WEST VIRGINIA Department of Health & Human Resources
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Guidance on Air Medical Transport for Patients with Ebola Virus Disease

On this Page

- Background
- A. Air Medical Transport of Patients with EVD: General Considerations
- B. Patient Placement
- C. Infection Control
- D. Patients Requiring Special Consideration
- E. Waste Disposal
- F. Cleaning and Disinfection
- G. Transport of an Asymptomatic Exposed Person
- H. Logistical Planning and Post-Mission Follow-Up
- I. Ground/In-Flight Emergency Procedures
- Related Pages

Who this is for: Operators of air medical transport (AMT) services that are considering transport of patients with Ebola virus disease (EVD) and healthcare providers who will be onboard. This guidance applies to AMT flights of any duration and using any type of aircraft. **The guidance does not apply to commercial passenger aircraft or other types of patient transport vehicles (for example, ground ambulances)**.

What this is for: Guidance for safe transportation of patients with EVD by AMT.

How to use: Use this guidance to ensure safety of healthcare personnel and patients during AMT of patients with EVD. Explain to pilots, other aircraft personnel, and cleaning crews what special actions should occur before, during and after transport, and how to keep themselves safe.

Key Points:

- Transport must be coordinated with public health and civil aviation authorities at origin and destination.

- Infection control policies and procedures should be established before and implemented during all phases of patient transport.
- A portable isolation unit is recommended to contain infected materials and minimize contamination of the aircraft.
- Personnel providing care during transport should be trained in clinical management, infection control, and correct use of personal protective equipment (PPE).
- PPE should be used by all those in the patient care area or who may have contact with patients or their body fluids; infection control guidelines should be followed, and procedures that could increase the risk of exposure to the patient's body fluids should be avoided.

Background

Air medical transport (AMT) is a unique patient care setting. Unlike ground medical transport, such as in a ground ambulance, the aircraft usually does not stop or re-supply during transport and the mission usually exceeds several hours. During AMT, a patient's condition can deteriorate, needing additional interventions that could result in an increased risk of exposure for healthcare providers. The recommendations in this guidance are based on standard infection prevention and control practices for Ebola and Marburg hemorrhagic fever, AMT standards, aircraft-specific safety considerations, and established international notification protocols.

Ebola virus is transmitted in healthcare settings by direct contact with infectious blood or body fluids (for example, blood, urine, feces, or vomit); accidental injuries by sharps, such as scalpel blades or needles, that are contaminated with infectious material; and splashes to unprotected mucous membranes of the eyes, nose, or mouth. Infection control measures(http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html) for patients with Ebola virus disease (EVD) include standard, contact, and droplet precautions. Injection therapy, blood sampling, and other procedures that require the use of needles and other sharp implements should be limited to what is essential for patient care. Procedures likely to generate splashing (such as transferring liquid waste from one container to another) should be performed only when necessary and with careful adherence to correct use of personal protective equipment (PPE). Procedures that might generate aerosols, such as intubation, should be avoided unless necessary for patient care; if it is necessary to perform such a procedure, healthcare

providers should wear appropriately fit-tested respirators that provide at least 95% filtering efficiency (such as a NIOSH-certified N-95 or higher-level filtering facepiece respirator).

The decision to transport a patient with EVD should be carefully considered and thoroughly planned in discussion with relevant public health agencies, civil aviation authorities, and personnel from the receiving facility. Factors that should weigh into the decision include whether the patient is clinically stable enough to travel (i.e., whether the patient's condition could deteriorate during transport), and that personnel providing care during transport are trained in clinical management, infection control, and correct use of PPE.

Top of Page

A. Air Medical Transport of Patients with EVD: General Considerations

- Patients with EVD should be transported on a dedicated AMT mission.
  - **Other patients who do not have laboratory-confirmed EVD should not be onboard.**
  - Only people directly involved in patient care or operating the aircraft should be onboard. If people other than those caring for the patient and operating the aircraft, such a patient's family member, need to be on the aircraft, decisions should be made on a case-by-case basis in consultation with public health authorities and, as necessary, aviation authorities.
  - Pilots, other necessary crew members, and ground crew should follow routine procedures for AMT missions. Anyone not involved in direct patient care should remain at least 3 feet (1 meter) away from the patient during movement of the patient onto and off the aircraft, and should not enter the designated patient care area.
- If available, a portable isolation unit (see C. Infection Control below) should be used to contain infectious materials. Use of a portable isolation unit minimizes the need to clean and decontaminate the aircraft after the mission.
- Infection control involves a variety of precautionary measures (see C. Infection Control for details):
  - Eliminate exposure to body fluids.
  - Minimize contamination of the aircraft. Disinfect surfaces that are soiled during patient care promptly (see F. Cleaning and Disinfection below).
  - Use personal protective equipment (PPE) correctly.

- Avoid procedures that require the use of sharps or that could create splashes of infectious material.

- Plan that the crew will need to take breaks in compliance with crew rest requirements.
- Coordinate international transport of patients with EVD with public health and civil aviation authorities at origin and destination.
- In the United States, EVD is a disease for which federal isolation and quarantine(http://www.cdc.gov/quarantine/aboutlawsregulationsquarantineisolation.html) are authorized. All transport of patients with EVD destined for a U.S. airport must be reported to CDC before arrival, preferably before travel, by calling the CDC Emergency Operations Center (EOC) at **+1 770-488-7100** (24-hour number). U.S. federal regulations require the commander of an aircraft destined for the United States to report any deaths and certain illnesses among travelers to CDC before arrival. For more information, see Guidance for Airlines on Reporting Onboard Deaths or Illnesses to CDC(http://www.cdc.gov/quarantine/air/reporting-deaths-illness/guidance-reporting-onboard-deaths-illnesses.html). Reports from flights operating in U.S. airspace provided to the Federal Aviation Administration Air Traffic Services (ATS) units will be shared with the CDC EOC.
- International movement of patients with EVD might additionally require special approvals by aircraft-servicing or fueling, or patient rest-stop locations, and countries that will be over-flown, if applicable.
- If the AMT experiences an in-flight incident (such as a change to the patient's condition requiring the flight to divert or be supported by special handling), the pilot should advise the appropriate ATS unit, to facilitate coordination with the responsible public health authorities and the implementation of any needed air traffic management related support. For more information, see the International Civil Aviation Organization's (ICAO) Annex 9, Facilitation, and Document 4444, Procedures for Air Navigation Services – Air Traffic Management. The pilot should also follow applicable company procedures.

B. Patient Placement

- If transport of more than one patient with confirmed EVD is planned, the patients can be isolated together as a group.

C. Infection Control

1. Designation of an "isolation area"

- Use of a disposable, portable isolation unit is recommended to contain infectious waste (such as soiled absorbent pads, emesis [vomit] basins, portable toilet) and prevent contamination of the aircraft cabin. After use, the unit should be discarded (see E. Waste Disposal below). If an isolation unit is not available, a perimeter should be established for designating "clean" and "dirty" areas that identifies where gowns and gloves should be put on and removed. The distance will depend on the area required for patient care support as well as designated space for safe removal of PPE. A minimum distance of 6 feet (2 meters) from the patient is recommended. Surfaces should be smooth, nonporous, and fluid-impermeable to allow appropriate cleaning and disinfection.
- Materials required for patient care, including PPE, should be stored outside of the isolation area.
- Containers for soiled linen, waste, and reusable equipment should be placed inside the isolation area. Supplies for cleaning spills should be kept in the area, including appropriate disinfectants (see F. Cleaning and Disinfection below).
- A portable chemical toilet that is dedicated for patient use should be placed within the isolation area. The lid of the toilet should be kept closed.

Personnel who are within the isolation unit or designated isolation area should wear PPE as required for standard, contact and droplet precautions, including at a minimum: gloves, a gown that is or fluid-resistant or impermeable, eye protection such as goggles or a face shield, and a facemask. Rubber boots are recommended to allow easy cleaning and disinfection in the event of a splash of infectious material, such as if a patient vomits unexpectedly; disposable shoe and leg covers may also be considered. Additional PPE may be considered if exposure to large amounts of body fluids is anticipated (see Section 3 below). Outside of the isolation unit or designated isolation area, PPE is not needed.

2. Minimize opportunities for exposure

- Limit use of needles and other sharps as much as possible.

- If use of needles or other sharps is necessary for patient care, handle these items with extreme care and discard them immediately after use in closed, puncture-proof containers.
- Use disposable equipment whenever possible.
- Avoid aerosol-generating procedures.
- Avoid procedures that can generate splashes of infectious material, such as transferring liquid waste from one container to another.

3. Personal protective equipment and procedures

- The following PPE should be available for use by personnel providing direct care to the patient or with potential exposure to the patient's body fluids, such as during cleaning:
  - Disposable gloves
  - Disposable gowns that are fluid-resistant or impermeable
  - Facemasks that cover the mouth and nose
  - Goggles or face shield (Corrective eyeglasses alone are not sufficient protection.)
  - Rubber boots that can be easily disinfected or disposable shoe and leg covers
  - Fit-tested, disposable respirators (at least as protective as fit-tested NIOSH-certified disposable N95 filtering face piece respirators), for use during aerosol-generating procedures if needed.
- At a minimum, disposable gloves, gown, facemask and eye protection should be worn when entering the isolation area and for all patient contact.
- Consider including additional PPE that might be required in certain situations, for example, large amounts of blood or other body fluids (feces, urine, saliva, or vomit) present in the environment, including but not limited to:
  - Double gloving
  - Plastic or vinyl full-length aprons
  - Head covers
- PPE should be removed carefully[PDF - 2 pages](http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf) to avoid touching contaminated outer surfaces of the PPE and discarded in designated containers after patient care is completed and before leaving the isolation area or when soiled or damaged. Hands should be washed with soap and water (preferred) or a waterless, alcohol-based

hand sanitizer containing at least 60% alcohol immediately after removing PPE. Soap and water should be used if hands are visibly soiled.

- Oxygen support may be provided during flight with simple and non-rebreather face masks.

D. Patients Requiring Special Consideration

- Mechanical ventilators for patients with EVD should provide HEPA or equivalent filtration of airflow exhaust.
- AMT services should consult their ventilator equipment manufacturer to confirm appropriate filtration capability and the effect of filtration on positive-pressure ventilation.

E. Waste Disposal

1. Management of waste during AMT

- Collect dry solid waste (such as used gloves, dressings) in leakproof biohazard bags.
- Collect waste that is soaked with blood or body fluids in leakproof biohazard bags or containers.
- Discard sharp items, such as used needles or scalpel blades, immediately after use in puncture-proof sharps containers.
- Store suctioned fluids and secretions in sealed containers. Handling patient body fluids might create splashes and should be avoided.
- If bedpans or urinals are needed, excretions, such as feces or urine, may be carefully poured down the dedicated portable patient toilet, taking care to avoid splashes and spills. If splashing or spills cannot be avoided, fluids should be kept in a sealed container until they can be disposed of safely. If necessary, the entire bedpan may be placed in a sealed container.

2. Disposal of waste after mission completion

- In the United States, Ebola virus is a Category A infectious substance regulated by the U.S. Department of Transportation's (DOT) Hazardous Materials Regulations (HMR). Any item transported for disposal that is contaminated with a Category A infectious substance must be packaged and transported in accordance with DOT regulations found in 49 Code of Federal

Regulations Parts 171-180. This includes used medical equipment or PPE, contaminated linens, and other medical waste collected during transport of a patient with confirmed or suspected EVD. All applicable requirements of the HMR can be found on the DOT website: http://phmsa.dot.gov/hazmat or in DOT Guidance for Transporting Ebola-Contaminated items. For questions on hazardous materials packaging and transportation regulations, contact the U.S. DOT HazMat Information Center at 1-800-467-4922.

- Outside of the United States, follow applicable regulations for waste disposal.
- Plans for waste disposal should be discussed in advance with waste handlers at the airport of arrival and the destination medical facility. Top of Page

F. Cleaning and Disinfection

- Recommended PPE should be worn(http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html) by personnel responsible for cleaning environmental surfaces and should, at a minimum, be consistent with standard, contact, and droplet precautions.
- Environmental surfaces should be disinfected using a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant(http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html) with a label claim for any of the "nonenveloped" viruses (such as norovirus, rotavirus, adenovirus, poliovirus) and that is approved by the aircraft manufacturer. Disinfectant should be available in spray bottles or as commercially prepared wipes for use during transport.
- Any surface that becomes potentially contaminated during transport should be immediately sprayed and wiped clean, or simply wiped clean using a commercially prepared disinfectant wipe.
- A blood spill or spill of other body fluid or substance (for example, urine, feces, or vomit) should be managed through removal of bulk spill matter, cleaning the site, and then disinfecting the site. For large spills, a chemical disinfectant (EPA-registered hospital 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 any of the nonenveloped viruses (for example, norovirus, rotavirus, adenovirus, poliovirus) should be used. Instructions for cleaning and decontaminating surfaces or objects soiled with blood or

body fluids should be followed to treat the spill before covering with absorbent material and wiping up. After the bulk waste is wiped up, the surface should be disinfected as described above.

- All patient-care areas (including stretchers, railings, medical equipment control panels, and adjacent flooring, walls, and work surfaces likely to be directly contaminated during care) should be considered contaminated and therefore cleaned and disinfected after AMT.
- Compressed air or pressurized water should not be used for cleaning the aircraft.
- Areas of the aircraft that were not used for patient care should be cleaned and maintained as per routine practices according to manufacturers' recommendations.
- Contaminated reusable patient care equipment should be placed in biohazard bags and labeled for cleaning and disinfection at the AMT service medical equipment section.
- Reusable equipment should be cleaned and disinfected, according to manufacturer's instructions, by trained personnel wearing correct PPE.
- Use of reusable items with porous surfaces that cannot be easily replaced should be avoided.
- Only mattresses and pillows with plastic or other fluid-impermeable covering should be used. Coverings should be disinfected after use or discarded (see E. Waste Disposal).
- To prevent exposure among laundry staff, all contaminated linens should be discarded.
- Any contaminated nonfluid-impermeable items, such as web seats, seat cushions, pillows, or mattresses should be discarded.
- After completing cleaning tasks, including cleaning and disinfection of reusable equipment, cleaning personnel should carefully remove[PDF - 2 pages](http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf) and dispose of PPE. They should wash hands thoroughly with soap and water (preferred) or a waterless, alcohol-based hand sanitizer containing at least 60% alcohol. Soap and water should be used if hands are visibly soiled.

G. Transport of an Asymptomatic Exposed Person

Persons who have had exposure to Ebola virus(http://www.cdc.gov/vhf/ebola/hcp/case-definition.html) should not travel by commercial aircraft because of the risk of developing symptoms in transit and potentially exposing others onboard. When transporting someone who has been exposed but who does not have symptoms, infection control precautions and use of PPE are not required. However, PPE should be available in case it is needed. The person who has been exposed should be monitored carefully, including temperature measurements every 12 hours, for

fever (≥100.4°F/38.0°C) or other signs or symptoms compatible with EVD(http://www.cdc.gov/vhf/ebola/hcp/case-definition.html), including severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage. The exposed person should immediately notify transport personnel if he or she suspects fever or develops other symptoms. If symptoms develop, standard, contact, and droplet precautions should be implemented immediately. Top of Page

H. Logistical Planning and Post-Mission Follow-Up

- Sufficient infection control supplies should be onboard to support the expected duration of the mission plus additional time in the event that the aircraft experiences maintenance delays or weather diversions.
- Flight planning should identify diversion airfields and coordinate with authorities responsible for those locations in advance. The potential need for coordination with ATS units and public health authorities responsible for those countries being overflown should also be taken into consideration.
- Once the mission is completed, the AMT team should provide the following information to their medical director: mission number/date; address of the team/aircraft basing; duration of patient transport; contact information for all team members; crew positions (including estimated duration of direct patient care provided); and a description of any recognized breaches in infection control.
- Personnel with any potential exposures to infectious material during the mission should be immediately evaluated in consultation with public health authorities so that a plan can be implemented for appropriate monitoring and medical evaluation and testing if indicated. Additional monitoring and movement restrictions(http://www.cdc.gov/vhf/ebola/hcp/monitoring-and-movement-of-persons-with-exposure.html) may be imposed by public health authorities for personnel with unprotected exposure to a patient with EVD.
- All mission personnel should be advised to self-monitor for a period of 21 days after the last known contact with the patient with EVD and to immediately report fever (≥100.4°F/38.0°C) or any other signs or symptoms consistent with EVD (http://www.cdc.gov/vhf/ebola/hcp/case-definition.html) to their supervisor.
- AMT services should designate people responsible for performing post-mission monitoring of mission personnel and reporting results to the AMT service medical director. Top of Page

I. Ground/In-Flight Emergency Procedures

AMT service providers should have a written plan addressing patient handling during in-flight or ground emergency situations. Certain activities, such as putting on life vests and rapidly evacuating the patient from the aircraft, may create special exposure risks. Use of PPE must be weighed against time constraints and the nature of the emergency conditions (such as smoke in the cabin, sudden cabin decompression).