



# Ebola Virus Disease (EVD) – *Survivability of Ebola Virus in Medical Waste*

Current to October 11, 2016

Waste contaminated with the Ebola virus requires special handling and disposal to prevent exposure to the virus. **All EVD-associated waste is considered biohazardous (infectious) waste.** This includes items (such as linen and sharps) contaminated with human blood and/or body fluids (i.e., respiratory secretions, saliva, emesis, feces, urine, dialysate/effluent) requiring special handling and disposal as they may present a risk of disease transmission. **EVD-associated waste that has been appropriately incinerated or autoclaved is not infectious and does not pose a health risk.**

## Background

The Ebola virus is an “enveloped virus,” meaning the core of the virus is surrounded by a lipoprotein outer layer. Enveloped viruses are more susceptible to destruction with a number of physical and chemical agents than viruses without lipoprotein envelopes.

### Most Susceptible to Disinfection

#### Enveloped viruses (e.g., Ebola, HIV, herpes, hepatitis B)

Vegetative bacteria (e.g., *S. aureus*, *P. aeruginosa*)

Fungi (e.g., *Aspergillus*, *Candida*)

Non-enveloped viruses (e.g., polio, coxsackie, norovirus)

Mycobacteria (e.g., *M. tuberculosis*, *M. terrae*)

Coccidia (e.g., *Cryptosporidium*)

Bacterial spores (e.g., *Bacillus atrophaeus*)

Prions (e.g., Creutzfeldt-Jakob Disease)

### Most Resistant to Disinfection

Any waste generated in the care of patients under investigation (PUIs) or patients with confirmed EVD is considered a Category A infectious substance. The Ebola virus is categorized as a Risk Group 4 agent as it is likely to cause serious disease and effective treatment is not available.

## Physical Agents/Heat

Physical agents that can eradicate Ebola virus include heat, sunlight, ultraviolet light, E-Beam, and Gamma Rays.

Killing Ebola virus on or attached to materials can be done by

- Heating to 60°C (140°F) for 60 minutes
- Heating to 72-80°C (162° - 176°F) for 30 minutes
- Submersing the material in boiling water for five minutes



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This can be achieved by treating materials suspected of being contaminated with Ebola in an autoclave under a “validated waste cycle” to 121°C (250°F) for at least 30 minutes. Depending on the load and packaging, the treatment uses more than enough heat and time to kill the virus. The autoclave runs should include a process control to show that the cycle was performed effectively. The autoclave cycles should be checked at some frequency with biological indicator (spores) as a quality assurance measure to show the waste cycles are achieving desired results.

Another heat treatment is incineration. Incinerators run at extremely high temperatures, well above the relatively low temperatures needed to kill Ebola virus. Incineration works well for large or bulky items, such as mattresses. Incineration that reduces waste to ash at any temperature kills Ebola virus. The ash produced via incineration is NOT hazardous with respect to microbial pathogens.

## **Chemical Agents**

Ebola virus also can be killed by many common chemical agents, including bleach, detergents, solvents, alcohols, ammonia, aldehydes, halogens, peracetic acid, peroxides, phenolics, and quaternary ammonium compounds.

Ebola virus can be killed with hospital-grade disinfectants when used according to the label instructions. A hospital disinfectant with a DIN and label claim for a non-enveloped virus (norovirus, rotavirus, adenovirus, poliovirus) can disinfect environmental surfaces in rooms of PUIs or patients with confirmed EVD.

## **Additional Information**

There is limited evidence of Ebola virus transmission through the environment or an inanimate object that may be contaminated during patient care with infectious organisms and serve in their transmission (bed rails, doorknobs, laundry). Ebola virus has not been found on surfaces in the absence of visible blood in the patient care environment. Frequently touched surfaces should be cleaned and disinfected on a regular basis to help reduce the risk of contact with contaminated surfaces. In addition, spills of biological fluids should be immediately cleaned and disinfected. Disinfectants should also be added to bagged waste.

## **References**

1. Public Health Agency of Canada (2015). Infection Prevention and Control Expert Working Group: Advice on the Management of Ebola Virus Disease-associated Waste in Canadian Healthcare Settings. Available at: <http://www.phac-aspc.gc.ca/id-mi/vhf-fvh/ebola-ipcw-pcid-eng.php#a1>
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