

# Example: Standard Operating Procedure (SOP) for Decontamination of an Ambulance that has Transported a Person under Investigation or Patient with Confirmed Ebola

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## Purpose

This SOP can serve as a model for emergency medical services (EMS) transport agencies to standardize the procedures and responsibilities for the decontamination and disinfection of an ambulance that has transported a person under investigation (PUI) for Ebola or a patient with confirmed Ebola. It is highly recommended that procedures and responsibilities for decontamination and disinfection of the ambulance be clearly defined before transporting a PUI. All personnel should be trained in donning and doffing (putting on and taking off) techniques for personnel protective equipment (PPE).

The following key assumptions are being made:

- All healthcare workers (hospital and out-of-hospital) who are involved will have received education and training and demonstrated the necessary competencies for management of patients with serious communicable diseases.
- Healthcare facilities and transporting ambulance agencies have procedures for the management of patients with serious communicable diseases.
- Facilities and transporting ambulance agencies are conducting tabletop and operational exercises that test and refine procedures for the transfer of patients.
- This guidance complements other CDC guidance for management of patients with serious communicable diseases.

## Safety

Ebola is transmitted through contact with infected body fluids, so infection control measures must be implemented that prevent contact with blood or infectious body fluid throughout the decontamination process.

This process is designed for a 3-person team. Two people will be donned in PPE and perform the decontamination. A third person, not donned in PPE, will be available to document the decontamination and for other assistance as needed.

## Decontamination site setup

- Select an appropriate site for ambulance decontamination that protects the vehicle and the decontamination team from weather elements, preferably a well-ventilated large enclosed structure.
- Establish a secure perimeter for safety of the public and decontamination personnel.
- Include considerations for waste management, security plan, public perception, and media visibility when selecting decontamination site.
- Depending on the location, the ability for climate control is beneficial.
- Define and mark hot, warm, and cold zones of contamination<sup>1</sup> around the ambulance that require PPE to enter.

## Transport unit decontamination

Note: All disinfection should use a U.S. Environmental Protection Agency (EPA)-registered [hospital disinfectant](#) with a label claim for a non-enveloped virus (norovirus, rotavirus, adenovirus, poliovirus) to disinfect environmental surfaces at appropriate concentration and contact time.

### Before decontamination

- To limit the number of people exposed to potentially contaminated materials, the vehicle operator and patient care provider may be responsible for decontamination and disinfection of the transport unit. However, a separate team may also be used to do this.
- All waste, including PPE, drapes, and wipes, should be considered Category A infectious substance, and should be packaged appropriately for disposal.
- Two people in PPE should decontaminate and disinfect. A third person should be available to document the decontamination and be available for other assistance as needed.

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<sup>1</sup> The hot zone is considered an area that is known or suspected to be contaminated and has a high risk of exposure. It should only be entered with full PPE. In ambulance decontamination, this would be the vehicle and an area about a meter beyond the ambulance.

The warm zone can be considered a transitional area between the hot and cold zones that has no known contamination but has a moderate risk of exposure. It should only be entered when wearing full PPE. This is also the area where one begins the initial portion of the doffing process (following a full suit wipe down within the hot zone) when leaving the hot zone. For ambulance decontamination, the warm zone can also be the place where waste barrels are pre-positioned so that the waste bags can be placed directly into the containers without entering the hot zone.

The cold zone is considered an area that has no contamination and no potential risk for exposure. The individuals in this area are not required to wear PPE, although the cold zone will often also serve as the PPE donning area.

- PPE should be donned and doffed according to organizational protocols.
- PPE selection should consider worker protection for biological exposures and potential chemical exposures based on the disinfectant used.

### During decontamination

- Disinfect the outside of any prepositioned but unused medical equipment (still inside the protective bags they were placed in) and pass it to the warm zone. If the equipment was removed from a protective bag in transit, assess the equipment to determine if it can be properly decontaminated and disinfected, or disposed of.
- Any areas that are visibly contaminated with the patient's body fluids should be decontaminated first with an approved EPA-registered disinfectant for the appropriate contact time before soaking up the fluid with absorbent materials.
- If the interior of the ambulance was draped prior to transport, remove the draping by rolling the drapes down outside in, from the ceiling to the floor of the unit starting at the front of the compartment and moving to the rear.
- Roll flooring drapes from the front to rear of the compartment, rolling drapes outside in.
- To facilitate packaging and transport, drapes can be gently cut into segments.
  - It is important that all drape materials are in sections that are small enough to facilitate the insertion of the biohazard bags into an autoclave or pre-determined Category A infectious substance packaging for disposal.
- Two people in PPE should manually disinfect the interior of the patient care compartment with particular detail for high-touch surfaces such as door handles and steps using care to limit mechanically generated aerosols and using the surface wipe method to disinfect.
- Disinfect the interior as a team so that the team members can talk each other through the process and expedite the decontamination process.
- Once the manual interior wipe down has been completed, collect and package all waste as Category A waste.
- Manually wipe down the ambulance's exterior patient loading doors and handles, and any areas that may have been contaminated, with disinfectant. The exterior of the ambulance does not require a full disinfectant wipe down.
- Once the outside of all surfaces (including waste bags) have been wiped with disinfectant, then doffing can occur.

### After decontamination

- A third person who has been in the cold zone should supervise doffing, which should be performed according to organization doffing protocols.
- Dispose of all waste according to organization protocols as well as local and federal regulations for Category A infectious substances.
- Additional cleaning methods can also be used. While not required, this may provide additional assurance to personnel and public prior returning the vehicle to service.
  - Ultraviolet germicidal irradiation, chlorine dioxide gas, or hydrogen peroxide vapor can be used for an additional disinfection step. However,

these should not replace the manual disinfection, as their efficacy against organisms in body fluids has not been fully established and these methods may require specialized equipment and PPE.

- The ambulance can then be returned to service.

## Materials and equipment needed to decontaminate an ambulance (for two people performing the decontamination)

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Fluid-resistant or impermeable coveralls (appropriate sized suits)	4
Fluid-resistant or impermeable boot covers	4
Powered air-purifying respirator (PAPR)	2
PAPR batteries	6
PAPR filters	6
PAPR hoods	3
PAPR hose and clamp	
<b>OR</b>	
Full-face respirators with appropriate cartridges for protection against particles and EPA-registered hospital disinfectant (OV/AG/P95 organic vapor/acid gas cartridges)	2
Biobags (Large)	30
Garbage bags (Large)	20
Nitrile gloves box (Small, Medium, Large, Extra large)	1EA
Hand sanitizer (bottle)	10
Absorbent rags (package)	2
Caution tape (yellow 200' roll)	2
Duct tape (roll)	2
Bucket	1
Healthcare bleach (wipes) or other EPA-registered hospital disinfectant wipes	4
Scissors	1
<b>Documentation</b>	
Bio-safety check-off sheet, donning check-off sheet, doffing check-off sheet, contact list	

## Additional Resources

1. Isakov, A., Jamison, A., Miles, W., & Ribner, B. Safe management of patients with serious communicable diseases: recent experience with Ebola virus. *Annals of internal medicine*. 161(11): 829-830.
2. Isakov A, Miles W, Gibbs S, Lowe J, Jamison A, Swansiger R. Transport and management of patients with confirmed or suspected Ebola virus disease. *Ann of Emerg Med*. 2015; 66(3):297-305.
3. Jelden, K.C., Gibbs, S.G., Smith, P.W., Schwedhelm, M., Iwen, P.C., \*Beam, E., Hayes, A.K., Marion, N., Kratochvil, C.J., Boulter, K.C., Hewlett, A., Lowe, J.J. Nebraska Biocontainment Unit Patient Discharge and Environmental Decontamination following Ebola Care. *American Journal of Infection Control*. 2015; 43(3):203-205.
4. Lowe, J.J., Gibbs, S.G., Schwedhelm, S., Nguyen, J., Smith, P.W. Nebraska Biocontainment Unit Perspective on Disposal of Ebola Medical Waste. *American Journal of Infection Control*. 2014; 42:1256-1257.
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7. Swansiger, R.G., Walters, W.A., Isakov, A.P., Gibbs, S.G., Lowe, J.J. 2014. BioContainment Ground Transport Standard Operating Procedures. Office of Medical Services Operational Medicine. United States Department of State.