

Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus

On August 1, 2014, CDC released guidance titled, "[Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals](http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html)(<http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html>)."

Ebola viruses are transmitted through direct contact with blood or body fluids/substances (e.g., urine, feces, vomit) of an infected person with symptoms or through exposure to objects (such as needles) that have been contaminated with infected blood or body fluids. The role of the environment in transmission has not been established. Limited laboratory studies under favorable conditions indicate that Ebolavirus can remain viable on solid surfaces, with concentrations falling slowly over several days.^{1, 2} In the only study to assess contamination of the patient care environment during an outbreak, virus was not detected in any of 33 samples collected from sites that were not visibly bloody. However, virus was detected on a blood-stained glove and bloody intravenous insertion site.³ There is no epidemiologic evidence of Ebolavirus transmission via either the environment or fomites that could become contaminated during patient care (e.g., bed rails, door knobs, laundry). However, given the apparent low infectious dose, potential of 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 in the patient care environment.

As part of the care of patients who are [persons under investigation, or with probable or confirmed Ebola virus infections](http://www.cdc.gov/vhf/ebola/hcp/case-definition.html)(<http://www.cdc.gov/vhf/ebola/hcp/case-definition.html>), hospitals are recommended to:

- **Be sure environmental services staff wear recommended [personal protective equipment \(PPE\)](http://www.cdc.gov/vhf/ebola/hcp/procedures-for-ppe.html)(<http://www.cdc.gov/vhf/ebola/hcp/procedures-for-ppe.html>) to protect against direct skin and mucous membrane exposure of cleaning chemicals, contamination, and splashes or spatters during environmental cleaning and disinfection activities.** If reusable heavy-duty gloves are used for cleaning and disinfecting, they should be disinfected and kept in the room or anteroom. Be sure staff are instructed in the proper use of personal protective equipment including safe removal to prevent contaminating themselves or others in the process, and that contaminated equipment is disposed of appropriately. (see question 8).
- **Use a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) to disinfect environmental surfaces in rooms of patients with suspected or confirmed Ebola virus infection.** Although there are no products with specific label claims against the Ebola virus, enveloped viruses such as Ebola are susceptible to a broad range of hospital disinfectants used to disinfect hard, non-porous surfaces. In contrast, non-enveloped viruses are more resistant to disinfectants. As a precaution, selection of a disinfectant product with a higher potency than what is normally required for an enveloped virus is being recommended at this time. EPA-registered hospital disinfectants with label claims against non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus) are broadly antiviral and capable of inactivating both enveloped and non-enveloped viruses.

- **Avoid contamination of reusable porous surfaces that cannot be made single use.**
Use only a mattress and pillow with plastic or other covering that fluids cannot get through. Do not place patients with suspected or confirmed Ebola virus infection in carpeted rooms and remove all upholstered furniture and decorative curtains from patient rooms before use.
- **To reduce exposure among staff to potentially contaminated textiles (cloth products) while laundering, discard all linens, non-fluid-impermeable pillows or mattresses, and textile privacy curtains into the waste stream and disposed of appropriately.**
- **The Ebola virus is classified as a Category A infectious substance by and regulated by the U.S. Department of Transportation's (DOT) Hazardous Materials Regulations (HMR, 49 C.F.R., Parts 171-180). Any item transported offsite for disposal that is contaminated or suspected of being contaminated with a Category A infectious substance must be packaged and transported in accordance with the HMR. This includes medical equipment, sharps, linens, and used health care products (such as soiled absorbent pads or dressings, kidney-shaped emesis pans, portable toilets, used Personal Protection Equipment (gowns, masks, gloves, goggles, face shields, respirators, booties, etc.) or byproducts of cleaning) contaminated or suspected of being contaminated with a Category A infectious substance.^{6, 7} (see question 8).**

Frequently Asked Questions

1. How can I determine whether a particular EPA-registered hospital disinfectant is appropriate for use in the room of a patient with suspected or confirmed Ebola virus infection?

Begin by looking at the product label or product insert or, if these are not available, search the [EPA search engine](#) for this information. Users should be aware that an 'enveloped' or 'non-enveloped virus' designation may not be included on the container label. Instead check the disinfectant's label for at least one of the common non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus).

2. Are there special instructions for cleaning and disinfecting the room of a patient with suspected or confirmed Ebola virus infection?

Daily cleaning and disinfection of hard, non-porous surfaces (e.g., high-touch surfaces such as bed rails and over bed tables, housekeeping surfaces such as floors and counters) should be done.⁴ Before disinfecting a surface, cleaning should be performed. In contrast to disinfection where products with specific claims are used, any cleaning product can be used for cleaning tasks. Use cleaning and disinfecting products according to label instructions. Check the disinfectant's label for specific instructions for inactivation of any of the non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus) follow label instructions for use of the product that are specific for inactivation of that virus. Use disposable cleaning cloths, mop cloths, and wipes and dispose of these in leak-proof bags. Use a rigid waste receptacle designed to support the bag to help minimize contamination of the bag's exterior.

3. How should spills of blood or other body substances be managed?

The basic principles for blood or body substance spill management are outlined in the United States Occupational Safety and Health Administration (OSHA) [Bloodborne Pathogen Standards](#)

(29 CFR 1910.1030).⁵ CDC guidelines recommend removal of bulk spill matter, cleaning the site, and then disinfecting the site.⁴ For large spills, a chemical disinfectant with sufficient potency is needed to overcome the tendency of proteins in blood and other body substances to neutralize the disinfectant's active ingredient. An EPA-registered hospital disinfectant with label claims for non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus) and instructions for cleaning and decontaminating surfaces or objects soiled with blood or body fluids should be used according to those instructions.

4. How should disposable materials (e.g., any single-use PPE, cleaning cloths, wipes, single-use microfiber cloths, linens, food service) and linens, privacy curtains, and other textiles be managed after their use in the patient room?

These materials should be placed in leak-proof containment and discarded appropriately. To minimize contamination of the exterior of the waste bag, place this bag in a rigid waste receptacle designed for this use. Incineration or autoclaving as a waste treatment process is effective in eliminating viral infectivity and provides waste minimization. If disposal requires transport offsite then this should be done in accordance with the U.S. Department of Transportation's (DOT) Hazardous Materials Regulations (HMR, 49 C.F.R., Parts 171-180).^{6, 7} Guidance from DOT has been released for Ebola.⁷

5. Is it safe for Ebola patients to use the bathroom?

Yes. Sanitary sewers may be used for the safe disposal of patient waste. Additionally, sewage handling processes (e.g., anaerobic digestion, composting, and disinfection) in the United States are designed to inactivate infectious agents.

6. How long does the Ebola virus persist in indoor environments?

Only one laboratory study, which was done under environmental conditions that favor virus persistence, has been reported. This study found that under these ideal conditions Ebola virus could remain active for up to six days.¹ In a follow up study, Ebolavirus was found, relative to other enveloped viruses, to be quite sensitive to inactivation by ultraviolet light and drying; yet sub-populations did persist in organic debris.²

In the only study to assess contamination of the patient care environment during an outbreak, conducted in an African hospital under "real world conditions", virus was not detected by either nucleic acid amplification or culture in any of 33 samples collected from sites that were not visibly bloody. Virus was detected on a blood-stained glove and bloody intravenous insertion site by nucleic acid amplification, which may detect non-viable virus, but not by culture for live, infectious virus.³ Based upon these data and what is known regarding the environmental infection control of other enveloped RNA viruses, the expectation is with consistent daily cleaning and disinfection practices in U.S. hospitals that the persistence of Ebola virus in the patient care environment would be short – with 24 hours considered a cautious upper limit.

7. Are wastes generated during delivery of care to Ebola virus-infected patients subject to select agent regulations?

As long as facilities treating Ebola virus-infected patients follow the CDC's [Infection Prevention and](#)

[Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals](http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html)(<http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html>); waste generated during delivery of care to Ebola virus-infected patients would not be subject to Federal select agent regulations (See the exclusion provision 42 CFR § 73.3(d)(1)). However, this would not apply to any facility that intentionally collected or otherwise extracted the Ebola virus from waste generated during the delivery of patient care.

8. Are wastes generated during delivery of care to Ebola virus-infected patients subject to any special transportation requirements?

Yes, wastes contaminated or suspected to be contaminated with Ebola virus must be packaged and transported in accordance U.S. DOT Hazardous Materials Regulations (HMR, 49 C.F.R., Parts 171-180).^{6, 7}

Once a patient with suspected Ebola Virus Disease (e.g., Patients under investigation) is no longer suspected to have Ebola Virus disease (EVD) or has ruled out for EVD, their waste materials no longer need to be managed as if contaminated with Ebola Virus.

References

1. Sagripanti JL, Rom AM, Holland LE. Persistence in darkness of virulent alphaviruses, Ebola virus, and Lassa virus deposited on solid surfaces. *Arch Virol* 2010; 155:2035-2039
2. Sagripanti JL, Lytle DC. Sensitivity to ultraviolet radiation of Lassa, vaccinia, and Ebola viruses dried on surfaces. *Arch Virol* 2011; 156:489-494
3. Bausch DG et al. Assessment of the Risk of Ebola Virus Transmission from Bodily Fluids and Fomites. *J Infect Dis* 2007; 196:S142-7
4. [CDC Guidelines for Environmental Infection Control in Healthcare Facilities](#)[PDF - 249 pages] (see: Environmental Surfaces Section).
5. [OSHA Bloodborne Pathogen Standard 29 CFR 1910.1030](#)
6. [DOT. Guidance for Transporting Ebola Contaminated Items, a Category A Infectious Substance](#)
7. [DOT. Hazardous Materials Regulations \[49 CFR Parts 100-1999; 49 CFR 172.700; 49 CFR 173.134\(a\)\(5\)\]](#)