosafety, Classification of Etiologic Agents on the Basis of Hazard, 4th Edition, US Department of Health, Education and Welfare, Public Health Service. http://www.cdc.gov/biosafety/publications/bmbl5/bmbl5_sect_i.pdf

CDC. 2014. Guidance for Safe Handling of Human Remains of Ebola Patients in U. S. Hospitals and Mortuaries. http://www.cdc.gov/vhf/ebola/hcp/guidance-safe-handling-human-remains-ebola-patients-us-hospitals-mortuaries.html

DA Pam 40-506, The Army Vision Conservation and Readiness Program

DOD 4500.9-R Part II, Defense Transportation Regulation – Part II, Cargo Movement

DOT, Pipeline and Hazardous Materials Safety Administration. 2014. DOT-SP 16266, Second Revision, October 3, 2014

EPA, Office of Pesticide Programs. 2009. January 9. List G, *EPA's registered antimicrobial products effective against norovirus (Norwalk-like virus)*. http://www.epa.gov/oppad001/list_g_norovirus.pdf

MEDCOM Regulation 40-35, Medical Services Management of Regulated Medical Waste, 15 July 2014

Stericycle, Category A Waste Handling & Packaging Procedures, Guidelines for a Suspected or Confirmed Case of Ebola

USAPHC 195. 2014. Safety and Health Guidance for Mortuary Affairs Operations: Infectious Materials and CBRN Handling, 4th Edition.

USAPHC Technical Information Paper. 2014. Decontamination of Equipment Used in the Area of Operations (AO) Impacted by Ebola Virus Disease (EVD.

USAPHC AIPH Technical Information Paper. 2014. Decontamination of Vehicles & Equipment Used for Transportation of Potential Ebola Virus Disease (EVD) Patients or Related Equipment.

USAPHC Technical Information Paper. 2014. Handling EVD Human Remains in an MTF.

USAPHC Technical Information Paper. 2014. Handling Personal Effects from Ebola Infected Patients.

WHO. 2014. Interim infection prevention and control guidance for care of patients with suspected or confirmed filovirus hemorrhagic fever in health-care settings, with focus on Ebola, August 2014.

Title 29, Code of Federal Regulations, Part 1910.1030, Bloodborne Pathogens

Title 49 CFR, Transport; http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49tab_02.tpl

Title 49 Code of Federal Regulations Parts 100-185, Pipeline and Hazardous Materials Safety Administration, Department of Transportation

Section II
Related Web Sites

http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html

http://www.cdc.gov/quarantine/air/managing-sick-travelers/ebola-guidance-airlines.html

http://www.epa.gov/oppad001/list_g_norovirus.pdf

http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/ebola-eng.php

http://www.nclonline.com/products/view/MICRO_CHEM_PLUS_

http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html

http://www.who.int/csr/resources/who-ipc-guidance-ebolafinal-09082014.pdf, page 9

http://phc.amedd.army.mil/topics/discond/diseases/Pages/EbolaVirusDisease.aspx

APPENDIX B

ABBREVIATIONS AND TERMS

AIPH
Army Institute of Public Health

ANSI
American National Standards Institute

ASTM
American Society for Testing and Materials

CDC
U.S. Centers for Disease Control

CFR
Code of Federal Regulations

cf
cubic feet

DA Pam
Department of the Army Pamphlet

DOD
Department of Defense

DOT
U.S. Department of Transportation

DOT-SP
U.S. Department of Transportation-Special Permit

EPA
U.S. Environmental Protection Agency

EVD
Ebola Virus Disease

ID
identification

MEDCOM
US Army Medical Command

MTF
medical treatment facility

OSHA
Occupational Safety and Health Adminstration

PHMSA
Pipeline and Hazardous Materials Safety Administration

PPE
personal protective equipment

RMW
Regulated Medical Waste

UN
United Nations

USAPHC
U.S. Army Public Health Command

WWTP
waste water treatment plant