



Wisconsin Department of Health Services (DHS)

Handling, Decontamination, Transport, and Disposal of Non-Health Care Setting Ebola-Contaminated Waste

Last Updated November 17, 2014

This document is an assemblage of established guidelines and protocols prepared by the Centers for Disease Control and Prevention (CDC) and other agencies that can address specific environmental aspects of potential Ebola viral contamination in non-health care settings. **The issues addressed here are the handling, decontamination, transport, and disposal of materials known or suspected to be infected with Ebola virus. These materials include, but are not limited to, clothing, bedding, carpets, and personal effects in the home.** Some of the guidance assembled here focuses on health-care settings; this information is also appropriate for non-health-care settings. This includes information about hospital clothing, bedding, personal protective equipment (PPE), medical instruments, and the patient's personal effects.

The document is organized into the following topics:

Handling of Known or Suspected Virus-Contaminated Materials or Waste, p. 2.

Decontamination of Locations with Known or Suspected Viral Contaminants, p. 3.

Transportation of Known or Suspected Virus-Contaminated Materials or Waste, p. 4.

Disposal of Known or Suspected Virus-Contaminated Waste, p. 6.

DHS can assist Local Public Health Agencies as they:

- assess non-healthcare locations and situations;
- develop a site-specific cleanup strategy;
- write cleanup/abatement orders;
- identify a cleanup contractor; and
- clear a setting/write a clearance letter.

Additional information can be found at the end of this document in:

Appendix A: *CDC Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing).*

Appendix B: *OSHA Cleaning and Decontamination of Ebola on Surfaces.*

Appendix C: *CDC Interim Guidance for the U.S. Residence Decontamination for Ebola Virus Disease (Ebola) and Removal of Contaminated Waste.*

Appendix D: *U.S. Army Public Health Command (USAPHC) Decontamination of Vehicles & Equipment Used for Transportation of Potential Ebola Virus Disease (EVD) Patients or Related Equipment.*

Appendix E: *U.S. DOT Procedural Guidance on the Proper Packaging of Ebola Suspected Waste.*

Appendix F: *U.S. DOT Transporting Infectious Substances Q&A.*

Handling of Known or Suspected Ebola Virus-Contaminated Materials or Waste.



Selection, Donning, and Doffing of PPE: When handling materials contaminated with body fluids from a known or suspected Ebola patient, it is critically important that workers wear appropriate PPE that will protect them from exposure and potential infection. At no time should skin be exposed when PPE is worn and every precaution should be taken to prevent worker contact with potentially contaminated PPE surfaces during its removal and packaging.

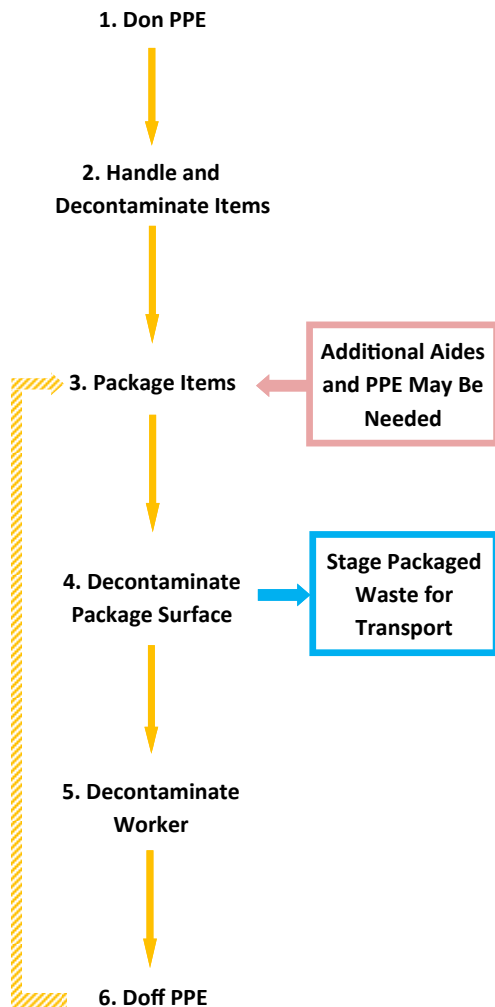
Detailed *Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing)* has been developed by CDC (see **Appendix A**). Although this guidance was developed for healthcare workers, it would also afford protection to workers handling materials outside of healthcare settings. Some alterations to the PPE recommendations may be appropriate, as additional PPE might be required in certain situations. In particular, heavy gloves worn over inner gloves may be necessary for work involving the handling of rough or sharp objects.



Safe and proper handling of clothing or possessions with obvious or likely contamination from body fluids: The Occupational Health and Safety Administration (OSHA) has issued guidance, *Cleaning and Decontamination of Ebola on Surfaces*, for workers and employers in non-healthcare, non-laboratory settings (see **Appendix B**). The guidance contains PPE information similar to the CDC guidance presented here. It also contains information on how to physically handle visible contaminants, references to CDC waste disposal guidelines, and a list of applicable OSHA compliance standards for worker protection.

Figure 1. PPE Work Interval for Ebola Waste Handling and Packaging

A trained observer assists in donning PPE and all subsequent steps.



Note: All PPE used during Ebola waste handling and packaging should be treated like contaminated waste. PPE worn only during waste transport is not contaminated waste. See appendices for additional information.

Decontamination of Locations with Known or Suspected Viral Contaminants.




Is professional decontamination necessary? Information from patient care settings provided by the CDC and from Emory University Hospital indicates that the virus is not present in the absence of visible contamination with potentially infectious material such as blood, vomitus, or diarrhea. For non-clinical settings, decisions about decontamination should be based on an assessment of where the patient spent time before and after becoming infectious, as well as the type and severity of their symptoms. DHS can provide technical support to LPHAs that are called on to assess the need for professional decontamination in a non-clinical setting or situation.



Decontamination of residences, offices, or other facilities where a suspected or known Ebola-infected person stayed. In cases where it is determined that decontamination of a residence, jail cell, office, school, or similar **non-health care** location is necessary, DHS recommends the procedures outlined in CDC's *Interim Guidance for the U.S. Residence Decontamination for Ebola Virus Disease (Ebola) and Removal of Contaminated Waste* (see **Appendix C**).

The Wisconsin Department of Health Services (DHS) is working to identify contractors who could properly decontaminate non-healthcare locations that may be contaminated with Ebola virus. DHS will maintain a list of cleanup contractors who can handle Category A Infectious Waste cleanups; contact DHS at (608) 266-1120 or DHSResponse@wi.gov for more information.

At this time, the Air National Guard 54th Weapons of Mass Destruction Civil Support Team (CST) is the only partner that has indicated they could conduct clean-up activities. This would only be under a unique or urgent situation, as they have limited capacity for a large-scale response.

Decontamination of vehicles. In cases where it is determined that decontamination of a  vehicle is necessary, DHS recommends the procedures outlined in the U.S. Army Public Health Command (USAPHC) Technical Information Paper 13-031-0914, *Decontamination of Vehicles Used for Transportation of Potential Ebola Virus Disease (EVD) Patients or Related Equipment* (see **Appendix D**). This paper includes information on products and techniques to be used for cleaning porous and non-porous surfaces, disposal of wastewater, and alternative or contingency methods such as lime and encapsulation. The waste burning and burial methods described in this paper are **not** appropriate for Ebola waste destruction in Wisconsin.

Transportation of Known or Suspected Virus-Contaminated Materials or Waste.

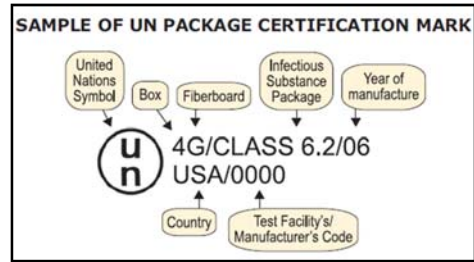
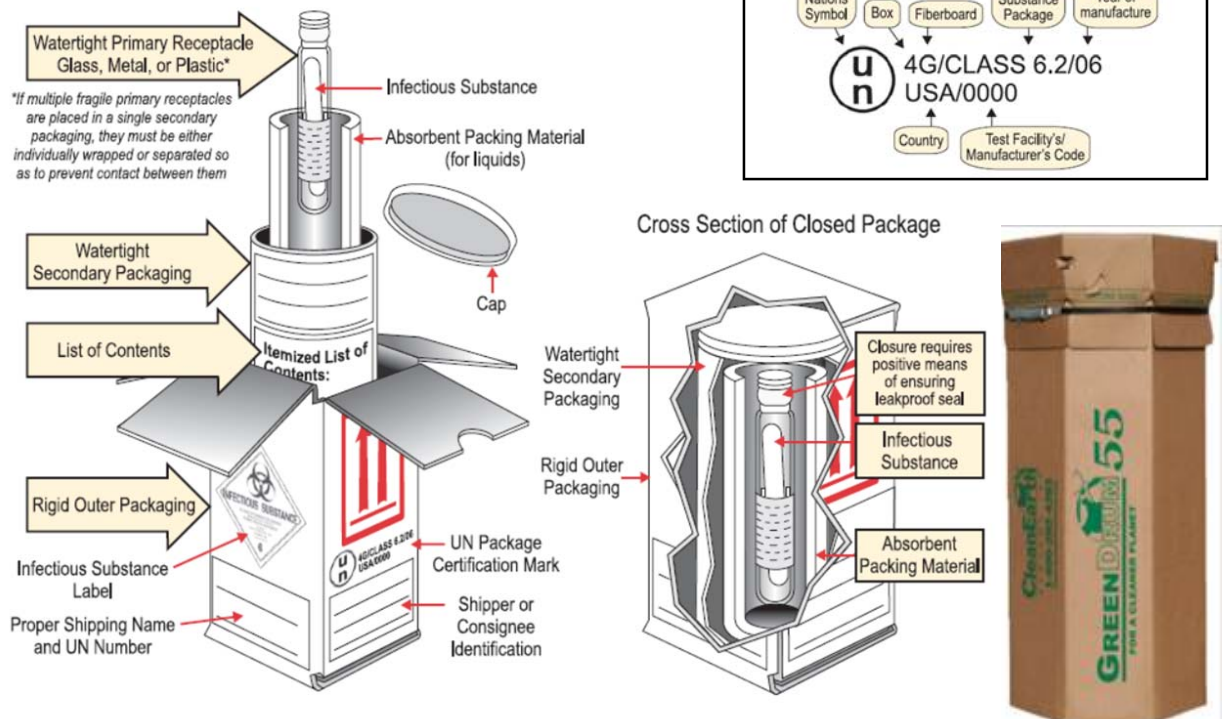


In the United States, Ebola virus is a Category A Infectious Substance, meaning that it is capable of causing permanent disability or life threatening or fatal disease in otherwise healthy humans or animals. As such, it is regulated by the U.S. Department of Transportation's (DOT) **Hazardous Materials Regulations (HMR)**. CDC has released guidance on the safe and proper handling of items that are likely contaminated with Ebola virus *before* they are transported (see **Appendix C**), or see the **Handling of Known or Suspected Virus-Contaminated Materials or Waste** section on page 2 of this document.

Packaging of Category A Infectious Waste. In general, a Category A infectious substance must be triple packed in a: (1) primary watertight receptacle; (2) watertight secondary packaging; and (3) rigid outer packaging. Specific requirements for the packaging of Category A Infectious Waste are described in guidance from the U.S. DOT (see **Appendix E**) and in Figure 2, below.

Special permits and alternative packaging designs are needed to accommodate the large volume of waste from a residential cleanup. See page 5 for more information about these.

Figure 2. Packaging and Labeling of Category A Infectious Substances



- Note 1:** The smallest external dimension of the outer packaging must not be less than 100 mm (3.9 inches)
- Note 2:** The primary receptacle or the secondary packaging must be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 kPa
- Note 3:** Follow package manufacturer's closure instructions

Figure references: U.S. DOT (2006) *Transporting Infectious Substances Safely*. Document # PHH50-0079-0706. The images are provided only to illustrate packaging and labeling concepts for Category A waste. Please refer to Appendix E for specific technical guidance.

Transportation of Known or Suspected Virus-Contaminated Materials or Waste (continued).

Transportation of a Category A infectious substances. Any item transported for disposal that is contaminated with a Category A Infectious Substance must be packaged and transported in accordance with U.S. DOT regulations found in 49 Code of Federal Regulations Parts 171-180. This includes used medical equipment, PPE, contaminated linens, and other contaminated waste associated with a confirmed or suspected case of Ebola. In addition, the motor carrier, including its driver, must comply with the Federal Motor Carrier Safety Regulations (FMCSR), 49 C.F.R., Parts 300-399, as applicable. All applicable requirements of the HMR can be found on the U.S. DOT website: <http://phmsa.dot.gov/hazmat/transporting-infectious-substances> or in the U.S. DOT Guidance for Transporting Ebola-Contaminated Items in **Appendix E**.

Alternative packaging designs have been required to accommodate the relatively large quantity of Ebola waste associated with the cleanup of a residence. U.S. DOT has developed a special permit that is required for the transport of this type of waste. The alternative packaging must provide a safety level that is: (1) at least equal to the safety level required under the HMR, or (2) consistent with the public interest if a required safety level does not exist.

If an entity requires a variance to the HMR, that entity must apply for a Special Permit under 49 CFR § 107.105. See **Appendix E** for additional guidance from the U.S. DOT.

Who can transport Ebola-contaminated waste? U.S. DOT has granted special permits to several companies for transporting Ebola-contaminated waste. The most current list of haulers can be found online at: <http://phmsa.dot.gov/hazmat/question-and-answer> (or see **Appendix F**).

For additional questions on hazardous materials packaging and transportation regulations, contact the U.S. DOT HazMat Information Center at 1-800-467-4922.

Is there a risk to workers transporting Category A Infectious waste? The packaging specifications and procedures are carefully designed to create *hard-packaged, secure*, containers that are free of microbial contamination on the *outside* of the containers. Containers prepared in this way are safe to handle by transport workers. Following the proper and safe packaging of materials contaminated or suspected of being contaminated with Ebola, containers should be considered safe for loading and transport by workers wearing PPE appropriate for normal package handling.

Disposal of Known or Suspected Virus-Contaminated Waste.

Certification and Licensing of Waste Disposal Contractors.

Waste disposal contractors must follow state and federal standards, such as:

- **OSHA Standards:** See **Appendix B** for a list of applicable OSHA compliance standards for worker protection.
- **U.S. DOT Guidelines:** U.S. DOT has issued specific guidelines for packaging and transporting Ebola-contaminated waste (see **Appendix E**). *Note: the U.S. DOT guidelines for Ebola-contaminated waste supersede Wisconsin rules about packaging and transporting infectious waste.*
- **Wisconsin DNR Licensing:** DNR requires licenses for infectious waste transport, including Ebola-contaminated waste. Infectious waste vendors in Wisconsin already have the Wisconsin license, but those from other states may need to secure the license (see <http://dnr.wi.gov/topic/healthwaste/infectious.html>).
- **Other State Licensing/Permitting:** If any Ebola-contaminated waste from Wisconsin is sent to other states for treatment and disposal, those states may require the vendors and facilities to have licenses or permits as well. Wisconsin waste vendors can help their customers verify the legal status of facilities they intend to use for treating and disposing of Ebola-contaminated waste.

Wisconsin Department of Administration hazardous waste disposal contract. The statewide hazardous waste disposal contract is in place and includes infectious waste transport. Use of this contract for transport and disposal of Ebola waste is not mandatory for state agencies (including the University of Wisconsin). Veolia has obtained a transport permit. Veolia will transport and dispose of, but will not package, Ebola-contaminated waste. Any Ebola waste disposed of through the Veolia contract will be incinerated at the Veolia facility in Port Arthur, Texas.

This contract is available (but not mandatory) for use by all municipalities in Wisconsin. *Municipality* means any county, city, village, town, school district, board of school directors, sewer district, drainage district, vocational, technical and adult education district, or any other public body having the authority to award public contracts (s. 16.70(8), Wis. Stats). Federally recognized tribes and bands in this state may participate in cooperative purchasing with the state or any municipality under §66.0301(1) and (2), Wis. Stats.

Private entities, and health care organizations are free to negotiate their own agreement with a licensed and permitted waste transportation and disposal firm.

Also see the ***Transportation of Known or Suspected Virus-Contaminated Materials or Waste*** section starting on page 4 of this document.

Disposal of Known or Suspected Virus-Contaminated Waste (continued).

Safe and Proper Disposition of Waste.

The State of Wisconsin continually evaluates options for the disposal of Ebola-contaminated waste. As of November 11, 2014, the state has not identified a single full-service contractor in Wisconsin to clean-up and secure a contaminated site, package waste, and provide waste transportation to an approved disposal facility. Wisconsin does not have an approved disposal facility.

- Private contractors operating approved infectious waste treatment facilities in Wisconsin will not accept or treat Ebola-contaminated waste in their facilities. However, all are willing to work with their customers to arrange for transportation to out-of-state incinerators. Some can provide storage containers. Some are ready to apply for the case-specific U.S. DOT permit required to transport Ebola-contaminated waste.
- U.S. DOT has granted special permits to several companies for transporting Ebola waste. The current list of approved Ebola waste transporters can be found online at: <http://phmsa.dot.gov/hazmat/question-and-answer> (or see **Appendix.F**).
- There are no medical waste or hazardous waste incinerators located in Wisconsin. There are companies with out-of-state incinerators which have indicated they will accept Ebola-contaminated waste from Wisconsin.
- Portable incinerators and open burning are not options for destroying Ebola-contaminated waste. Open burning is illegal and portable incinerators burn at low temperatures, often creating new air pollutants of concern. Under state and federal air quality rules, WI DNR can only approve facilities that meet Wisconsin requirements for medical waste incinerators to burn Ebola-contaminated waste.
- Waste-to-energy facilities and municipal solid waste incinerators in Wisconsin are not permitted, nor able in most cases, to burn infectious waste, including Ebola-contaminated waste.

For information on waste disposal options, call Barb Bickford of DNR at (608) 267-3548 or email her at barbara.bickford@wisconsin.gov. For information on requirements for air quality permitting in Wisconsin for existing or proposed air quality permitted facilities call Kristin Hart of DNR at (608) 266-6876 or email her at Kristin.hart@wisconsin.gov.

Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing)

 Share

This guidance is current as of
October 20, 2014

The following procedures provide detailed guidance on the types of personal protective equipment (PPE) to be used and on the processes for donning and doffing (i.e., putting on and removing) PPE for all healthcare workers entering the room of a patient hospitalized with Ebola virus

disease (Ebola). The guidance in this document reflects lessons learned from the recent experiences of U.S. hospitals caring for Ebola patients and emphasizes the importance of **training, practice, competence, and observation** of healthcare workers in correct donning and doffing of PPE selected by the facility.

This guidance contains the following key principles:

1. Prior to working with Ebola patients, all healthcare workers involved in the care of Ebola patients must have received repeated training and have demonstrated competency in performing all Ebola-related infection control practices and procedures, and specifically in donning/doffing proper PPE.
2. While working in PPE, healthcare workers caring for Ebola patients should have no skin exposed.
3. The overall safe care of Ebola patients in a facility must be overseen by an onsite manager at all times, and each

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step of every PPE donning/doffing procedure must be supervised by a trained observer to ensure proper completion of established PPE protocols.

In healthcare settings, Ebola is [spread through direct contact](#) (e.g., through broken skin or through mucous membranes of the eyes, nose, or mouth) with blood or body fluids of a person who is sick with Ebola or with objects (e.g., needles, syringes) that have been contaminated with the virus. For all healthcare workers caring for Ebola patients, PPE with full body coverage is recommended to further reduce the risk of self-contamination.

External (Non-CDC) Resources on PPE

- [Emory Healthcare: Ebola Preparedness Protocols](#) 
- [University of Nebraska Medical Center: PPE for Ebola](#) 
- [Médecins Sans Frontières \(Doctors without Borders\): Filovirus Haemorrhagic Fever Guideline, 2008](#)
 [PDF - 134pages] 
- [World Health Organization \(WHO\): Infection prevention and control guidance for care of patients in health-care settings, with focus on Ebola](#) 

To protect healthcare workers during care of an Ebola patient, healthcare facilities must provide onsite management and oversight on the safe use of PPE and implement administrative and environmental controls with continuous safety checks through direct observation of healthcare workers during the PPE donning and doffing processes.

Recommended Administrative and Environmental Controls for Healthcare Facilities

Protecting healthcare workers and preventing spread of Ebola requires that proper administrative procedures and safe work practices be carried out in appropriate physical settings. These controls include the following:

- At an administrative level, the facility's infection prevention management system, in collaboration with the facility's occupational health department, should
 - Establish and implement triage protocols to effectively identify patients who may have Ebola and institute the precautions detailed in this document.
 - Designate individuals as site managers responsible for overseeing the implementation of precautions for healthcare workers and patient safety. A site manager's sole responsibility is to ensure the safe and effective delivery of Ebola treatment. These individuals are responsible for all aspects of Ebola infection control including supply monitoring and evaluation with direct observation of care before, during, and after staff enter an isolation and treatment area.
 - At least one site manager should be on-site at all times in the location where the Ebola patient is being cared for.
 - Identify critical patient care functions and essential healthcare workers for care of Ebola patients, for collection of laboratory specimens, and for management of the environment and waste ahead of time.

- Ensure healthcare workers have been trained in all recommended protocols for safe care of Ebola patients before they enter the patient care area.
- Train healthcare workers on all PPE recommended in the facility's protocols. Healthcare workers should practice donning and doffing procedures and must demonstrate during the training process competency through testing and assessment before caring for Ebola patients.
 - Use trained observers to monitor for correct PPE use and adherence to protocols for donning and doffing PPE, and guide healthcare workers at each point of use using a checklist for every donning and doffing procedure.
- Document training of observers and healthcare workers for proficiency and competency in donning and doffing PPE, and in performing all necessary care-related duties while wearing PPE.
- Designate spaces so that PPE can be donned and doffed in separate areas.
- Key safe work practices include the following:
 - Identify and isolate the Ebola patient in a single patient room with a closed door and a private bathroom as soon as possible.
 - Limit the number of healthcare workers who come into contact with the Ebola patient (e.g., avoid short shifts), and restrict non-essential personnel and visitors from the patient care area.
 - Monitor the patient care area at all times, and log at a minimum entry and exit of all healthcare workers who enter the room of an Ebola patient.
 - Ensure that a trained observer watches closely each donning and each doffing procedure, and provides supervisory assurance that donning and doffing protocols are followed.
 - Ensure that healthcare workers have sufficient time to don and doff PPE correctly without disturbances.
 - Ensure that practical precautions are taken during patient care, such as keeping hands away from the face, limiting touch of surfaces and body fluids, preventing needlestick and sharps injuries, and performing frequent disinfection of gloved hands using an alcohol-based hand rub (ABHR), particularly after handling body fluids.
 - Disinfect immediately any visibly contaminated PPE surfaces, equipment, or patient care area surfaces using an *EPA-registered disinfectant wipe.
 - Perform regular cleaning and disinfection of patient care area surfaces, even absent visible contamination.
 - This should be performed only by nurses or physicians as part of patient care activities in order to limit the number of additional healthcare workers who enter the room.
 - Implement observation of healthcare workers in the patient room, if possible (e.g., glass-walled intensive care unit [ICU] room, video link).
 - Establish a facility exposure management plan that addresses decontamination and follow-up of an affected healthcare worker in case of any unprotected exposure. Training on this plan and follow-up should be part of the healthcare worker training.

Principles of PPE

Healthcare workers must understand the following basic principles to ensure safe and effective PPE use, which include

that no skin may be exposed while working in PPE:

- Donning
 - PPE must be donned correctly in proper order before entry into the patient care area and not be later modified while in the patient care area. The donning activities must be directly observed by a trained observer.
- During Patient Care
 - PPE must remain in place and be worn correctly for the duration of exposure to potentially contaminated areas. PPE should not be adjusted during patient care.
 - Healthcare workers should perform frequent disinfection of gloved hands using an ABHR, particularly after handling body fluids.
 - If during patient care a partial or total breach in PPE (e.g., gloves separate from sleeves leaving exposed skin, a tear develops in an outer glove, a needlestick) occurs, the healthcare worker must move immediately to the doffing area to assess the exposure. Implement the facility exposure plan, if indicated by assessment.
- Doffing
 - The removal of used PPE is a high-risk process that requires a structured procedure, a trained observer, and a designated area for removal to ensure protection
 - PPE must be removed slowly and deliberately in the correct sequence to reduce the possibility of self-contamination or other exposure to Ebola virus
 - A stepwise process should be developed and used during training and daily practice

Double gloving provides an extra layer of safety during direct patient care and during the PPE removal process. Beyond this, more layers of PPE may make it more difficult to perform patient care duties and put healthcare workers at greater risk for percutaneous injury (e.g., needlesticks), self-contamination during care or doffing, or other exposures to Ebola. If healthcare facilities decide to add additional PPE or modify this PPE guidance, they must consider the risk/benefit of any modification, and train healthcare workers on correct donning and doffing in the modified procedures.

Training on Correct Use of PPE

Training ensures that healthcare workers are knowledgeable and proficient in the donning and doffing of PPE prior to engaging in management of an Ebola patient. Comfort and proficiency when donning and doffing are only achieved through repeated practice on the correct use of PPE. Healthcare workers should be required to demonstrate competency in the use of PPE, including donning and doffing while being observed by a trained observer, before working with Ebola patients. In addition, during practice, healthcare workers and their trainers should assess their proficiency and comfort with performing required duties while wearing PPE. Training should be available in formats accessible to individuals with disabilities or limited English proficiency. Target training to the educational level of the intended audience.

Use of a Trained Observer

Because the sequence and actions involved in each donning and doffing step are critical to avoiding exposure, a trained observer will read aloud to the healthcare worker each step in the procedure checklist and visually confirm and document that the step has been completed correctly. The trained observer is a dedicated individual with the sole responsibility of ensuring adherence to the entire donning and doffing process. The trained observer will be knowledgeable about all PPE recommended in the facility's protocol and the correct donning and doffing procedures, including disposal of used PPE, and will be qualified to provide guidance and technique recommendations to the healthcare worker. The trained observer will monitor and document successful donning and doffing procedures, providing immediate corrective instruction if the healthcare worker is not following the recommended steps. The trained observer should know the exposure management plan in the event of an unintentional break in procedure.

Designating Areas for PPE Donning and Doffing

Facilities should ensure that space and layout allow for clear separation between clean and potentially contaminated areas. It is critical that physical barriers (e.g., plastic enclosures) be used where necessary, along with visible signage, to separate distinct areas and ensure a one-way flow of care moving from clean areas (e.g., area where PPE is donned and unused equipment is stored) to the patient room and to the PPE removal area (area where PPE is removed and discarded).

Post signage to highlight key aspects of PPE donning and doffing, including

- Designating clean areas vs. potentially contaminated areas
- Reminding healthcare workers to wait for a trained observer before removing PPE
- Reinforcing need for slow and deliberate removal of PPE to prevent self-contamination
- Reminding healthcare workers to perform disinfection of gloved hands in between steps of the doffing procedure, as indicated below.

Designate the following areas with appropriate signage:

1. PPE Storage and Donning Area

This is an area outside the Ebola patient room (e.g., a nearby vacant patient room, a marked area in the hallway outside the patient room) where clean PPE is stored and where healthcare workers can don PPE before entering the patient's room. Do not store potentially contaminated equipment, used PPE, or waste removed from the patient's room in this area. If waste must pass through this area, it must be properly contained.

2. Patient Room

This is a single-patient room. The door is kept closed. Any item or healthcare worker exiting this room should be considered potentially contaminated.

3. PPE Removal Area

This is an area in proximity to the patient's room (e.g., anteroom or adjacent vacant patient room that is separate from the clean area) where healthcare workers leaving the patient's room can doff and discard their PPE.

Alternatively, some steps of the PPE removal process may be performed in a clearly designated area of the

patient's room near the door, provided these steps can be seen and supervised by a trained observer (e.g., through a window such that the healthcare worker doffing PPE can still hear the instructions of the trained observer). Do not use this clearly designated area within the patient room for any other purpose. Stock gloves in a clean section of the PPE removal area accessible to the healthcare worker while doffing.

In the PPE removal area, provide supplies for disinfection of PPE and for performing hand hygiene and space to remove PPE, including a place for sitting that can be easily cleaned and disinfected, where the healthcare workers can remove boot covers. Provide leak-proof infectious waste containers for discarding used PPE. Perform frequent environmental cleaning and disinfection of the PPE removal area, including upon completion of doffing procedure by healthcare workers.

If a facility must use the hallway outside the patient room as the PPE removal area, construct physical barriers to close the hallway to through traffic and thereby create an anteroom. In so doing, the facility should make sure that this hallway space complies with fire-codes. Restrict access to this hallway to essential personnel who are properly trained on recommended infection prevention practices for the care of Ebola patients.

Facilities should consider making showers available for use by healthcare workers after doffing of PPE.

Selection of PPE for Healthcare Workers during Management of Ebola patients

This section outlines several PPE combinations and how they should be correctly worn. The key to all PPE is consistent implementation through repeated training and practice. A facility should select and standardize the PPE to be used by all essential healthcare workers directly interacting with Ebola patients and provide a written protocol outlining procedures for donning and doffing of this PPE, which will be reviewed and monitored by the trained observer.

CDC recommends facilities use a powered air-purifying respirator (PAPR) or an N95 or higher respirator in the event of an unexpected aerosol-generating procedure.

For healthcare workers who may spend extended periods of time in PPE while caring for Ebola patients, safety and comfort are critical. Standardizing attire under PPE (e.g., surgical scrubs or disposable garments and dedicated washable footwear) facilitates the donning and doffing process and eliminates concerns of contamination of personal clothing.

If facilities elect to use different PPE from what is outlined below (e.g., coveralls with either an integrated hood or a surgical hood with integrated full face shield), they must train healthcare workers in this use and ensure that donning and doffing procedures are adjusted and practiced accordingly.

Recommended Personal Protective Equipment

- **PAPR or N95 Respirator.** If a NIOSH-certified PAPR and a NIOSH-certified fit-tested disposable N95 respirator is

used in facility protocols, ensure compliance with all elements of the [OSHA Respiratory Protection Standard, 29 CFR 1910.134](#), including fit testing, medical evaluation, and training of the healthcare worker.

- **PAPR:** A PAPR with a full face shield, helmet, or headpiece. Any reusable helmet or headpiece must be covered with a single-use (disposable) hood that extends to the shoulders and fully covers the neck and is compatible with the selected PAPR. The facility should follow manufacturer's instructions for decontamination of all reusable components and, based upon those instructions, develop facility protocols that include the designation of responsible personnel who assure that the equipment is appropriately reprocessed and that batteries are fully charged before reuse.
 - A PAPR with a self-contained filter and blower unit integrated inside the helmet is preferred.
 - A PAPR with external belt-mounted blower unit requires adjustment of the sequence for donning and doffing, as described below.
- **N95 Respirator:** Single-use (disposable) N95 respirator in combination with single-use (disposable) surgical hood extending to shoulders and single-use (disposable) full face shield.** If N95 respirators are used instead of PAPRs, careful observation is required to ensure healthcare workers are not inadvertently touching their faces under the face shield during patient care.
- Single-use (disposable) fluid-resistant or impermeable gown that extends to at least mid-calf or coverall without integrated hood. Coveralls with or without integrated socks are acceptable.

Consideration should be given to selecting gowns or coveralls with thumb hooks to secure sleeves over inner glove. If gowns or coveralls with thumb hooks are not available, personnel may consider taping the sleeve of the gown or coverall over the inner glove to prevent potential skin exposure from separation between sleeve and inner glove during activity. However, if taping is used, care must be taken to remove tape gently. Experience in some facilities suggests that taping may increase risk by making the doffing process more difficult and cumbersome.
- Single-use (disposable) nitrile examination gloves with extended cuffs. Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.
- Single-use (disposable), fluid-resistant or impermeable boot covers that extend to at least mid-calf or single-use (disposable) shoe covers. Boot and shoe covers should allow for ease of movement and not present a slip hazard to the worker.
 - Single-use (disposable) fluid-resistant or impermeable shoe covers are acceptable only if they will be used in combination with a coverall with integrated socks.
- Single-use (disposable), fluid-resistant or impermeable apron that covers the torso to the level of the mid-calf should be used if Ebola patients have vomiting or diarrhea. An apron provides additional protection against exposure of the front of the body to body fluids or excrement. If a PAPR will be worn, consider selecting an apron that ties behind the neck to facilitate easier removal during the doffing procedure.

Recommended PPE for Trained Observer during Observations of PPE Doffing

The trained observer should not enter the room of a patient with Ebola, but will be in the PPE removal area to observe and assist with removal of specific components of PPE, as outlined below. The observer should not participate in any

Ebola patient care activities while conducting observations. The following PPE are recommended for trained observers:

- Single-use (disposable) fluid-resistant or impermeable gown that extends to at least mid-calf or coverall without integrated hood.
- Single-use (disposable) full face shield.
- Single-use (disposable) nitrile examination gloves with extended cuffs. Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.
- Single-use (disposable) fluid-resistant or impermeable shoe covers. Shoe covers should allow for ease of movement and not present a slip hazard to the worker.

Trained observers should don and doff selected PPE according to same procedures outlined below. Of note, if the trained observer assists with PPE doffing, then the trained observer should disinfect outer-gloved hands with an *EPA-registered disinfectant wipe or ABHR immediately after contact with healthcare worker's PPE.

Donning PPE, PAPR Option – This donning procedure assumes the facility has elected to use PAPRs. An established protocol facilitates training and compliance. Use a trained observer to verify successful compliance with the protocol.

1. **Engage Trained Observer:** The donning process is conducted under the guidance and supervision of a trained observer, who confirms visually that all PPE is serviceable and has been donned successfully. The trained observer uses a written checklist to confirm each step in donning PPE and can assist with ensuring and verifying the integrity of the ensemble. No exposed skin or hair of the healthcare worker should be visible at the conclusion of the donning process.
2. **Remove Personal Clothing and Items:** Change into surgical scrubs (or disposable garments) and dedicated washable (plastic or rubber) footwear in a suitable clean area. No personal items (e.g., jewelry, watches, cell phones, pagers, pens) should be brought into patient room.
3. **Inspect PPE Prior to Donning:** Visually inspect the PPE ensemble to be worn to ensure that it is in serviceable condition, that all required PPE and supplies are available, and that the sizes selected are correct for the healthcare worker. The trained observer reviews the donning sequence with the healthcare worker before the healthcare worker begins the donning process and reads it to the healthcare worker in a step-by-step fashion.
4. **Perform Hand Hygiene:** Perform hand hygiene with ABHR. When using ABHR, allow hands to dry before moving to next step.
5. **Put on Inner Gloves:** Put on first pair of gloves.
6. **Put on Boot or Shoe Covers.**
7. **Put on Gown or Coverall:** Put on gown *or* coverall. Ensure gown or coverall is large enough to allow unrestricted freedom of movement. Ensure cuffs of inner gloves are tucked under the sleeve of the gown *or* coverall
 - a. If a PAPR with a self-contained filter and blower unit that is integrated inside the helmet is used, then the belt and battery unit must be put on prior to donning the impermeable gown *or* coverall so that the belt and battery unit are contained under the gown *or* coverall.
 - b. If a PAPR with external belt-mounted blower is used, then the blower and tubing must be on the outside of gown *or* coverall to ensure proper airflow.

8. **Put on Outer Gloves:** Put on second pair of gloves (with extended cuffs). Ensure the cuffs are pulled over the sleeves of the gown *or* coverall
9. **Put on Respirator:** Put on PAPR with a full face-shield, helmet, or headpiece
 - a. If a PAPR with a self-contained filter and blower unit integrated inside the helmet is used, then a single-use (disposable) hood that extends to the shoulders and fully covers the neck must also be used. Be sure that the hood covers all of the hair and the ears, and that it extends past the neck to the shoulders.
 - b. If a PAPR with external belt-mounted blower unit and attached reusable headpiece is used, then a single-use (disposable) hood that extends to the shoulders and fully covers the neck must also be used. Be sure that the hood covers all of the hair and the ears, and that it extends past the neck to the shoulders.
10. **Put on Outer Apron (if used):** Put on full-body apron to provide additional protection to the front of the body against exposure to body fluids or excrement from the patient.
11. **Verify:** After completing the donning process, the integrity of the ensemble is verified by the trained observer. The healthcare worker should be comfortable and able to extend the arms, bend at the waist, and go through a range of motions to ensure there is sufficient range of movement while all areas of the body remain covered. A mirror in the room can be useful for the healthcare worker while donning PPE.
12. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with ABHR. Allow to dry prior to patient contact.

Donning PPE, N95 Respirator Option – This donning procedure assumes the facility has elected to use N95 respirators. An established protocol facilitates training and compliance. Use a trained observer to verify successful compliance with the protocol.

1. **Engage Trained Observer:** The donning process is conducted under the guidance and supervision of a trained observer who confirms visually that all PPE is serviceable and has been donned successfully. The trained observer will use a written checklist to confirm each step in donning PPE and can assist with ensuring and verifying the integrity of the ensemble. No exposed skin or hair of the healthcare worker should be visible at the conclusion of the donning process.
2. **Remove Personal Clothing and Items:** Change into surgical scrubs (or disposable garments) and dedicated washable (plastic or rubber) footwear in a suitable, clean area. No personal items (e.g., jewelry, watches, cell phones, pagers, pens) should be brought into patient room.
3. **Inspect PPE Prior to Donning:** Visually inspect the PPE ensemble to be worn to ensure it is in serviceable condition, all required PPE and supplies are available, and that the sizes selected are correct for the healthcare worker. The trained observer reviews the donning sequence with the healthcare worker before the healthcare worker begins and reads it to the healthcare worker in a step-by-step fashion.
4. **Perform Hand Hygiene:** Perform hand hygiene with ABHR. When using ABHR, allow hands to dry before moving to next step.
5. **Put on Inner Gloves:** Put on first pair of gloves.
6. **Put on Boot or Shoe Covers.**
7. **Put on Gown or Coverall:** Put on gown *or* coverall. Ensure gown *or* coverall is large enough to allow unrestricted freedom of movement. Ensure cuffs of inner gloves are tucked under the sleeve of the gown *or* coverall.
8. **Put on N95 Respirator:** Put on N95 respirator. Complete a user seal check.

9. **Put on Surgical Hood:** Over the N95 respirator, place a surgical hood that covers all of the hair and the ears, and ensure that it extends past the neck to the shoulders. Be certain that hood completely covers the ears and neck.
10. **Put on Outer Apron (if used):** Put on full-body apron to provide additional protection to the front of the body against exposure to body fluids or excrement from the patient.
11. **Put on Outer Gloves:** Put on second pair of gloves (with extended cuffs). Ensure the cuffs are pulled over the sleeves of the gown *or* coverall.
12. **Put on Face Shield:** Put on full face shield over the N95 respirator and surgical hood to provide additional protection to the front and sides of the face, including skin and eyes.
13. **Verify:** After completing the donning process, the integrity of the ensemble is verified by the trained observer. The healthcare worker should be comfortable and able to extend the arms, bend at the waist and go through a range of motions to ensure there is sufficient range of movement while all areas of the body remain covered. A mirror in the room can be useful for the healthcare worker while donning PPE.
14. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with ABHR. Allow to dry prior to patient contact.

Preparing for Doffing

The purpose of this step is to prepare for the removal of PPE. Before entering the PPE removal area, inspect and disinfect (using an *EPA-registered disinfectant wipe) any visible contamination on the PPE. As a final step, disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR, and allow to dry. Verify that the trained observer is available in the PPE removal area before entering and beginning the PPE removal process.

Doffing PPE, PAPR Option – PPE doffing should be performed in the designated PPE removal area. Place all PPE waste in a [leak-proof infectious waste container](#).

1. **Engage Trained Observer:** The doffing process is conducted under the supervision of a trained observer, who reads aloud each step of the procedure and confirms visually that the PPE is removed properly. Prior to doffing PPE, the trained observer must remind the healthcare worker to avoid reflexive actions that may put them at risk, such as touching their face. Post this instruction and repeat it verbally during doffing. Although the trained observer should minimize touching the healthcare worker or the healthcare worker's PPE during the doffing process, the trained observer may assist with removal of specific components of PPE, as outlined below. The trained observer disinfects the outer-gloved hands immediately after handling any healthcare worker PPE.
2. **Inspect:** Inspect the PPE to assess for visible contamination, cuts, or tears before starting to remove. If any PPE is potentially contaminated, then disinfect using an *EPA-registered disinfectant wipe. If the facility conditions permit and appropriate regulations are followed, an *EPA-registered disinfectant spray can be used, particularly on contaminated areas.
3. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR, and allow to dry.
4. **Remove Apron (if used):** Remove and discard apron taking care to avoid contaminating gloves by rolling the apron from inside to outside.

5. **Inspect:** Following apron removal, inspect the PPE ensemble to assess for visible contamination or cuts or tears. If visibly contaminated, then disinfect affected PPE using an *EPA-registered disinfectant wipe.
6. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
7. **Remove Boot or Shoe Covers:** While sitting down, remove and discard boot or shoe covers.
8. **Disinfect and Remove Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard outer gloves, taking care not to contaminate inner glove during removal process.
9. **Inspect and Disinfect Inner Gloves:** Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If an inner glove is visibly soiled, cut, or torn, then disinfect the glove with either an *EPA-registered disinfectant wipe or ABHR. Then remove the inner gloves, perform hand hygiene with ABHR on bare hands, and don a clean pair of gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
10. **Remove Respirator (PAPR)***:**
 - a. If a PAPR with a self-contained filter and blower unit integrated inside the helmet is used, then wait until Step 15 for removal and go to Step 11.
 - b. If a PAPR with an external belt-mounted blower unit is used, then all components must be removed at this step.
 - i. Remove and discard disposable hood.
 - ii. Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
 - iii. Remove headpiece, blower, tubing, and the belt and battery unit. This step might require assistance from the trained observer.
 - iv. Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
 - v. Place all reusable PAPR components in an area or container designated for the collection of PAPR components for disinfection.
11. **Remove Gown or Coverall:** Remove and discard.
 - a. Depending on gown design and location of fasteners, the healthcare worker can either untie fasteners, receive assistance by the trained observer to unfasten the gown, or gently break fasteners. Avoid contact of scrubs or disposable garments with outer surface of gown during removal. Pull gown away from body, rolling inside out and touching only the inside of the gown.
 - b. To remove coverall, tilt head back and reach under the PAPR hood to reach zipper or fasteners. Use a mirror to help avoid touching the skin. Unzip or unfasten coverall completely before rolling down and turning inside out. Avoid contact of scrubs with outer surface of coverall during removal, touching only the inside of the coverall.
12. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR
13. **Disinfect Washable Shoes:** Sitting on a new clean surface (e.g., second clean chair, clean side of a bench) use an *EPA-registered disinfectant wipe to wipe down every external surface of the washable shoes.
14. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
15. **Remove Respirator (if not already removed):** If a PAPR with a self-contained filter and blower unit that is integrated inside helmet is used, then remove all components.

- a. Remove and discard disposable hood
 - b. Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR
 - c. Remove and discard inner gloves taking care not to contaminate bare hands during removal process
 - d. Perform hand hygiene with ABHR
 - e. Don a new pair of inner gloves
 - f. Remove helmet and the belt and battery unit. This step might require assistance from the trained observer.
16. **Disinfect and Remove Inner Gloves:** Disinfect inner-gloved hands with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard gloves taking care not to contaminate bare hands during removal process.
 17. **Perform Hand Hygiene:** Perform hand hygiene with ABHR.
 18. **Inspect:** Perform a final inspection of healthcare worker for any indication of contamination of the surgical scrubs or disposable garments. If contamination is identified, immediately inform infection preventionist or occupational safety and health coordinator or their designee before exiting PPE removal area.
 19. **Scrubs:** Healthcare worker can leave PPE removal area wearing dedicated washable footwear and surgical scrubs or disposable garments.
 20. **Shower:** Showers are recommended at each shift's end for healthcare workers performing high-risk patient care (e.g., exposed to large quantities of blood, body fluids, or excreta). Showers are also suggested for healthcare workers spending extended periods of time in the Ebola patient room.
 21. **Protocol Evaluation/Medical Assessment:** Either the infection preventionist or occupational safety and health coordinator or their designee on the unit at the time should meet with the healthcare worker to review the patient care activities performed to identify any concerns about care protocols and to record healthcare worker's level of fatigue.

Doffing PPE, N95 Respirator Option – PPE doffing is performed in the designated PPE removal area. Place all PPE waste in a [leak-proof infectious waste container](#).

1. **Engage Trained Observer:** The doffing process is conducted under the supervision of a trained observer, who reads aloud each step of the procedure and confirms visually that the PPE has been removed properly. Prior to doffing PPE, the trained observer must remind healthcare workers to avoid reflexive actions that may put them at risk, such as touching their face. Post this instruction and repeat it verbally during doffing. Although the trained observer should minimize touching healthcare workers or their PPE during the doffing process, the trained observer may assist with removal of specific components of PPE as outlined below. The trained observer disinfects the outer-gloved hands immediately after handling any healthcare worker PPE.
2. **Inspect:** Inspect the PPE to assess for visible contamination, cuts, or tears before starting to remove. If any PPE is visibly contaminated, then disinfect using an *EPA-registered disinfectant wipe. If the facility conditions permit and appropriate regulations are followed, an *EPA-registered disinfectant spray can be used, particularly on contaminated areas.
3. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
4. **Remove Apron (if used):** Remove and discard apron taking care to avoid contaminating gloves by rolling the apron from inside to outside.

5. **Inspect:** Following apron removal, inspect the PPE ensemble to assess for visible contamination or cuts or tears. If visibly contaminated, then disinfect affected PPE using an *EPA-registered disinfectant wipe.
6. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
7. **Remove Boot or Shoe Covers:** While sitting down, remove and discard boot or shoe covers.
8. **Disinfect and Remove Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard outer gloves taking care not to contaminate inner gloves during removal process.
9. **Inspect and Disinfect Inner Gloves:** Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If an inner glove is visibly soiled, cut, or torn, then disinfect the glove with either an *EPA-registered disinfectant wipe or ABHR. Then remove the inner gloves, perform hand hygiene with ABHR on bare hands, and don a clean pair of gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
10. **Remove Face Shield:** Remove the full face shield by tilting the head slightly forward, grabbing the rear strap and pulling it over the head, gently allowing the face shield to fall forward and discard. Avoid touching the front surface of the face shield.
11. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
12. **Remove Surgical Hood:** Unfasten (if applicable) surgical hood, gently remove, and discard. The trained observer may assist with unfastening hood.
13. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
14. **Remove Gown or Coverall:** Remove and discard.
 - a. Depending on gown design and location of fasteners, the healthcare worker can either untie fasteners, receive assistance by the trained observer to unfasten to gown, or gently break fasteners. Avoid contact of scrubs or disposable garments with outer surface of gown during removal. Pull gown away from body, rolling inside out and touching only the inside of the gown.
 - b. To remove coverall, tilt head back to reach zipper or fasteners. Unzip or unfasten coverall completely before rolling down and turning inside out. Avoid contact of scrubs with outer surface of coverall during removal, touching only the inside of the coverall.
15. **Disinfect and Change Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard gloves taking care not to contaminate bare hands during removal process. Perform hand hygiene with ABHR. Don a new pair of inner gloves.
16. **Remove N95 Respirator:** Remove the N95 respirator by tilting the head slightly forward, grasping first the bottom tie or elastic strap, then the top tie or elastic strap, and remove without touching the front of the N95 respirator. Discard N95 respirator.
17. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
18. **Disinfect Washable Shoes:** Sitting on a new clean surface (e.g., second clean chair, clean side of a bench) use an *EPA-registered disinfectant wipe to wipe down every external surface of the washable shoes.
19. **Disinfect and Remove Inner Gloves:** Disinfect inner-gloved hands with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard gloves taking care not to contaminate bare hands during removal process.
20. **Perform Hand Hygiene:** Perform hand hygiene with ABHR.

21. **Inspect:** Perform a final inspection of healthcare worker for any indication of contamination of the surgical scrubs or disposable garments. If contamination is identified, immediately inform infection preventionist or occupational safety and health coordinator or their designee before exiting PPE removal area.
22. **Scrubs:** Healthcare worker can leave PPE removal area wearing dedicated washable footwear and surgical scrubs or disposable garments.
23. **Shower:** Showers are recommended at each shift's end for healthcare workers performing high risk patient care (e.g., exposed to large quantities of blood, body fluids, or excreta). Showers are also suggested for healthcare workers spending extended periods of time in the Ebola patient room.
24. **Protocol Evaluation/Medical Assessment:** Either the infection preventionist or occupational health safety and health coordinator or their designee on the unit at the time should meet with the healthcare worker to review the patient care activities performed to identify any concerns about care protocols and to record healthcare worker's level of fatigue.

Footnotes

*EPA-registered disinfectant wipe: Use a disposable wipe impregnated with a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim of potency at least equivalent to that for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus).

** Note: A full face shield may not provide full face protection in the setting of significant splashing.

***All facilities should have a protocol for removing their particular PAPR and preparing equipment for reprocessing (e.g., bagging for temporary storage before reprocessing, immediate reprocessing in the doffing area)

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Page last reviewed: October 20, 2014

Page last updated: October 21, 2014

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OSHA[®] FactSheet

Cleaning and Decontamination of Ebola on Surfaces

Guidance for Workers and Employers in Non-Healthcare/Non-Laboratory Settings

Workers tasked with cleaning surfaces that may be contaminated with Ebola virus, the virus that causes Ebola hemorrhagic fever (EHF), must be protected from exposure. Employers are responsible for ensuring that workers are protected from exposure to Ebola and that workers are not exposed to harmful levels of chemicals used for cleaning and disinfection.

Guidelines for cleaning and disinfection

- Immediately clean and disinfect any visible surface contamination from blood, urine, feces, vomit, or other body fluids that may contain Ebola virus.
- Isolate areas of suspected Ebola virus contamination until decontamination is completed to minimize exposure to individuals not performing the work.
- Cover spills with absorbent material (e.g., paper towels), then pour disinfectant on to saturate the area, and allow bleach to soak into spills for at least 30 minutes before cleaning to allow it to kill any virus or other infectious agents that may be present.
- Treat any visible contamination or bulk spill matter with a suitable disinfectant (described on p. 2) before cleaning up and removing bulk material.
- After disinfecting and removing bulk material, clean and decontaminate the surface using the disinfectant.
- Ensure adequate ventilation in areas where workers are using disinfectants, including by opening windows and doors, or using mechanical ventilation equipment.
- In some cases, the use of chemical disinfectants may require an employer to train workers about how to protect themselves against chemical hazards and comply with OSHA's Hazard Communication, [29 CFR 1910.1200](#), and other standards.

Use appropriate protective equipment

Employers must select personal protective equipment (PPE) (such as gloves, gowns, goggles and facemasks) that will protect workers against Ebola virus and other hazards to which they may be exposed. Workers must wear PPE to help minimize exposure to the virus via mucous membranes or broken skin. PPE suitable for contact-transmissible diseases, such as Ebola, includes:

- Nitrile gloves (consider using double-gloves for extra protection);
- Fluid-resistant or fluid-impermeable gowns;
- Goggles or face shields; and
- Facemasks that cover the nose and mouth.

Wearing protective sleeve, leg, and shoe coverings or fluid-resistant or fluid-impermeable coveralls further reduces the risk of contact with infectious materials. In some cases, additional respiratory protection (e.g., respirators) may be necessary to protect workers from exposure to Ebola and/or chemical disinfectants.

- Use tools, such as tongs from a spill kit, as much as possible rather than doing cleanup work directly with gloved hands.
- After cleaning and disinfection work is complete, remove PPE as follows: gloves, face shield/goggles, gown, and then

mask/respirator. Wash hands with soap and water, or use an alcohol-based hand gel if no running water is available. See CDC fact sheet on donning and removal of PPE: www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf.

- Avoid cleaning techniques, such as using pressurized air or water sprays, that may result in the generation of bio-aerosols (aerosolized droplets containing infectious particles that can be inhaled).

Disinfectants for Ebola virus

- Use an EPA-registered disinfectant suitable for non-enveloped viruses (e.g., adenovirus, norovirus, poliovirus) to treat contamination/spills and to disinfect surfaces after bulk spill material has been removed. See www.epa.gov/oppad001/chemregindex.htm. Follow manufacturer instructions for the specific disinfectant.
- When commercial disinfectant products are unavailable, common household bleach and other appropriate disinfectants may be effective alternatives.
- Use a 1:10 solution of bleach to water (e.g., 1 cup of bleach in 9 cups of water).
- **Never mix chemicals together.** Certain combinations of chemicals can be deadly or can reduce the effectiveness of the disinfectant.

Guidelines for waste disposal

- Soak materials and PPE used in cleanup and decontamination in disinfectant, double-bag, and place in a leak-proof container to further reduce the risk of worker exposure. Use a puncture-proof container for sharps.
- It may be necessary to dispose of contaminated objects with porous surfaces that cannot be disinfected.
- Dispose of waste from surface cleanup in accord with CDC guidelines and the U.S. Department of Transportation's (DOT) Hazardous Materials Regulations (HMR), at www.cdc.gov/vhf/ebola/hcp and phmsa.dot.gov/hazmat/transporting-infectious-substances.

Use appropriate respiratory protection

- In instances where workers may be exposed to bio-aerosols (e.g., as a result of spraying liquids or air during cleaning) suspected of or known to contain Ebola virus, additional respiratory protection is needed. In these cases, medically qualified workers must use, at a minimum, a NIOSH-approved, fit-tested N95 respirator.
- Wearing a respirator for extended periods of time can be uncomfortable. Workers who need respirators for long durations may find powered air-purifying respirators more tolerable.
- Respirators or face masks used for protecting workers against Ebola virus may not be effective for also protecting them from exposure to certain toxic chemicals used for cleaning and decontamination. To learn more about the requirements for selecting an appropriate respirator to protect against chemical exposure (elastomeric respirator with appropriate chemical cartridges or a supplied-air respirator), consult OSHA's Respiratory Protection standard, [29 CFR 1910.134](http://www.cfr.gov), and the manufacturer's Safety Data Sheet (SDS) for the specific chemical(s) that workers are using. See OSHA's Respiratory Protection web page: www.osha.gov/SLTC/respiratoryprotection.

Follow applicable OSHA standards

- Employers must ensure that they comply with OSHA's Bloodborne Pathogens standard, [29 CFR 1910.1030](http://www.cfr.gov), to protect workers who may be exposed to blood or other potentially infectious materials.
- OSHA's Personal Protective Equipment (PPE) standard, [29 CFR 1910.132](http://www.cfr.gov), provides additional information about how to select and use appropriate PPE, training and other requirements.
- Employers must comply with OSHA's Hazard Communication standard, [29 CFR 1910.1200](http://www.cfr.gov), when their workers use certain chemicals for cleaning and decontamination.
- In some cases where a specific OSHA standard doesn't apply, the General Duty Clause (Sec. 5(a)(1)) of the *Occupational Safety*

and Health Act (OSH Act) requires employers to furnish to each employee employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to employees.

Assistance for Employers

OSHA's On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site Consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing safety and health management systems. To locate the OSHA On-site Consultation Program nearest you, call 1-800-321-6742 (OSHA) or visit www.osha.gov/consultation.

Additional OSHA resources

- Safety and Health Topics web page for Ebola www.osha.gov/SLTC/ebola
- Safety and Health Topics page for Bloodborne Pathogens (and Needlesticks) www.osha.gov/SLTC/bloodbornepathogens
- Safety and Health Topics web page for PPE www.osha.gov/SLTC/personalprotectiveequipment
- Safety and Health Topics web page for Respiratory Protection www.osha.gov/SLTC/respiratoryprotection
- Safety and Health Topics web page for Hazardous and Toxic Substances www.osha.gov/SLTC/hazardoustoxicsubstances
- Hazard Communication web page www.osha.gov/dsg/hazcom

Note: This document is not intended to cover all OSHA standards that may apply. State Plans adopt and enforce their own occupational safety and health standards at www.osha.gov/dcsp/osp. Additionally, this guidance is not for cleanup and decontamination of Ebola virus released as a biological weapon. See OSHA's emergency preparedness and response resources for information related to biological terrorism: www.osha.gov/SLTC/emergencypreparedness.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.



www.osha.gov (800) 321-OSHA (6742)



U.S. Department of Labor

Appendix C (From: <http://www.cdc.gov/vhf/ebola/hcp/residential-decontamination.html>)



Interim Guidance for the U.S. Residence Decontamination for Ebola Virus Disease (Ebola) and Removal of Contaminated Waste

Who this is for: Public health, state and/or local authorities who may have to decontaminate or arrange for a contract company to decontaminate a U.S. residence and remove contaminated waste because someone living there was confirmed to have Ebola Virus Disease (Ebola).

For the general public reading this guidance, who have concerns regarding their residence and environmental contamination due to a member of the residence being confirmed with Ebola, whether owned or rented, should contact local public health and/or assigned authorities for Ebola emergency response in their location. If the public health and/or assigned authorities cannot be reached, please call CDC-INFO: 1-800-232-4636.

What this is for: These recommendations list effective disinfectant products and procedures, guidance for contract companies to follow in dealing with contaminated wastes, and guidance on how to use personal protective equipment (PPE).

How to use: Use this document for guidance on how to decontaminate a residence and dispose of waste that could be contaminated.

Key Points:

- **Effective disinfectant product(s):** Use an Environmental Protection Agency (EPA)-registered hospital disinfectant according to manufacturer's instructions with a label claim against a non-enveloped virus, such as norovirus, rotavirus, adenovirus, or poliovirus. Currently, no EPA-registered hospital disinfectant products will have a statement on the label that specifically says it can kill Ebola virus. However, any EPA-registered hospital disinfectant that is effective against a non-enveloped virus will also be effective against Ebola virus.

One simple way to identify an appropriate product effective against Ebola virus is to use a product included in EPA's List L: [Disinfectants for Use Against the Ebola Virus \(http://www.epa.gov/oppad001/list-l-ebola-virus.html\)](http://www.epa.gov/oppad001/list-l-ebola-virus.html).

- **Level of cleaning and decontamination:** Once a person has been confirmed to have Ebola, the way to decontaminate the residence depends on the person's symptoms at the time they were in the residence:
 1. Cleaning by residents - If the person with Ebola **only had a fever** with no gastrointestinal (e.g., diarrhea, vomiting) or hemorrhagic (bleeding) symptoms while he or she was in the residence, the person should not be contaminating their environment. The remaining members of the residence can clean and launder as normal using detergent and/or disinfectant.
 2. Cleaning by contract company - If the person with Ebola had a fever AND diarrhea, vomiting, and/or unexplained bleeding, public health and/or assigned authorities may need to contact a contract company who will assess the residence to determine the proper decontamination and disposal procedures. Remaining members of the residence should avoid contaminated rooms and areas until after the completion of the assessment and decontamination.
- **Which contract companies can conduct the cleaning?:** Companies with experience in cleaning biohazard and crimes scenes. [OSHA provides guidance for cleaning and decontaminating in non-healthcare settings \(https://www.osha.gov/SLTC/ebola/\)](https://www.osha.gov/SLTC/ebola/). Any contract company conducting such work must comply with the its state's Ebola policies and with [OSHA standards \(https://www.osha.gov/SLTC/ebola/standards.html\)](https://www.osha.gov/SLTC/ebola/standards.html) for, among others that may apply, [bloodborne pathogens \(https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051\)](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051) (29 CFR 1910.1030), [personal protective equipment \(PPE\) \(https://www.osha.gov/Publications/osa3151.html\)](https://www.osha.gov/Publications/osa3151.html) (29 CFR 1910.132), respiratory protection (29 CFR 1910.134), and [hazard communication \(https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099\)](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099) (29 CFR 1910.1200) (e.g., for chemical hazards). In states that operate their own occupational safety and health programs, different or additional requirements may exist.
- **Transport of waste:** Transportation of Ebola-contaminated waste (i.e., materials that cannot be decontaminated and were in contact with the person with Ebola having fever AND diarrhea, vomiting, and/or unexplained bleeding) must be packaged and transported in accordance with regulations on the transportation of Ebola contaminated items provided by the U.S. Department of Transportation (DOT): [U.S. DOT Hazardous Materials Regulation for Category A Infectious Substance \(http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vnextfmt=print\)](http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vnextfmt=print). If a contract company is handling the waste, requirements in OSHA standards, including Bloodborne Pathogens (29 CFR 1910.1030) may also apply.

Definitions:

- **Contract company:** A company hired to complete a needed task. In regards to decontaminating residences of Ebola virus, the contract company will be specialized in decontaminating, handling, and discarding of toxic chemicals, infectious agents, etc. with experience in cleaning biohazard or crime scenes and comply with all health and safety regulations.
- **Disinfection product:** A product that will make certain biological agents inactive. Specific to Ebola, use an EPA-registered hospital disinfectant included in EPA's List L: [Disinfectants for Use Against the Ebola Virus \(http://www.epa.gov/oppad001/list-l-ebola-virus.html\)](http://www.epa.gov/oppad001/list-l-ebola-virus.html).
- **Personal Protective Equipment (PPE):** Equipment worn to prevent exposure to hazardous substances (e.g., chemicals, infectious agents, particles). For Ebola decontamination, the level of PPE will vary due to the contamination level and chemicals used for cleaning and decontaminating. Refer to the [OSHA Ebola page \(https://www.osha.gov/SLTC/ebola/\)](https://www.osha.gov/SLTC/ebola/) for appropriate PPE and related recommendations in the CDC "[Guidance on Personal Protective Equipment To Be](#)

Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing) (<http://www.cdc.gov/vhf/ebola/hcp/procedures-for-ppe.html>).

Decontamination and waste disposal – Determined by the symptoms of the person confirmed with Ebola while they were within the residence

(1) Remaining members of residences where a person with Ebola **only had a fever** with no gastrointestinal (e.g., diarrhea, vomiting) or hemorrhagic (bleeding) symptoms, can clean and launder as normal because the individual should not be contaminating their environment.

(2) Remaining members of residences where a person with Ebola **had a fever AND diarrhea, vomiting, and/or unexplained bleeding** should have local public health and/or assigned authorities for Ebola emergency response managing the decontamination and waste disposal through a contract company. **Members of the residence (or property owners, if the residence is rented) should not handle contaminated materials; do not touch any body fluids or soiled surfaces and materials.**

The public health authorities can assist in finding a qualified contract company. Any contract company conducting such work must comply with the its state's Ebola policies and with OSHA standards (<https://www.osha.gov/SLTC/ebola/standards.html>) for, among others that may apply, bloodborne pathogens (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051) (29 CFR 1910.1030), personal protective equipment (PPE) (<https://www.osha.gov/Publications/osh3151.html>) (29 CFR 1910.132), respiratory protection (29 CFR 1910.134), and hazard communication (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099) (29 CFR 1910.1200) (e.g., for chemical hazards). In states that operate their own occupational safety and health programs, different or additional requirements may exist. The contract company will assess the residence to determine the proper decontamination and disposal procedures. **Only areas/rooms with contamination from diarrhea, vomiting, unexplained bleeding, and/or other body fluids, will need to be cleaned and disinfected.**

Recommendations for contract companies about disinfectants, training requirements, PPE, and waste removal

Recommendations for the contract company to follow are described in the CDC "Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus" (<http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html>) and OSHA Fact Sheet 3756 on "Cleaning and Decontamination of Ebola on Surfaces – Guidance for Workers and Employers in Non-Healthcare/ Non-Laboratory Settings" (https://www.osha.gov/Publications/OSHA_FS-3756.pdf).

- For non-porous surfaces (e.g., door handles, tile floors), use an EPA-registered hospital disinfectant according to manufacturer's instructions with a label claim against a non-enveloped virus, such as norovirus, rotavirus, adenovirus, or poliovirus. One simple way to identify an appropriate product effective against Ebola virus is to use a product included in EPA's List L: Disinfectants for Use Against the Ebola Virus (<http://www.epa.gov/oppad001/list-l-ebola-virus.html>). Any EPA-registered hospital disinfectant that is effective against a non-enveloped virus will also be effective against Ebola virus.
- Porous materials (e.g., linens, carpet, mattress, pillows) should be properly contained and disposed of according to regulations set by the state where the waste is located (<http://www.epa.gov/waste/nonhaz/industrial/medical/programs.htm>). Store the properly contained contaminated material in a room that is not being used until it can be collected for disposal. Additional CDC recommendations for Ebola Medical Waste Management (<http://www.cdc.gov/vhf/ebola/hcp/medical-waste-management.html>) provides further information about safe handling and disposal of medical waste people diagnosed with or suspected of having Ebola.
- Waste contaminated with Ebola virus must be packaged and transported in accordance to U.S. DOT Hazardous Materials Regulations (HMR, 49 CFR, Parts 171-180) (<http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vgnnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vgnnextfmt=print>)
[vgnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vgnnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vgnnextfmt=print](http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vgnnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vgnnextfmt=print)
If a contract company is handling the waste, requirements in OSHA standards, including Bloodborne Pathogens (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051) (29 CFR 1910.1030) may also apply.

Contract company requirements and PPE (biological and chemical): Contract company employees must be properly trained. The contract company is responsible for selecting and providing PPE to protect their workers from exposure to Ebola and to chemical hazards from the cleaning and disinfectant agents. Where respiratory hazards exist, such as from aerosolized viral particles or chemicals used in cleaning and disinfection, workers must use NIOSH-approved respirators, be fit-tested before using respirators, and be medically cleared.

OSHA Bloodborne Pathogens Standard (29 CFR 1910.1030) (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051)

OSHA Personal Protective Equipment (29 CFR 1910.132) (<https://www.osha.gov/Publications/osh3151.html>)

OSHA Respiratory Protection (29 CFR 1910.134) (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12716)

Hazard Communication Standards (29 CFR 1910.1200) (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099)

- Biological - PPE recommendations for contract companies are the same as those in the CDC "Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing)" and OSHA Fact Sheet 3756 on "Cleaning and Decontamination of Ebola on Surfaces – Guidance for Workers and Employers in Non-Healthcare/ Non-Laboratory Settings" (https://www.osha.gov/Publications/OSHA_FS-3756.pdf).
- Chemical - Contract companies are required to have completed OSHA training for Hazard Communication Standards (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099) and should follow OSHA/ NIOSH guidelines for "Protecting Workers Who Use Cleaning Chemicals".

Table 1. Interim guidance summary for decontamination and waste disposal in a U.S. residence where a person has Ebola.

Category	Definition	Decontamination and Disposal	Training and PPE
Cleaning by residents	<ul style="list-style-type: none"> Residence where a person with Ebola only had a fever and no gastrointestinal (e.g., diarrhea, vomiting) and/ or no hemorrhagic (bleeding) symptoms 	<ul style="list-style-type: none"> Residents can clean and launder as normal using detergent and/or disinfectant Residents can discard of waste as normal 	<ul style="list-style-type: none"> No training required Follow detergent and disinfectant product manufacturer's instructions
Cleaning by contract company	<ul style="list-style-type: none"> Residence where a person with Ebola had a fever AND diarrhea, vomiting, and/or unexplained bleeding 	<ul style="list-style-type: none"> Members of the residence or property owners should NOT handle contaminated materials Contact local public health or assigned authorities Contract company should conduct decontamination and disposal procedures 	<ul style="list-style-type: none"> Contract company should follow local state policies, comply with OSHA standards, and federal guidelines as appropriate

Resources

[CDC Ebola Medical Waste Management \(http://www.cdc.gov/vhf/ebola/hcp/medical-waste-management.html\)](http://www.cdc.gov/vhf/ebola/hcp/medical-waste-management.html)

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

[CDC Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On \(Donning\) and Removing \(Doffing\)](#)

[OSHA Fact Sheet 3756, 'Cleaning and Decontamination of Ebola on Surfaces' \(https://www.osha.gov/Publications/OSHA_FS-3756.pdf\)](https://www.osha.gov/Publications/OSHA_FS-3756.pdf)

[OSHA Bloodborne Pathogens Standard \(29 CFR 1910.1030\) \(https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051\)](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051)

[OSHA Hazard Communication Standards \(29 CFR 1910.1200\) \(https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099\)](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099)

[OSHA Personal Protective Equipment \(29 CFR 1910.132\) \(https://www.osha.gov/Publications/OSHA-3151.html\)](https://www.osha.gov/Publications/OSHA-3151.html)

[OSHA/NIOSH Infosheet: Protecting Workers Who Use Cleaning Chemicals \(http://www.cdc.gov/niosh/docs/2012-126/pdfs/2012-126.pdf\)](http://www.cdc.gov/niosh/docs/2012-126/pdfs/2012-126.pdf)

[OSHA Ebola Web page \(http://www.osha.gov/ebola/\)](http://www.osha.gov/ebola/)

[U.S. EPA Office of Pesticide Programs, List L: Disinfectants for Use Against the Ebola Virus \(http://www.epa.gov/oppad001/list-l-ebola-virus.html\)](http://www.epa.gov/oppad001/list-l-ebola-virus.html)

[U.S. EPA Where You Live - State Medical Waste Programs and Regulations \(http://www.epa.gov/waste/nonhaz/industrial/medical/programs.htm\)](http://www.epa.gov/waste/nonhaz/industrial/medical/programs.htm)

[U.S. DOT Hazardous Materials Regulations \(http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vgnnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vgnnextfmt=printhttp://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfrv2_02.tpl\)](http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vgnnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vgnnextfmt=printhttp://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfrv2_02.tpl)

[Electronic Code for Federal Regulations \(http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfrv2_02.tpl\)](http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfrv2_02.tpl)

File Formats Help:

How do I view different file formats (PDF, DOC, PPT, MPEG) on this site? (<http://www.cdc.gov/Other/plugins/>)

(<http://www.cdc.gov/Other/plugins/#pdf>)

Page last reviewed: November 3, 2014

Page last updated: November 5, 2014

Content source: Centers for Disease Control and Prevention (/index.htm)

National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) (/ncezid/index.html)

Division of High-Consequence Pathogens and Pathology (DHCPP) (/ncezid/dhcpp/index.html)

Viral Special Pathogens Branch (VSPB) (/ncezid/dhcpp/vspb/index.html)



**Decontamination of Vehicles Used for
Transportation of Potential Ebola Virus Disease (EVD)
Patients or Related Equipment**

Technical Information Paper No. 13-031-1014

1. Purpose. This information paper provides guidance for decontaminating vehicles used to transport personnel or equipment in the Area of Operations (AO) impacted by Ebola virus disease (EVD). It is intended to provide decontamination information specific to Department of Defense (DoD/DOD) equipment deployed with U.S. troops to EVD affected areas. It is not intended to change any existing DoD directives, policies, or procedures provided by Combatant Commands, concept plans (CONPLANS), or Operation Orders (OPORDs) in the AO or the U.S. Africa Command (AFRICOM) Area of Responsibility (AOR).

2. Applicability. This information is applicable to DOD-owned vehicles and equipment. This is preliminary information based upon limited available data. This document is not intended to be a step-by-step instruction and should be read and understood in its entirety prior to commencing any vehicle decontamination activity. Hence, there is an expectation that personnel involved with decontamination activities have familiarity with the proper use of personnel protective equipment (PPE), respirator protection program, working with hazardous materials, hazards associated with working with infected persons and remains, and waste management and disposal practices.

3. Background. The U.S. Centers for Disease Control and Prevention (CDC) notes that the 2014 outbreak is the largest outbreak of EVD in history and the first in West Africa. There may be instances during responses to the outbreak when DOD vehicles may be used for the transport of suspected and/or confirmed EVD patients, equipment, or medical waste.

4. References. Established military procedures for decontamination of several types of military equipment are found in Field Manual (FM) 3-11.5/MCWP 3- 37.3/NTTP 3-11.26/AFTTP(I)3-2.60, CBRN Decontamination: Multiservice Tactics, Techniques, and Procedures for Chemical Biological Radiological and Nuclear Decontamination, April 2006. See Appendix A for additional references.

5. EVD Transmission.

a. Body fluids and tissue from individuals who develop symptoms of EVD are very infectious. EVD spreads in the community through

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Updated: 22 October 2014

Use of trademarked name(s) does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product.

human-to-human transmission, with infection resulting primarily from direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and indirect contact with environments contaminated with such fluids. According to the limited research available, isolation of cases, disease contact tracing, proper handling of blood/body fluids and remains of the deceased, and proper use of PPE when in contact with EVD-infected persons is required to stop further spread.

b. Persons in contact with suspected and/or confirmed EVD patients must consistently apply appropriate infection control procedures (standard, contact, and droplet precautions). These include basic hand hygiene, respiratory hygiene, PPE to reduce the risk from splashes or other contact with infected materials, and patient isolation. Prevention guidelines for medical and transport personnel who may come in contact with EVD patients or their bodily fluids are available at: <http://www.cdc.gov/vhf/ebola/hcp/index.html>.

c. Given the apparent low infectious dose, potential for high virus titers in the blood of ill patients, and disease severity, higher levels of precaution are warranted to reduce the potential risk posed by contaminated surfaces.¹

d. Infection control guidelines addressing procedures to disinfect healthcare settings are readily available from the CDC. The CDC also provides guidance for decontamination procedures for air medical transport of EVD patients and disinfection for airport cargo and cleaning personnel. This document is intended to augment these resources by providing decontamination information specific to DOD vehicles deployed to EVD affected areas.

e. Porous surfaces in the vehicle (cloth seats, worn or torn plastic seats, pillows, bedding) should be covered with plastic or other fluid-impermeable covering prior to transporting patients. Coverings must be disinfected after use or disposed.

6. Decontamination and Waste Management Process. The following processes are discussed in this paper.

a. Equipment to disinfect. Mission leadership in theater along with infection control will decide what equipment is reusable and can be disinfected and what equipment will be treated and disposed.

b. Select PPE.

c. Appropriate disinfection chemicals. The on-site Infection Control Officer (ICO) will select the disinfection method and chemicals.

- d. Positive control of reusable equipment
- e. Decontamination steps for porous and non-porous equipment.
- f. Disposal of solid waste and wastewater generated in the decontamination process.
- g. Management of contaminated items selected for disposal.
- h. In theater treatment and disposal of infectious waste.

7. Vehicles in the AO where EVD is Present or Suspected. Vehicles in the AO that do not come in contact with persons ill with EVD or items potentially contaminated with Ebola virus do not require special decontamination, but should follow normal protocols for washing military vehicles as established in DoD Regulation 4500.36, Management, Acquisition, and Use of Motor Vehicles.

8. Vehicles that have Transported a Suspected and/or Confirmed EVD Patient. Vehicles used to transport a suspected and/or confirmed Ebola patient must be decontaminated as soon as possible after use.

9. Select PPE. Personnel cleaning and disinfecting equipment must wear PPE. The on-site ICO will determine the appropriate level of PPE for disinfection of vehicles. Disposable PPE will not be reused. The ICO will also determine which PPE can be reused and the disinfection procedures necessary. Reusable PPE items will require proper cleaning and disinfection after each use.

a. Donning and doffing of PPE are critical steps in the prevention of exposure. It is imperative that personnel carefully remove PPE after working in potentially contaminated environments to avoid exposure of non-protected skin and mucous membranes. It is highly recommended that donning and doffing of PPE is performed in pairs or with supervision to minimize potential for unintentional exposures. Instructions for putting on and removing PPE are available at <http://www.cdc.gov/HAI/prevent/ppe.html> and <http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf>.

b. The onsite ICO will determine the PPE necessary for the disinfection process. At a minimum, PPE should include doubled disposable gloves with the inner glove taped to the suit, fluid resistant/impermeable gown, eye protection (face shield), and N95 respirator to protect against direct skin and mucous membrane exposure of cleaning chemicals, contamination, and splashes or spatters during cleaning and disinfection

activities. Additional barriers (e.g., leg covers, shoe covers) may be required for disinfection process requiring a low pressure sprayer.

c. When there is a greater risk of splashes or splatters, use full Tyvek® coverall suit, and overboots, heavy gauge rubber gloves over disposable gloves taped to the coverall suit, along with personal air purifying respirator (PAPR) during cleaning and disinfection activities. (Tyvek® is a registered trademark of E.I. DuPont de Nemours and Company.)

10. Selection of Decontamination Method. There are a number of procedures and materials that can be used to decontaminate surfaces suspected of Ebola virus contamination. Not all decontamination methods are suitable or amenable to the material/item that is suspected of contamination. The best method to use depends on the type of material that is contaminated, how the material is contaminated, the ability to obtain decontamination supplies, and other factors specific to the AO. One key element impacting decontamination is the porosity of the material and whether electronic components are present. Establish a decontamination area according to in FM 3-11.5/MCWP 3-37.3/NTTP 3-11.26/AFTTP(I)3-2.60, *CBRN Decontamination: Multiservice Tactics, Techniques, and Procedures for Chemical Biological Radiological and Nuclear Decontamination*, April 2006.

a. Porous materials. These are materials that will allow liquid and gas to pass through them. These will vary in hardness, density, and porosity. As a result, liquids spilled or applied to these will absorb into the material making it more difficult to remove or decontaminate. Examples of porous materials include paper, fabric, and wood.

b. Non-porous materials. These are materials that will limit or prevent liquid and gas from passing through them. Liquids spilled or applied to these materials will pool or run off the material. Examples of non-porous materials include glass, metals, and plastics.

c. Electronics. These are items containing electronic circuitry, switches, batteries, wiring, and so forth. These items may or may not be installed or manufactured in a manner to prevent exposure to vapors and liquids, such as contaminants and decontamination products.

d. Heavily soiled items. Even at the higher concentration of bleach solution, disinfection will be more successful if gross debris is removed prior to disinfection. Organic matter will neutralize bleach solution. Use disposable cleaning cloths, mop cloths, and wipes to manually clean the surfaces with a bleach and soap and water solution. This step should be followed with disinfection with one of the following disinfectants.

11. Chemical Decontamination. Selected disinfectants and bleach are recommended for killing the Ebola virus. Note that while alcohol is part of any hand sanitation/infection control program (alcohol-based hand sanitizer), it is not effective for decontaminating objects that have been in contact with the Ebola virus.

a. Commercial disinfectants. The U.S. Environmental Protection Agency (EPA) has identified a number of disinfectants suitable for Ebola virus decontamination (Table 1). The disinfectants on *List G: EPA’s Registered Antimicrobial Products Effective Against Norovirus* have been identified as being acceptable for use against Ebola virus. A large number of these are peroxide and acidic/alkaline-based cleaners.² Prepare and use commercial disinfectant per the directions on the package.

Table 1. National Stock Numbers for Some EPA-Approved Disinfectants

NSN	Trade Name	Nomenclature
6840-01-389-6088	Dispatch [®]	Disinfectant-Detergent, General Purpose
6840-01-491-4889	Dispatch	Disinfectant-Detergent, General Purpose
7930-01-084-3103	Spray Nine [®]	Cleaner, Industrial, Multi-Purpose
7930-01-177-0795	Spray Nine	Cleaner, Industrial, Multi-Purpose
7930-01-346-5280	Spray Nine	Cleaner, Industrial, Multi-Purpose
7930-01-346-5281	Spray Nine	Cleaner, Industrial, Multi-Purpose
7930-01-346-5284	Spray Nine	Cleaner, Industrial, Multi-Purpose
7930-01-393-6747	Spray Nine	Cleaning Compound Solvent Detergent Liquid Disinfectant 25oz 12s

Notes:

Dispatch[®] is a registered of The Clorox Company. SprayNine[®] is a registered trademark of the U.S. EPA.

b. Bleach. Diluted bleach is highly effective at decontaminating surfaces and items contaminated with the Ebola virus. Non-porous surfaces that are relatively free of debris and caked or pooled material can be decontaminated with a solution of 1 percent bleach [1:100 (~8 teaspoons of bleach added to 1 gallon of water or 10 milliliters (mL) of bleach to 990 mL of water)]. For unclean, soiled, dirty, and porous surfaces, or when decontaminating an item via immersion; a solution of 10 percent bleach solution should be used [1:10 (1 cup of bleach added to 9 cups of water or 100 mL of bleach added to 900 mL of water)].³ Even at the higher concentration of bleach solution, disinfection will be more successful if gross debris is removed prior to disinfection. Organic matter will neutralize bleach solution. Bleach solution should remain in contact with surfaces/items for at least 10 minutes.

(1) Full strength bleach emits toxic vapors and should never be used in small or enclosed spaces. Ideally, mix your solution outside. If that is not an option, go to a large, well-ventilated room and open the windows.

(2) Carefully pour the bleach into the container first, and then add cold water. Mixing the solution in this order will prevent the bleach from splashing up on you. If you do get any bleach on your skin, wipe it off immediately with a damp cloth.

(3) Place the lid on the container and gently invert the container back and forth a few times to mix. The solution is now ready to use. Never add any other ingredients to the bleach solution because many substances, including vinegar, create harmful fumes when mixed with chlorine bleach.

(4) Chlorine bleach solution begins to lose its disinfectant power quickly when exposed to heat, sunlight, and evaporation. To ensure the solution is still strong enough to kill germs, mix a fresh batch every 2 hours using cold water and discard any remaining solution.

(5) Use of Super Tropical Bleach (STB), as specified in FM 3-11.5, can be used where applicable if it will not degrade/damage the contaminated item.

c. MicroChem Plus™ solution. MicroChem Plus solution is highly effective at decontaminating surfaces and items contaminated with the Ebola virus. Approximately 190 mL of MicroChem Plus solution can be added to 1 gallon of water to achieve the correct dilution for decontaminating surfaces. The MicroChem Plus solution should remain in contact with the surfaces/items for at least 15 minutes. An advantage of MicroChem Plus is that it is not believed to be degraded by organic matter to the degree that bleach is. (MicroChem Plus™ is a trademark of National Chemical Laboratories, Inc.)⁴

12. Encapsulated Treatment. This method requires encapsulating an item, or area to be decontaminated, within a sealed enclosure whereupon all items within the enclosure are subjected to treatment. Treatment may be in the form of heating, vaporized chemical oxidizers (e.g., hydrogen peroxide vapor, chlorine dioxide), or disinfectant bombs/fogs (fumigation). The amount of time required to effectively decontaminate the area depends on the concentration used, the contact time, environmental controls (maintaining the temperature and/or concentrations), the size of the space (this will be a factor for reaching the desired concentration), and the integrity of the encapsulation (maintained positive pressure, sealed, and so forth). Failure of any one of these may compromise the decontamination process. Additionally, it will be necessary to validate the treatment process to demonstrate all locations within the enclosed area were adequately subjected to the particular treatment used. Validate according to the chemical manufacturer directions.

The drawback to encapsulation is the potential for the treatment itself to adversely impact sensitive items contained within the enclosure (i.e., corrosion of electronics,

melting of plastics, chemical residues). This form of treatment should only be used in those instances where surface decontamination or disposal of the contaminated item is not feasible due to the total area requiring treatment, when contamination is not limited to the surface, and/or when the cost to replace the item is excessive. Specialized equipment for dispersing reagents, PPE, and controlling the environment will be required.

This option may not be available in theater.

13. Positive Control of Reusable Equipment. Establish a system for tracking items selected for disinfection and reuse. Establish a means for identifying and tracking all items that have and have not been disinfected. Whether through the use of colored tape, flags, tags, spray paints, or designated holding areas; this is absolutely necessary to ensure all reusable items are decontaminated prior to being released for reuse. Identify one person (or team) as the central controller for tracking and documenting all items subject to disinfection. By utilizing a centralized point of contact (POC) or team, this allows for greater control, monitoring, tracking, and review of potentially contaminated items.

14. Decontamination of Non-Porous Surfaces (e.g., Glass, Metal, Painted Surfaces, Plastics). Coat the surface with disinfectant and let stand for 30 minutes. If using hand sprayers, ensure PPE designed for splash protection is worn. During this time, a disinfectant saturated media (i.e., sponge, rag, wipe) can be used to gently spread the disinfectant across and around the surface. Allow to dry.

15. Decontamination of Porous Surfaces. For porous surfaces (e.g., removed clothing, bedding, mattresses, seat cushions); decontamination will require a decision as to whether the item will be reused.

a. Porous items that have been in direct contact with bodily fluids from infected patients will be disposed as infectious waste (see paragraph 17).

b. There may be times when a porous item must be placed back into use. In these limited situations disinfect the item according to FM 3-11.5/MCWP 3-37.3/NTTP 3-11.26/AFTTP(I)3-2.60, *CBRN Decontamination: Multiservice Tactics, Techniques, and Procedures for Chemical Biological Radiological and Nuclear Decontamination*, April 2006. For additional protection after disinfection, cover items with plastic or other fluid-impermeable covering prior to next use.

NOTE: Infection control will determine how to accomplish disinfection and collect wastewater for items that cannot be immersed due to size or inability to detach from a mount.

16. Decontamination of Electronic Equipment. Moisture, dust, and corrosive decontamination chemicals can damage unsealed electronic equipment circuitry. Most field electronic equipment is watertight to protect it from environmental damage. This also provides good protection against biological contamination. Contamination will probably not penetrate gasket-equipped protective covers and sealed components on electronic equipment; but if exposed, the contaminants may be present on the outside of cases containing the electronic equipment. Wipe down the outside of the equipment case with an approved decontaminant and stand for the contact time required for that decontaminant. After decontaminating the outside, wipe down the equipment with water or an approved solvent to remove traces of decontaminant solution. If equipment seals appear damaged or penetration of the Ebola virus into the equipment is suspected, treat the item as if it were unsealed. Under no circumstances should electronic equipment be immersed in a decontaminant solution or subjected to high-pressure application of decontaminant solutions.⁵ Segregate contaminated electronic equipment in a dirty or until technical experts can determine the best decontamination method. Electronic equipment that cannot be decontaminated must be disposed as infectious waste.

17. Disposal of Solid Waste and Wastewater Generated During Decontamination.

a. Solid waste. Solid waste generated during transport (bedding, clothing, pillows), or as part of the decontamination process (including PPE) will be disposed as infectious waste.

(1) Place items in a leak-proof biohazard bag. Use a rigid waste receptacle designed to support the bag to help minimize contamination of the bag's exterior. Care must be taken to prevent splashes and/or spread of fluids beyond the area of contamination.

(2) Do not compact bags.

(3) Tie the bag to prevent the release of material from the bag when inverted.

(4) Treat the exterior of the primary bag with bleach or approved disinfectant. Use an absorbent pad to capture drips from the sprayed bag.

(5) Place primary bag into a secondary bag. Spray the exterior of the secondary bag.

(6) If red biohazard bags are not available, affix signs or labels to the secondary bags to indicate the contents of the bag are infectious waste.

(7) Place the bags in a designated clean rigid waste receptacle for transport to the infectious waste storage area.

b. Storage area. To store the infectious waste prior to treatment and disposal, select a secure location that provides maximum protection from vectors, is enclosed, and protected from the weather. A Military Van (MILVAN) or Container Express (CONEX) may be used for this purpose. Keep this waste separate from all other types of waste.

c. Wastewater. Although decontamination is intended to destroy or inactivate Ebola virus, it is possible that wastewater from decontamination of vehicles could still contain some active virus. Disposing of the wastewater through sanitary sewers is only a good option if additional disinfection occurs as part of the wastewater treatment process. However, in the areas of Africa where EVD has been found recently, functioning modern sewers with disinfection prior to discharge are not routinely available.

d. Using a soakage pit is an option if the site selected is completely isolated from any surface water or any subsurface source of drinking water. If soakage pits are used, after the rinse water enters, add enough lime to achieve a pH of 12 or above and maintain it at that level for 2 hours without adding more lime. Each time the pH slips below 12, add more lime and wait a full 2 hours from the time the additional lime was added.⁶ After the pH has successfully been maintained for 2 hours as described above, cover the area with earth and secure the area so that it is not used for farming, irrigation, digging of wells, and so forth.

e. Lime is usually available at farm supply stores in the United States as a soil pH adjustment and may be available in less developed areas of the world. The lime addition rate to the pit should be approximately a 50 pound (23 kilograms) bag per 1,000 gallons (3,785 liters) of rinse water. The lime will react with water to produce heat. It is best to add the lime as a slurry to the pit by premixing it with other water (NOT the rinse water), rather than pouring powdered lime directly into the rinse water.

18. In-Theater Treatment and Disposal. Personnel handling the EVD waste containers in the treatment and disposal process will don and doff the same level of PPE used by personnel who generate the infectious waste.

a. Incineration is the preferred and most effective disposal method for infectious waste; however, incineration options may be limited. Options include:

(1) Collaborating with local hospitals which may have incineration capabilities.

(2) Determining whether DOD Mediburn incinerators are in the AO and coordinating for their use.

(3) Constructing an inclined plane incinerator as described in Chapter 3 of Technical Manual (TM) 3-34.56/MCIP 4-11.01, *Waste Management for Deployed Forces*, July 2013. The inclined-plane incinerator is a field-expedient means to treat and destroy infectious waste, including sharps (syringes, and so forth). Depending on the size constructed, it can accommodate the waste generated by a combat support hospital or similar-size unit. The waste feed to the inclined-plane incinerator should be mixed at approximately 10 percent, by weight, infectious waste (to include sharps) to 90 percent, by weight, of regular trash. This mixture will help ensure the hottest and cleanest burn possible. General specifications for the inclined plane incinerator are:

(a) Insert a sheet of metal through 2 telescoped 55-gallon drums that have had both ends removed.

(b) The sheet of metal should extend 2 feet beyond the upper end of the telescoped barrels to serve as a loading or stoking platform.

(c) Position the drums, with the plane in place on an inclined surface (hill).

(d) Position a grate at the lower end of the drums. The fire (wood or fuel oil) will be built under the grate.

(e) After the incinerator becomes hot, place the infectious waste on the loading platform (metal sheet). As the waste starts to burn, push it down the incline in small amounts.

(f) Final combustion takes place on the grate.

(4) Burning should be avoided when the wind may blow the resulting smoke toward the base camp or other inhabited areas. Depending on the guidance established for the theater of operations, if the ash does not contain sharps and has been evaluated for hazardous characteristics, it can be buried with other solid waste. If it is determined to be hazardous, manage as hazardous waste. If it is nonhazardous but contains sharps, it must be placed in 55-gallon drums that will be retrograded to an approved landfill. A retrograde shipment of drums containing this ash is not considered a hazmat shipment. If retrograding sharps is not an option, they should be buried below scavenger depth (approximately 8 feet).⁷

(5) Soldiers involved in the actual burning of medical waste must wear PPE that is both protective from exposure to infectious waste as well as inhalation hazards. An

air-purifying respirator (cartridge or canister) with a high-efficiency particulate air filter is recommended. Paper surgical masks do not protect from hazards inherent in the burning of waste and should not be substituted for an air-purifying respirator. Wearing a Soldier's personal protective mask is also not recommended. Though a Soldier's personal protective mask is equipped with a high-efficiency particulate air filter, it is best used to protect the Soldier against chemical and biological threats.⁹

b. Department of Defense Instruction (DoDI) 4715.19, *Use of Open-Air Burn Pits in Contingency Operations*, prohibits the disposal of waste in open-air burn pits during contingency operations except in circumstances in which no alternative disposal method is feasible as determined according to the procedures in this document. Refer to DoDI 4715.19 for details.

c. The World Health Organization provides the option of burying waste in a designated pit of appropriate depth (2 meters or about 7 feet) and filled to a depth of 1–1.5 meters (about 3–5 feet). After each waste load, the waste should be covered with a layer of soil 10–15 centimeters (4–6 inches) deep.⁸

19. Point of Contact. The point of contact for this document is the Army Institute of Public Health Waste Management Program at 410-436-3651 or DSN 584-3651.

Endnotes:

¹<http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html>

²http://www.epa.gov/oppad001/list_g_norovirus.pdf

³<http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/ebola-eng.php>

⁴http://www.nclonline.com/products/view/MICRO_CHEM_PLUS_

⁵FM 3-11.5/MCWP 3-37.3/NTTP 3-11.26/AFTTP(I)3-2.60, *CBRN Decontamination: Multiservice Tactics, Techniques, and Procedures for Chemical Biological Radiological and Nuclear Decontamination*, April 2006, page E-2

⁶40 CFR 503, Rules on lime stabilization of biosolids

⁷TM 3-34.56/MCIP 4-11.01, Waste Management for Deployed Forces, July 2013, Chapters 3 and 6

⁸<http://www.who.int/csr/resources/who-ipc-guidance-ebolafinal-09082014.pdf>, page 9

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World Health Organization. (2014, August). *Interim infection prevention and control guidance for care of patients with suspected or confirmed filovirus haemorrhagic fever in health-care settings, with focus on ebola*. 9.

Procedural Guidance on the Proper Packaging of Ebola Suspected Waste

DOT Guidance for Preparing Packages of Ebola Contaminated Waste for Transportation and Disposal

This guidance is intended for persons who prepare packages containing waste contaminated or suspected of being contaminated with Ebola, for transportation to off-site treatment and disposal. It provides guidance on DOT regulations regarding the transportation of a Category A infectious substance only and highlights some of the requirements of the HMR, which can affect transportation safety. This document should not be used as a substitute for the HMR to determine compliance.

An infectious substance is regulated as a hazardous material under the U.S. Department of Transportation's (DOT's) Hazardous Materials Regulations (HMR; 49 C.F.R. Parts 171-180). The HMR apply to any material DOT determines is capable of posing an unreasonable risk to health, safety, and property when transported in commerce.¹ An infectious substance must conform to all applicable HMR requirements when offered for transportation or transported by air, highway, rail, or water. Refer to the Center for Disease Control and Prevention (CDC) for guidance on handling these agents before transporting them (see <http://www.cdc.gov/vhf/ebola/hcp/index.html>).

Strict compliance with the HMR is required. For more information on the HMR requirements see <http://phmsa.dot.gov/hazmat/transporting-infectious-substances>. The HMR contains federal requirements for transporting hazardous materials in commerce. If a person requires a variance to the HMR, that person must apply for a Special Permit under 49 CFR § 107.105. DOT may grant a special permit if the applicant can demonstrate that an alternative packaging will achieve a safety level that is: (1) at least equal to the safety level required under the HMR, or (2) consistent with the public interest if a required safety level does not exist.

In addition, the motor carrier, including its driver, must comply with the Federal Motor Carrier Safety Regulations (FMCSR), 49 C.F.R., Parts 300-399, as applicable.

Packaging Preparation: Bag the waste in plastic film bags and place in a rigid outer packaging.

Note: Individual plastic film bags may weigh no more than 10 kg (22 lbs.) when filled. An outer packaging may contain more than one set of triple bagged waste.

Step 1

- Follow all appropriate occupational safety and health requirements in place by regulating agencies and your facility;
- Place the potentially contaminated waste into the first plastic bag;
- Prior to closure, treat potentially contaminated waste with an U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g.,

¹ The HMR applies to interstate, intrastate, and foreign commerce.

Procedural Guidance on the Proper Packaging of Ebola Suspected Waste

norovirus, rotavirus, adenovirus, poliovirus) that is recommended by the CDC for use as a disinfectant for the Ebola virus. Please review product label to ensure it meets these requirements;

- Place sharps waste in an authorized sharps container, and close and seal it in accordance with the packaging instructions for that container;
- Wrap objects with sharp edges to prevent the tearing or puncture of the plastic bag;
- Close the plastic film bag by tying the bag with a knot or other equally effective positive means of closure that will not tear or puncture the outer bag or liner such as heat sealing, tape, or adhesive, and will ensure any liquid contents will not leak from the packaging; and,
- Disinfect the exterior surface of the plastic bag with an EPA-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) that is recommended by the CDC for use as a disinfectant for the Ebola virus.

Step 2

- Place the first plastic film bag, with the knot facing upward, into a second plastic film bag;
- Close the second plastic film bag by tying the bag with a knot or other equally effective positive means of closure that will not tear or puncture the outer bag or liner such as heat sealing, tape, or adhesive, and will ensure any liquid contents will not leak from the packaging. Make sure the primary bag does not interfere with closing the second bag;
- Disinfect the exterior surface of the second bag with an EPA-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) that is recommended by the CDC for use as a disinfectant for the Ebola virus.

Step 3 – Preparation of outer packaging

- The outer package must be either a rigid UN Standard or DOT Approved non-bulk packaging. If the outer packaging is fabricated from fiberboard, it must be a minimum of triple wall and contain a 6 mil polyethylene liner.
- Place absorbent material sufficient to absorb all free liquid (if any) in the bottom of the rigid outer packaging or the liner of the fiberboard outer packaging;
- Place the double bagged waste into the rigid outer packaging or into the outer fiberboard packaging with an installed liner;
- Close the liner (if used) either by zip tie or other equally effective means of closure or as specified by the manufacturer of the packaging;
- Securely close the outer packaging as specified by the manufacturer of the packaging;
- Disinfect the exterior surface of the package with an EPA-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) that is recommended by the CDC for use as a disinfectant for the Ebola virus.

Procedural Guidance on the Proper Packaging of Ebola Suspected Waste

Authorized Packaging Materials

Plastic film bag

Plastic film bags must:

- Be 175 liters or smaller (46 gallons);
- Be marked and certified by its manufacturer as having an impact resistance of 165 grams and a tearing resistance of 480 grams in both the parallel and perpendicular planes with respect to the length of the bag when tested in accordance with ASTM D 1709 and ASTM D 1922;
- Be compatible with the EPA-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) used to disinfect the waste and packagings.

Outer packaging

The outer packaging must:

- Be a UN Standard or DOT Approved non-bulk packaging:
 - Drums made of plastic, or triple wall corrugated fiberboard (authorized under approval); or
 - Boxes made of plastic or triple wall corrugated fiberboard;
- Be certified and tested to the PG II level;²
- Have a minimum of a six millimeter polyethylene plastic liner if the outer packaging is fiberboard;
- Must be marked and labeled in accordance with 49 CFR §172.301.

Operational Controls – Medical Facility

- The outer packaging must be closed except when being filled with inner packagings containing waste materials;
- Before loading the package into a transport vehicle, the medical facility must ensure that the package is not leaking and the package is closed and sealed according to the recommended closure instructions.

Operational Controls – Transporter

Note: If the waste contaminated or suspected of being contaminated with Ebola cannot be packaged and transported in accordance with the HMR, the waste transporter may apply for a special permit. The following list of operational controls is provided as guidance for those seeking special permits and should be addressed in the special permit application.

² Will be either an X or Y certified package.

Procedural Guidance on the Proper Packaging of Ebola Suspected Waste

- Materials may be transported by highway only.
- The motor carrier, including its driver, must comply with the Federal Motor Carrier Safety Regulations (FMCSR), 49 CFR Parts 300-399, as applicable.
- Loading and unloading the vehicle must be performed using manual means. Fork trucks or other powered mechanical handling equipment may not be used for loading or unloading the vehicle.
- After loading and prior to transportation, the transporter must perform an external visual inspection of the transport vehicle to determine that it is closed and free of leakage.
- All shipments must be accompanied by a Hazardous Materials Shipping Paper in accordance with 49 C.F.R. §172 Subpart C.
- While in transportation, the doors on the motor vehicle or shipping container being used to transport the material must be closed and locked except when an outer packaging is being loaded or unloaded into the vehicle.
- The transporter may only transport the vehicle loaded with the material to a final destination that is authorized by applicable laws for treatment or disposal of such materials, without unnecessary delay from the time the carrier's motor vehicle leaves the shipper's premises.
- Waste must be transported to the nearest appropriate disposal facility available at the time the material is offered for transportation without additional loading or unloading of the vehicle.
- The transporter must have a written spill response plan that includes provisions for the decontamination of spilled materials and for personal protective equipment to be carried on the vehicle and used to protect its employees from contact with infectious materials in any form.
- The transporter must respond to any release from a package that occurs during transportation. The response must include complete removal of any spilled material and decontamination of the release site, vehicle surfaces and external surfaces of the package involved. Any release must be reported to PHMSA as soon as practicable.
- Each motor vehicle used must be decontaminated in accordance with applicable federal, state and local laws.
- Each motor vehicle and driver involved in the transport of the contaminated waste must be made available for a Commercial Vehicle Safety Alliance (CVSA) Level I hazardous materials inspection prior to transport. If violations of the CVSA North American Standard Out-of-Service Criteria (2014 edition) are found, the violation(s) must be corrected prior to transporting hazardous materials.

Appendix F (From: <http://phmsa.dot.gov/hazmat/question-and-answer>)

PHMSA

Pipeline and Hazardous Materials
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Q&A

Q&A

- Why is a special permit needed to transport suspected or confirmed Ebola contaminated waste?**

Solid materials contaminated with the Ebola virus are classified as Category A infectious substances according to the Hazardous Materials Regulations (HMR). Category A infectious substances -- including the Ebola virus -- may only be transported in two scenarios; in full compliance with classification and packaging requirements of the HMR; or under the terms of a special permit. Because of the relatively large quantity of contaminated waste generated when treating patients with known or suspected Ebola Virus Disease (EVD), the available packagings authorized under the regulations governing the transport of Category A infectious substances were not large enough to meet the need. Alternative packaging designs were needed to meet safety requirements and to accommodate the large volume of waste. The emergency special permit authorizes transportation of these materials in the alternative packaging designs. Guidance about how to comply with the special permit can be found [here](#).
- What is different about this most recent special permit from those issued to Stericycle in Texas?**

This special permit is not site specific; meaning, it is applicable for use anywhere in the United States where a need arises for disposal of suspected or confirmed Ebola-contaminated waste. It also allows additional companies to apply for "party status," authorizing them to transport infected waste using the same special permit.

This permit does not require a specific type of packaging; rather, it provides for a degree of flexibility in packaging design to accommodate the needs of the collection and disposal facilities without compromising the level of safety to the public, as long as all of the performance requirements specified in the special permit are met.
- How many special permits have been granted?**

As of 10/28/2014, seven companies have been granted party status to transport waste under the provisions of this special permit:

 - Veolia ES Technical Solutions, LLC
 - Triumvirate Environmental, Inc.
 - Stericycle, Inc.
 - Smith Systems Transportation, Inc.
 - Advanced Environmental Options, Inc.
 - Clean Harbors Environmental Services, Inc.
 - Daniels Sharpsmart, Inc.
- Where can I find the most recent version of the special permit and how can I locate the most recent list of companies holding party status to DOT-SP 16279?**

Enter "16279" on our [Special Permits Search page](#) for the most recent version of this special permit and a complete list of companies holding party status.
- What is the process for obtaining party status to this special permit?**

The requirements for applying for party status can be found in [49 CFR 107.107](#).
- Does this mean that infected waste may now be transported by other modes?**

Yes, transportation is now authorized by Motor Vehicle and Vessel.
- Can this special permit be used at sites which are not hospitals or other medical facilities?**

TRANSPORTING INFECTIOUS SUBSTANCES

+ SPECIAL PERMITS

+ PACKAGING OF EBOLA CONTAMINATED WASTE

Q&A

This special permit may be used to transport Ebola-contaminated waste originating anywhere in the U.S., which would include medical facilities or other areas where Ebola-contaminated waste has been generated and must be transported for disposal.

■ What role do other Federal agencies play in the transport of hazardous materials?

DOT has jurisdiction over transportation; however, we work closely with CDC, OSHA, HHS, DOD, EPA, and state and local government to assure that our respective safety missions are adequately addressed in these scenarios.

■ What other safety measure have been put in place by these special permits?

In addition to the conditions specified in the packaging section, the special permit requires the following key operational controls:

- The transport vehicle must be attended at all times;
- Each commercial motor vehicle and driver involved in this operation must be made available for a Commercial Vehicle Safety Alliance Level I hazardous materials inspection prior to transport;
- The carrier must maintain a written spill response plan with guidelines for protecting employees and decontaminating any released material in the event of an accident; and
- The carrier must adhere to strict packaging requirements, including a series of inner and outer packaging and the application of a disinfectant recommended by the Center for Disease Control to the inner packaging. Outer packaging must meet specified performance requirements.

■ Why did PHMSA issue Safety Advisory No. 14-04?

PHMSA develops and enforces federal Hazardous Materials Regulations (HMR) to ensure the safe commercial transport of hazmat in interstate, intrastate and foreign commerce by aircraft, railcar, vessel, and motor vehicle. Because state governments disposing medical waste fall beyond the HMR's purview, PHMSA has issued this safety advisory in a preventive measure. The [advisory](#) provides an inventory of all relevant information PHMSA has issued for the reference of state and local governments in dealing with the waste, including guidance on packaging.

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