

DRAFT VERSION 2 - MARCH 15, 2017 - DO NOT CITE



EMS INFECTIOUS DISEASE **PLAYBOOK**



This document was created using official or best practice information taken from multiple organizations that was vetted and assembled by subject matter experts working for the Technical Resources, Assistance Center, and Information Exchange (TRACIE) at the request of the U.S. Department of Health and Human Services (HHS)/Office of the Assistant Secretary for Preparedness and Response (ASPR). The aim was not to develop novel guidance for emergency medical services (EMS) agencies, but to unify multiple sources of information in a single planning document addressing the full spectrum of infectious agents to create a concise reference resource for EMS agencies developing their service policies. This document does not represent official policy of HHS/ASPR or other federal or private agencies.

The information contained in this playbook is intended as a planning resource, and should be incorporated into agency standard operating procedures and reviewed by the EMS medical director. Appropriate education and training is critical to the success of infection prevention and control protocols. The authors, TRACIE, and HHS/ASPR take no responsibility or bear liability for any clinical care outcomes, provider injury/illness, or inaccuracies in or resulting from this document. All recommendations were current at the time of publication and vetted to the best of our ability.

Inclusion of specific references and resources is offered as an acknowledgement of their contribution of material and for additional information for EMS planners, but does not constitute endorsement or vouch for accuracy or applicability of the documents in total.

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Dispatch/Responder Actions

GENERAL PRINCIPLES

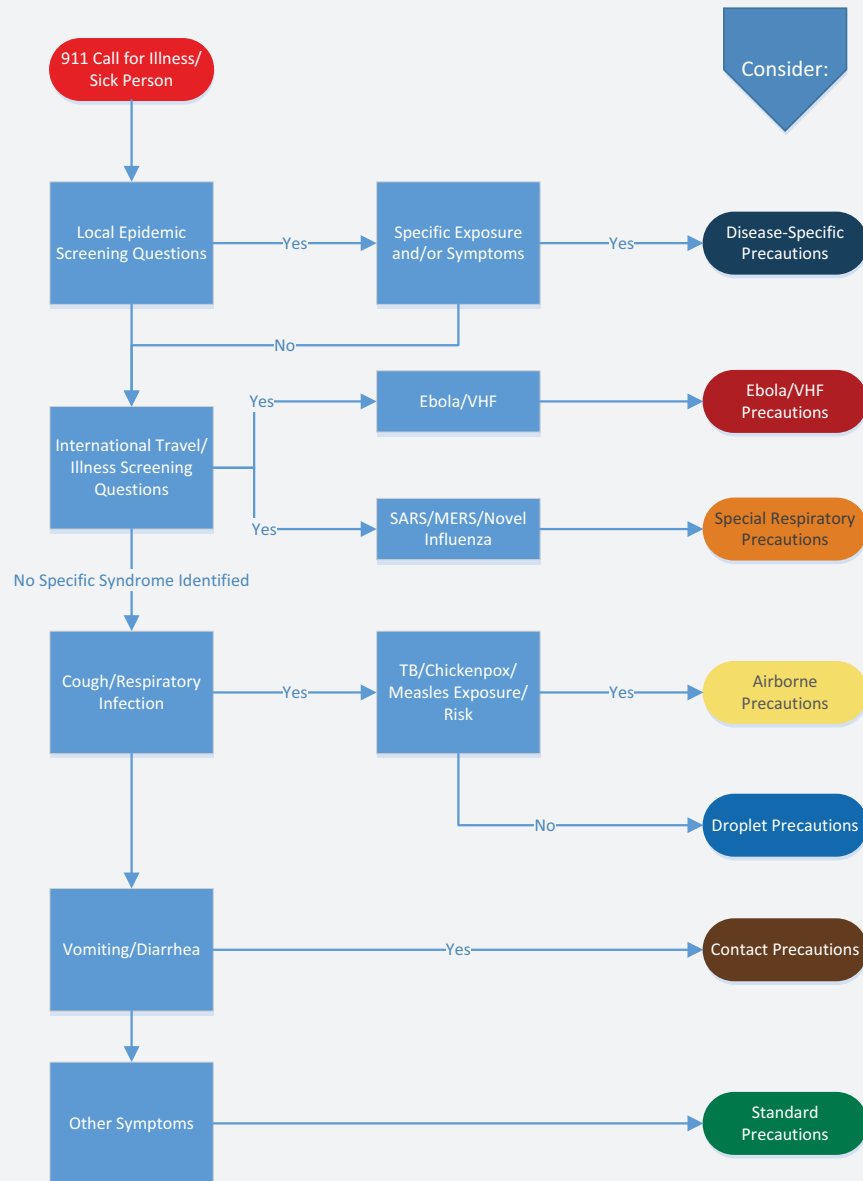
- Safe response by EMS requires an integrated approach: Appropriate information from the caller and dispatcher; appropriate protocols for response, clinical care, application of administrative and environmental controls and use of personal protective equipment (PPE) by responding EMS personnel; and transport to a hospital that can provide effective evaluation and treatment of the suspected condition.
- Regardless of dispatch information, EMS personnel should be vigilant for signs and symptoms of communicable disease and the use of standard precautions and adopt appropriate transmission-based infection control precautions whenever history or exam findings warrant.
- Basic principle: Avoid exposure to potentially infectious bodily fluids. Implement strict standard and transmission based precautions based on the patient's clinical information.
- Avoid direct contact with a patient who may have a serious communicable disease until you are wearing appropriate PPE.
- Understand and be practiced with PPE so that you can rapidly and safely don the equipment and carefully doff it without cross-contamination.
- Infection control practices can evolve with novel agents or during epidemics. The EMS agency must be aware of changes that affect their employees.
- Screening for suspected highly infectious pathogens often involves questions about recent travel to endemic areas. The timeframe for these conditions varies (e.g., 14 days for Middle East Respiratory Syndrome (MERS), 21 for Ebola); 21 days is used in the general screen for consistency since this is inclusive of the diseases, but can be adjusted as required if screening for specific pathogens.
- Local screening questions may be needed during outbreaks and can be inserted into the dispatch algorithm and keyed to the appropriate precautions.
- Fever may be a helpful contributing symptom, but should not be used as an inclusion/exclusion criteria as it is not universally present in cases of highly transmissible diseases.

Dispatch/Responder Actions

- Whenever possible, EMS agencies should limit exposure to the minimum number of individuals necessary to provide effective medical care.
- EMS must avoid excessive delays in care or provision of substandard care to patients due to infection prevention practices. In most cases, the patient will not turn out to have the suspected disease. Training and practice should allow EMS personnel to offer appropriate emergent medical care to suspect patients without waiting for specialized response.
- Specialized transport should be reserved for stable suspect serious communicable disease patients (e.g. Ebola Virus Disease (EVD), Marburg Disease, smallpox, etc.) or for inter-facility transport of those with suspected or known disease.
- Hand hygiene is one of the best ways to remove germs, avoid getting sick, and prevent the spread of germs to others.
- Placing a simple mask on a patient with likely infectious cough significantly limits droplet generation.
- Goggles are much more protective than the masks with integrated face shields used by many EMS workers and should be encouraged, in conjunction with a mask or respirator for any airway interventions and during patient care for patients with acute respiratory illness. Influenza and other diseases can transmit via the ocular surfaces as well as other mucous membranes.

Dispatch/Responder Actions

DISPATCH SCREENING ALGORITHM*



EMS personnel should re-assess risk on-scene and adjust precautions as appropriate.

*Dispatch screening is designed to suggest the highest potential level of precautions that may be required. On-scene evaluation is required to adjust precautions according to history and exam.

Dispatch/Responder Actions

NOTES ON THE ALGORITHM:

- Basic symptom screening suggests a level of precautions for responders. On-scene, additional evaluation is required to determine if higher or lower levels of protection are required.
- If a medically trained dispatcher is not available, these questions may still be used. If the dispatch agency declines to ask these questions, a process should be in place to refer the caller to an emergency medical dispatcher (EMD) if possible or the crew may be able to establish contact with the patient/caller via a callback number.
- If screening is not possible, responders should be aware of any epidemic issues potentially in their community and be prepared to rapidly adopt any level of infection precaution through special respiratory at any time (if community is at risk for EVD/viral hemorrhagic fever (VHF) cases, responders should be ready to adopt those precautions based on 'doorway evaluation').

ADDITIONAL DISPATCH CONSIDERATIONS

- The following information may be used to update/modify dispatch reference cards.
- All-Caller Interrogation obtains location (and phone number) and patient status information (i.e., age, consciousness, breathing normally).
 - » Dispatch resources and initiate pre-arrival instructions/dispatch life support as needed per service protocols.
 - » Consider modifying assignment to EMS only for calls involving suspect EVD/VHF or Special Respiratory Precautions patients based on travel or exposure history (i.e., cancel first responder unless unconscious, difficulty breathing, or other clear immediate life threat).
- Subsequent "Chief Complaint" information regarding type/severity of medical emergency:
 - » Chief complaint – If illness-related 911 call, additional screening questions include:
 - Priority symptoms – severe bleeding (e.g., large amounts of GI blood loss), decreased level of consciousness, respiratory difficulty, chest pain
 - Pertinent medical history - any known illness or exposures to Methicillin-resistant Staphylococcus aureus (MRSA), tuberculosis (TB), C diff, norovirus, etc.

Dispatch/Responder Actions

- For the following specific chief complaints ask additional questions (below) and provide dispatch life support as indicated:
 - » Breathing problems
 - » Cardiac/respiratory arrest
 - » Chest pain
 - » Convulsions/seizure
 - » Headache
 - » Hemorrhage
 - » Sick person
 - » Unconscious/Fainting (Near)
 - » Unknown Problem (Man Down)
- Additional questions
 - » Is there anyone else there who is also sick?
 - » In the last day or two any:
 - Fever or chills?
 - Vomiting or diarrhea?
 - Severe cough?
 - Active bleeding?

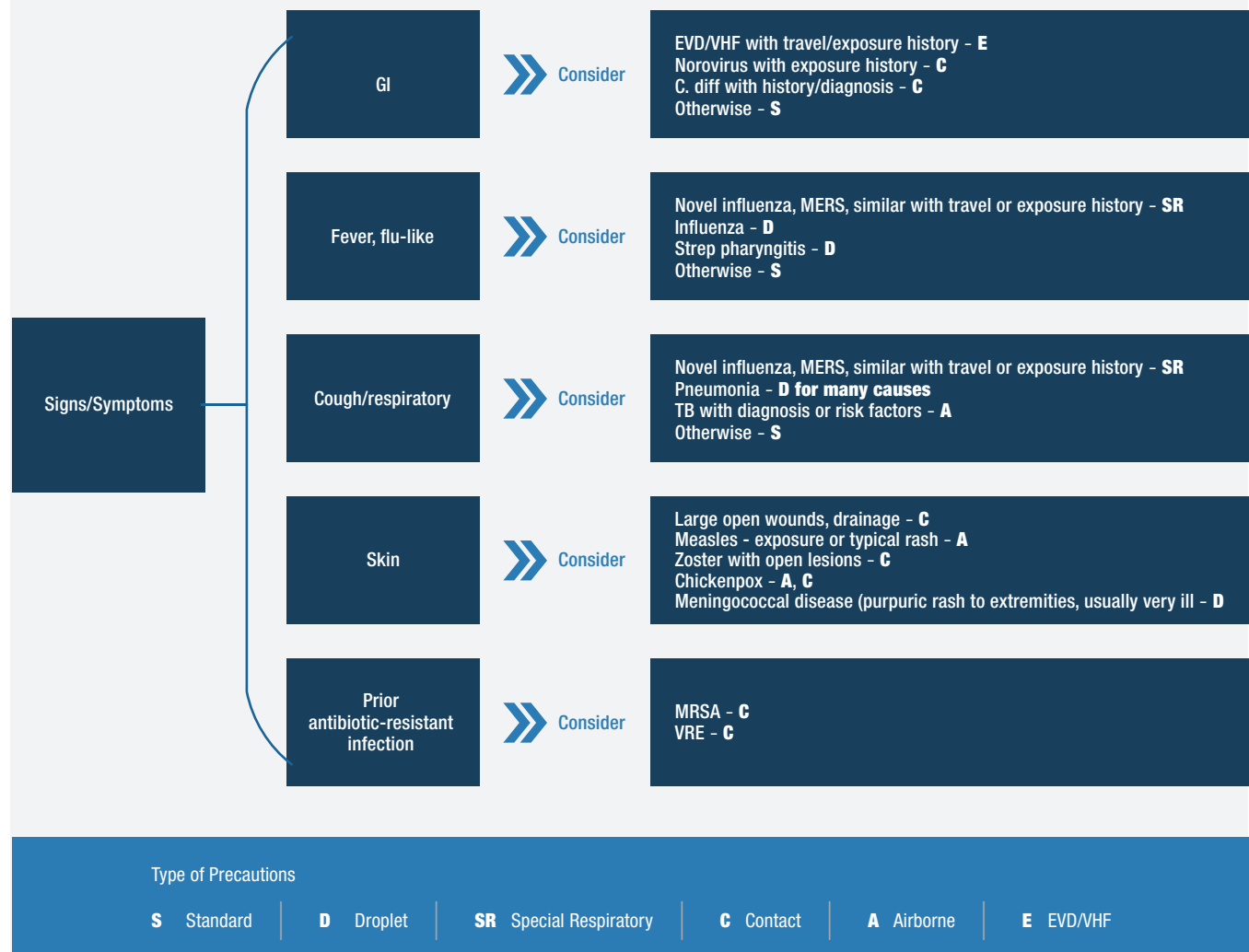
For any positive questions, the emergency medical dispatcher will alert any first responders and EMS providers being dispatched of potential for a patient with a communicable disease and to implement infection control measures as indicated. This designation is preliminary and responders may be able to adjust precautions based on further information from the patient/family. If language barriers prevent questions, the dispatcher should advise the crew that they cannot rule out an infectious patient.

Implement emerging infectious disease surveillance tool¹ whenever a novel or dangerous disease is endemic in specific areas. See EVD/VHF section for examples.

¹ Examples: [Emerging Infectious Disease Surveillance Tools \(SRI/MERS/Ebola\) and Identify, Isolate, Inform: Emergency Medical Services \(EMS\) Systems and 9-1-1 Public Safety Answering Points \(PSAPs\) for Management of Patients Who Present with Possible Ebola Virus Disease \(Ebola\) in the United States.](#)

Dispatch/Responder Actions

ON-SCENE ASSESSMENT ALGORITHM



Dispatch/Responder Actions

FIRST RESPONDER - GENERAL²

- First responder should have access to relevant information via radio or computer aided dispatch (CAD) to assure alerting of potential risks.
- Ask dispatch for additional information if needed.
- Identify patients who may be infected with a serious communicable disease by verbal screening and symptoms and recognize the potential hazards.
- Inform ambulance/dispatch about the risk of a serious communicable disease so appropriate infection prevention and control measures can be implemented.
- Apply PPE appropriate for the patient's condition prior to making direct patient contact.
- Patients with respiratory illnesses: Interview conducted at least 6 feet away from the patient may provide some protection from infectious droplets.
- Ask any patient with respiratory symptoms to wear a surgical mask if they can tolerate it.
- Limit the number of EMS providers making patient contact to the minimum required to perform tasks safely.
 - » Consider the strategy of one provider putting on PPE and managing the patient while the other provider does not engage in patient care, but provides the 'doorway evaluation' and communications/charting.
- Use caution when approaching the disoriented or delirious patient, as erratic behavior (e.g., flailing or staggering) can place EMS providers at additional risk of exposure.

² Adapted from [Identify, Isolate, Inform: Emergency Medical Services \(EMS\) Systems and 9-1-1 Public Safety Answering Points \(PSAPs\) for Management of Patients Who Present with Possible Ebola Virus Disease \(Ebola\) in the United States](#). Note that this document is somewhat dated.

Dispatch/Responder Actions

For geographically-associated serious communicable diseases like EVD or MERS, the public health or EMS medical authority may request first responders ask additional screening questions including:

1. Travel history and/or direct exposure to potential case within the number of days of the incubation period for the illness of interest (e.g., EVD – 21 days, MERS – 14 days)
2. Specific signs and symptoms of illness

AMBULANCE RESPONDERS – GENERAL

- 911 ambulance responders should be working collaboratively with the 911 communications center and first responders and be alerted to any infectious risks.
- 911 ambulance responders implement medical screening questions to alert them to the possibility of a serious communicable disease both to guide infection prevention and control measures and to inform choice of destination hospital.
- Ask dispatch for additional information if needed.
- Apply PPE appropriate for the patient's condition prior to making direct patient contact.
- Patients with respiratory illnesses: Interview conducted at least 6 feet away from the patient may provide some protection from infectious droplets.
- Ask any patient with respiratory symptoms to wear a surgical mask if they can tolerate it.
- Limit the number of EMS providers making patient contact to the minimum required to perform tasks safely.
 - » Consider the strategy of one provider putting on PPE and managing the patient while the other provider does not engage in patient care, but provides the 'doorway evaluation' and communications/charting.
 - » Avoid unnecessary direct contact with the patient.
- Use caution when approaching the disoriented or delirious patient, as erratic behavior (e.g., flailing or staggering) can place EMS providers at additional risk of exposure.

Dispatch/Responder Actions

- Keep nonessential equipment away from the patient, so as to minimize contamination on the scene and in the ambulance.
- If patient has nausea or vomiting, treat symptoms per protocols, provide emesis bag, and contain any emesis.
- For profuse diarrhea, consider asking the patient to wear an absorbing undergarment and/or wrapping the patient in an impermeable sheet to reduce contamination of other surfaces.
- Choose a receiving facility appropriate to the potential disease and alert them about the patient and estimated time of arrival (ETA) as early as possible.

For geographically-associated serious communicable diseases like EVD or MERS, the public health or EMS medical authority may request first responders ask additional screening questions including:

1. Travel history and/or direct exposure to potential case within the number of days of the incubation period for the illness of interest (e.g., Ebola – 21 days, MERS – 14 days)
2. Specific signs and symptoms of illness

Standard Precautions



EXAMPLE DISEASES

Acquired immune deficiency syndrome (AIDS)/human immunodeficiency virus (HIV) • anthrax (cutaneous or pulmonary) • botulism • cellulitis • dengue • minor wound infections including abscess • nonspecific upper respiratory infections



GOAL OF PRECAUTIONS

Apply a standard set of protections based on the patient's symptoms and the clinical care rather than a specific suspected organism. The goal is to apply personal protective garments as needed to prevent exposure to bodily fluids. Examples include routine use of hand hygiene, gloves, and adding eye protection and mask for patients with respiratory symptoms and during airway interventions, or gown for potential splash exposures.



DISPATCH ACTIONS

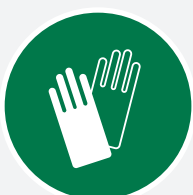
- Resource assignment – usual assignment of first responders and appropriate basic life support (BLS)/advanced (ALS) response
- Patient instructions – usual pre-arrival instructions (porch light, control animals, gather medications, etc.)
- Crew instructions: Advise responding crew of patient illness/symptoms.

Standard Precautions



ARRIVING EMS ACTIONS/CONSIDERATIONS

- Assess patient upon arrival – Assure history consistent with dispatch.
- Adjust infection prevention precautions as required.
- Perform hand hygiene before and after patient care activities.



PPE

- Exam gloves during patient contact for any potential exposure to infectious agent or bodily fluids
- Goggles/face shield and simple mask for any airway procedures (intubation, suctioning) or patient with active cough from apparent infectious source
- Impermeable gown/apron for any situation likely to generate splash/liquid exposures



PATIENT CARE CONSIDERATIONS

- Provide a simple mask for all patients with acute infectious respiratory symptoms who can tolerate it.
- Provide tissues to patients for secretion control and encourage patient hand hygiene practices.

Standard Precautions



TRANSPORT CONSIDERATIONS

- Standard transportation to appropriate hospital facility



AMBULANCE DECONTAMINATION

- Absorb/wipe any liquid or solid spills.
- Disinfect with standard Environmental Protection Agency (EPA)-registered³ bacteriocidal/virucidal wipes or solution (chlorine, quaternary disinfectants, etc.) all potentially contaminated surfaces including the stretcher.
- Medical equipment (stethoscope, blood pressure (BP) cuff, etc.) making patient contact should be disposable or cleaned and disinfected before use on another patient.

RESOURCES



- + **Guideline for Isolation Precautions 2007**
- + **Selected EPA-Registered Disinfectants**
- + **Standard Precautions in Health Care**

³ [Selected EPA-Registered Disinfectants](#) is relevant to all mentions of EPA-registered disinfectants in this document.

Contact Precautions



EXAMPLE DISEASES

Major open wound • MRSA • Vancomycin-resistant enterococci (VRE) • C. difficile • norovirus* • other suspected infectious diarrhea • head lice/body lice/scabies • respiratory syncytial virus (RSV) (plus mask) • zoster with open lesions



GOAL OF PRECAUTIONS

- Provide impermeable barriers to infectious agents that are either highly pathogenic, drug resistant, contagious, or persistent that can easily be contracted or spread to other environments via fomites and surface contact.



DISPATCH ACTIONS

- Resource assignment – usual assignment of first responders and appropriate BLS/ALS response
- Patient instructions – usual pre-arrival instructions (porch light, control animals, gather medications, etc.)
- Crew instructions - Advise responding crew of patient illness/symptoms.

*Wear mask during vomiting/diarrhea if norovirus suspected



Contact Precautions



ARRIVING EMS ACTIONS/CONSIDERATIONS

- Be aware of any community-based outbreaks of norovirus or other epidemic disease requiring contact precautions and obtain relevant history as indicated.
- Assess patient upon arrival – Assure history consistent with dispatch.
 - » Inquire specifically about C. difficile, MRSA history.
 - » Look for evidence of infestation or large open draining wounds.
- Adjust infection prevention precautions as required based on symptoms.
 - » Not all gastrointestinal (GI) illness requires contact precautions, but since norovirus and C. difficile (among others) do, consider maintaining contact precautions unless clearly not required (and can assume standard precautions at that point).
- Perform hand hygiene before and after patient care activities.



PPE

Type:

- Disposable fluid-resistant gown that extends to at least mid-calf or disposable fluid-resistant coveralls
- Disposable gloves with extended cuffs
- Ensure strict adherence to standard precautions based on situation (e.g., mask, goggles/face shield for splatter risk or airway interventions).

Contact Precautions

**Donning:**

1. Personal items (e.g., jewelry [including rings], watches, cell phones, pagers, pens) should ideally be removed and stowed. Long hair should be tied back. Eyeglasses should be secured with a tie.
2. Inspect PPE prior to donning to assure not torn or ripped, that all required supplies are available, and that correct sizes are selected for the healthcare worker (HCW).
3. Perform hand hygiene; allow hands to dry before moving to next step
4. Put on first pair of gloves if double gloving.
5. Put on gown or coverall. Ensure large enough to allow unrestricted movement. Ensure cuffs of inner gloves are tucked under the sleeve of the gown or coverall, if used.
6. Put on outer gloves. Ensure the cuffs are pulled over the sleeves of the gown or coverall and are tight.
7. After donning, the integrity of the ensemble should be verified. The HCW should go through a range of motions to ensure sufficient range of movement while all areas of the body remain covered.

Contact Precautions



Doffing:

Remove PPE only in an appropriate doffing area. Meticulous care should be taken to avoid self-contamination. PPE waste should be placed in a labeled leak-proof biohazard bag.

1. Inspect the PPE for visible contamination, cuts, or tears before removal. Disinfect any visible contamination with an EPA-registered disinfectant wipe.
2. Disinfect outer-gloved hands with either an EPA-registered disinfectant wipe or alcohol-based hand rub (ABHR). Remove and discard outer gloves into biohazard bag, taking care not to contaminate inner gloves (if used) in the process.
3. Inspect the inner glove (if used; if not used, perform hand hygiene and don a clean pair of gloves) outer surfaces for visible contamination, cuts, or tears.
 - Visible contamination, cut, or tear - If an inner glove is visibly soiled, disinfect the glove with either an EPA-registered disinfectant wipe or ABHR, remove the inner gloves, perform hand hygiene with ABHR on bare hands, and don a new pair of gloves. If the inner glove is cut or torn, review your occupational exposure protocol.
 - No visible contamination, cuts or tears - Disinfect the inner gloves with either an EPA-registered disinfectant wipe or ABHR.

Contact Precautions



4. Remove gown or coverall and discard.

- Gown - Depending on gown design and location of fasteners, the HCW can either untie or gently break fasteners. Avoid contact with outer surface of gown during removal. Pull gown away from body, rolling inside out and touching only the inside of the gown.
- Coverall - Tilt head back to reach zipper or fasteners. Unzip or unfasten completely before rolling down while turning inside out. Avoid contact with outer surface of coverall during removal, touching only the inside of the coverall.
- Dispose of gown or coverall into the biohazard bag.

5. 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. Dispose of inner gloves into the biohazard bag.

6. Perform hand hygiene

- Visibly dirty, contaminated, or soiled with blood or body fluids - Wash hands with soap and water, then perform hand hygiene with ABHR.
- Not visibly soiled - Perform hand hygiene with ABHR.

7. Inspect for any contamination of the HCW uniform. If there is contamination, secure the garment for cleaning.



PATIENT CARE CONSIDERATIONS

- Provide anti-emetics per service protocols.
- Anticipate additional stool/vomit to reduce contamination of the HCW and the ambulance (emesis bags, towels available, and/or impermeable sheet placed on stretcher).

Contact Precautions



TRANSPORT CONSIDERATIONS

- Consider applying an impermeable barrier sheet to the patient to protect the HCW and environmental surfaces in the presence of excessive wound drainage, fecal incontinence, or other discharges.
- Patients on contact precautions should preferentially be transported to a private room.



AMBULANCE DECONTAMINATION

- Absorb/wipe any liquid or solid spills.
- Large volume spills of infectious body fluids (e.g., diarrhea) should be pre-treated with 1:10 bleach solution (1 part 5% household bleach to 9 parts water) or similar solution for 90 seconds prior to cleanup.
- Medical equipment (stethoscope, BP cuff, etc.) making patient contact should be disposable or cleaned and disinfected before use on another patient.
- Confirmed or suspected *C. difficile* infection decontamination should utilize hypochlorite solutions. EPA-registered disinfectants with sporocidal activity may be sufficient, but limited data is available.

RESOURCES



- + **Frequently Asked Questions about Clostridium difficile for Healthcare Providers**
- + **Guidelines for Isolation Precautions 2007**

Droplet Precautions



EXAMPLE DISEASES

Neisseria meningitidis • mumps • mycoplasma • streptococcal and many other causes of pneumonia • parvovirus • pertussis • pneumonic plague • rhinovirus • rubella • seasonal influenza • streptococcal pharyngitis



GOAL OF PRECAUTIONS

- Provide additional respiratory protection against inhalation of larger infectious droplets during direct patient care activities.



DISPATCH ACTIONS

- Resource assignment – usual assignment of first responders and appropriate BLS/ALS response except in epidemic situation consider restricting first responders if no life-threatening symptoms (chest pain, difficulty breathing, altered mental status) present
- Patient instructions – usual pre-arrival instructions (porch light, control animals, gather medications, etc.)
- Crew instructions - Advise responding crew of patient illness/symptoms.

Droplet Precautions



ARRIVING EMS ACTIONS/CONSIDERATIONS

- Be aware of any community-based outbreaks of influenza or other epidemic disease requiring droplet precautions and obtain relevant history as indicated.
- Assess patient upon arrival – Assure history consistent with dispatch.
 - » Inquire specifically about influenza or other specific exposures.
- Adjust infection prevention precautions as required based on symptoms/history. Maintain strict adherence to standard precautions.
- Perform hand hygiene before and after patient care activities.



PPE

Type:

- Disposable simple (surgical, flexible fabric) facemask (not N95)
- Disposable exam gloves
- Eye protection – cleanable goggles or disposable face shield

Donning:

1. Select gloves and mask and inspect to ensure not torn or ripped and that the correct size is selected.
2. Perform hand hygiene with ABHR; allow hands to dry before moving to next step.
3. Put on gloves.
4. Put on facemask.

Droplet Precautions



Doffing:

Care should be taken to avoid self-contamination when removing mask and gloves. Place all PPE waste in a labeled leak-proof biohazard bag.

1. Inspect PPE for visible contamination, cuts, or tears before starting to remove. If any PPE is visibly contaminated, disinfect with an EPA-registered disinfectant wipe.
2. Remove and discard gloves, taking care not to contaminate hands when removing the gloves. Dispose of gloves in biohazard bag. Perform hand hygiene with ABHR.
3. Remove eye protection: Remove by strap, avoid touching the front surface of the eye protection. Discard in biohazard bag. Perform hand hygiene with ABHR. Reusable goggles must be thoroughly cleansed with EPA-registered disinfection wipes or dilute (1:100) bleach solution.
4. Remove the surgical facemask by tilting the head slightly forward, grasping the elastic straps, sliding them off the ears/head, and removing the mask without touching the front fabric. Discard the mask into the biohazard bag.
5. Perform hand hygiene: If hands are visibly dirty, or soiled with blood or body fluids or other material, wash hands with soap and water, then perform hand hygiene with ABHR. If hands are not visibly soiled, simply perform hand hygiene with ABHR.
6. The HCW should inspect for any contamination of their uniform. If there is contamination, remove the soiled garment and secure it for cleaning.

Droplet Precautions



PATIENT CARE CONSIDERATIONS

- Provide a simple mask for all patients with acute infectious respiratory symptoms who can tolerate it.
- Provide tissues to patients for secretion control and encourage patient hand hygiene and cough etiquette practices.
- Personnel not in appropriate PPE should maintain a distance of 3-6 feet from the patient and should wear gloves to guard against droplets which the patient may have deposited in the immediate surroundings.
- Minimize use of nebulizers to decrease droplet generation; consider metered dose inhalers.
- Minimize airway interventions that may cause coughing (e.g., suctioning) to degree possible.



TRANSPORT CONSIDERATIONS

- Standard transportation
- Consider having the patient compartment exhaust vent on high and isolating the driver compartment if performing aerosol producing procedures (airway suctioning, intubation, aerosolized medication administration) or other ambulance-specific methods of increasing ventilation and decreasing recirculation in the patient care compartment.
- Advise receiving hospital of respiratory symptoms – private (but not negative pressure) room preferred.

Droplet Precautions



AMBULANCE DECONTAMINATION

- Absorb/wipe any liquid or solid spills.
- Disinfect with standard EPA-registered bacteriocidal/virucidal wipes (chlorine, quaternary disinfectants, etc.) all potentially contaminated surfaces including the stretcher.
- Medical equipment (stethoscope, BP cuff, etc.) making patient contact should be disposable or cleaned and disinfected before use on another patient.

RESOURCES

- + [Guidelines for Isolation Precautions 2007](#)



Airborne Precautions



EXAMPLE DISEASES

measles • monkeypox • TB (suspected or confirmed pulmonary or laryngeal) • varicella (chickenpox)



GOAL OF PRECAUTIONS

- Provide respiratory protection against inhalation of infectious aerosols (3-5u particles).



DISPATCH ACTIONS

- Resource assignment – Consider restricting assignment of first responders if no life-threatening symptoms (chest pain, difficulty breathing, altered mental status) present and high suspicion for airborne disease.
- Patient instructions – usual pre-arrival instructions (porch light, control animals, gather medications, etc.)
- Crew instructions - Advise responding crew of patient illness/symptoms and concern for airborne infection.

Airborne Precautions



ARRIVING EMS ACTIONS/CONSIDERATIONS

- Be aware of any community-based outbreaks of TB, measles, or other disease requiring airborne precautions and obtain relevant history as indicated.
- Assess patient upon arrival – Assure history consistent with dispatch
 - » Inquire specifically about TB, measles or other relevant exposures.
- Adjust infection prevention precautions as required based on symptoms. Change to standard precautions if no significant concern for airborne. Maintain strict adherence to standard precautions.
- Perform hand hygiene before and after patient care activities.



PPE

Type:

- Disposable National Institute for Occupational Safety and Health (NIOSH)-approved, fit-tested N95 respirator or higher level respirator (e.g., re-usable half-face elastomeric respirator N95 or higher rating or powered air-purifying respirator (PAPR) with full hood and high-efficiency particulate air (HEPA) filter)
 - » In most cases, EMS agencies use PAPRs for airborne precautions for employees that cannot safely fit test on N95 masks due to facial hair, facial structure, etc.
- Disposable exam gloves

Airborne Precautions

**Donning:**

1. Inspect PPE prior to donning to ensure that it is in serviceable condition (e.g., gloves not torn or ripped, respirator not soiled or creased; if using PAPR, check motor and airflow) and that correct size is selected.
2. Perform hand hygiene with ABHR; allow hands to dry before donning gloves.
3. Put on gloves.
4. Put on respirator.
 - N95 mask or elastomeric respirator – Apply mask, mold to nose/face, and perform fit check to assure intact seal.
 - PAPR – Turn on PAPR motor, apply hood assuring inner and outer liner drape smoothly over shoulders, and adjust headband to comfort.

Doffing:

PPE should be doffed in a designated removal area, (particularly if using a PAPR). Care should be taken to avoid self-contamination during removal. Place all PPE waste in a labeled, leak-proof biohazard bag. PAPR should be placed in a separate biohazard bag and/or managed by service protocol.

1. Inspect glove outer surfaces for visible contamination, cuts, or tears.
 - Visible contamination, cut, or tear - If a glove is visibly soiled, then disinfect the glove with either an EPA-registered disinfectant wipe or ABHR, remove the gloves, dispose in biohazard bag, perform hand hygiene with ABHR on bare hands. If the inner glove is cut or torn, inspect the underlying skin. If any break in the skin, contact your supervisor and follow your service exposure guidelines.
 - No visible contamination, cuts or tears - Remove and discard gloves, taking care not to contaminate hands during removal. Dispose of gloves in biohazard bag. Perform hand hygiene with ABHR.



Airborne Precautions



2. Respirator

- Remove N95 respirator mask tilting the head slightly forward, grasping the elastic straps, sliding them off the ears/head, and removing the mask without touching the front fabric. Discard mask into the biohazard bag.
- Elastomeric half-face respirator – Reapply clean gloves, remove mask by straps, wipe surface with EPA-registered disinfectant wipe or dilute (1:100) chlorine bleach solution, allow to dry. Remove gloves and perform hand hygiene with ABHR.
- PAPR with External Belt-Mounted Blower (if used): Remove PAPR belt and set PAPR down in front of you. Lean forward, grasp top of hood (avoid grabbing hose), slowly remove hood by pulling off and straight down to floor. Retain the belt-mounted blower unit and reusable PAPR components in a separate bag for disinfection (must be wiped down with EPA-registered disinfectant wipes or dilute (1:100) chlorine bleach solution, and allowed to air dry).

3. Perform hand hygiene.

- Visibly dirty, contaminated, or soiled with blood or body fluids - Wash hands with soap and water, then perform hand hygiene with ABHR.
- Not visibly soiled - Perform hand hygiene with ABHR.

4. Inspect for any contamination of the HCW uniform. If there is contamination, secure the garment for cleaning.



Airborne Precautions



PATIENT CARE CONSIDERATIONS

- Ensure strict adherence with standard precautions (e.g., add gown or coverall for significant bodily fluid exposures and follow doffing for contact precautions).
- Ask the patient to wear a surgical mask (not an N95 respirator) if they are able to tolerate it.
- Exercise caution when performing aerosol-producing procedures (endotracheal intubation, airway suctioning, administration of nebulized medication, continuous positive airway pressure (CPAP)/bilevel positive airway pressure (BiPAP), cardiopulmonary resuscitation (CPR)). Only perform these procedures if medically necessary and cannot be postponed.
- If clinically indicated and available, rapid sequence intubation should be considered for patient requiring definitive airway management to avoid aerosol production as a consequence of coughing.



TRANSPORT CONSIDERATIONS

- Notify the receiving hospital of the need for an airborne infection isolation room (AIIR) for patient placement.
- Consider having the patient compartment exhaust vent on high and isolating the driver compartment from the patient compartment. Consider having the driver compartment ventilation fan set to high without recirculation.
- If driver/pilot compartment is not isolated from the patient compartment, vehicle operator to wear NIOSH approved fit tested N95 respirator.
- Patients that are intubated should be ventilated with a bag-valve device or ventilator equipped with a HEPA filter on exhalation port.

Airborne Precautions



AMBULANCE DECONTAMINATION

- Absorb/wipe any liquid or solid spills.
- Disinfect with standard bacteriocidal/virucidal wipes (chlorine, quaternary disinfectants, etc.) all potentially contaminated surfaces including the stretcher except if TB suspected must use approved wipes for TB (e.g., peroxide-based) or dilute chlorine bleach solution (1:100) for surface decontamination. Depending on circumstances, supplemental decontamination with aerosolized peroxide or other methods may be used according to service protocol.
- Medical equipment (stethoscope, BP cuff, etc.) making patient contact should be disposable or cleaned and disinfected before use on another patient.

RESOURCES

- + **Respiratory Protection Standards**



Special Respiratory Precautions



EXAMPLE DISEASES

Severe acute respiratory syndrome (SARS) • MERS • novel influenza strains (e.g., H7N9) • smallpox



GOAL OF PRECAUTIONS

- Provide respiratory protection against inhalation of infectious aerosols (3-5u particles) as well as impermeable barrier to reduce spread of highly pathogenic viruses on surfaces and via fomites during direct patient care activities (standard + contact + droplet + airborne).



DISPATCH ACTIONS

- In addition to travel history to affected countries, may need to introduce screening questions based on local cases.
- Resource assignment – Consider restricting assignment to ambulance only if no life-threatening symptoms (chest pain, difficulty breathing, altered mental status) present in order to decrease first responder exposure.
- Patient instructions – Usual pre-arrival instructions (porch light, control animals, gather medications, etc.). Request family member to meet arriving personnel at door.
- Crew instructions - Advise responding crew of patient illness/symptoms and concern for special pathogen.

Special Respiratory Precautions



ARRIVING EMS ACTIONS/CONSIDERATIONS

- Be aware of any community-based outbreaks of SARS/MERS type diseases or other disease requiring special precautions and obtain relevant travel and exposure history as indicated.
- Assure appropriate training and education on PPE use and patient management.
- 'Doorway evaluation' if possible – If stable and verbal, minimize contact with while caregiver dons appropriate PPE.
- Assure history consistent with dispatch.
 - » Inquire specifically about travel and relevant exposures.
- Adjust infection prevention precautions as required based on symptoms. Change to standard precautions if no significant concern for special pathogen. Maintain strict adherence to standard precautions.
- For special pathogens, minimize number of direct caregivers.
- Perform hand hygiene before and after all patient care activities.



PPE

Type:

- Disposable NIOSH-approved, fit-tested N95 or equivalent/higher level respirator (e.g., re-usable half-face elastomeric respirator N95 or higher rating mask or PAPR with full hood and HEPA filter)
- Disposable face shield or disposable or cleanable goggles (if not using hooded PAPR)
- Disposable fluid-resistant gown that extends to at least mid-calf or disposable fluid-resistant coveralls

Special Respiratory Precautions



- Disposable gloves with extended cuffs (strongly consider double-gloving)
- Disposable boot/shoe covers

Donning:

1. Personal items (e.g., jewelry [including rings], watches, cell phones, pagers, pens) should ideally be removed and stowed. Long hair should be tied back. Eyeglasses should be secured with a tie.
2. Inspect PPE prior to donning to ensure that it is in serviceable condition (e.g., gloves not torn or ripped, respirator not soiled or creased, if using PAPR check motor and airflow) and that correct size is selected.
3. Perform hand hygiene with ABHR; allow hands to dry before donning gloves.
4. Put on first pair of gloves (assume double-gloving).
5. Put on gown or coverall. Ensure large enough to allow unrestricted movement. Ensure cuffs of inner gloves are tucked under the sleeve of the gown or coverall.
6. Put on boot/shoe protectors.
7. Put on outer gloves. Ensure the cuffs are pulled over the sleeves of the gown or coverall and are tight. Consider taping, if required.
8. If not using hooded PAPR, apply full face shield or goggles.
9. Put on respirator.
 - N95 mask or elastomeric respirator – Apply mask, mold to nose/face, perform fit check to assure intact seal; apply face shield if not using goggles.
 - PAPR – Turn on PAPR motor, apply hood assuring inner liner (if equipped) is tucked into coverall (if used) and outer liner drapes smoothly over shoulders and adjust headband to comfort.
10. After donning, the integrity of the ensemble should be verified by the HCW. The HCW should go through a range of motions to ensure sufficient range of movement without suit binding/stretching while all areas of the body remain covered.



Special Respiratory Precautions



Doffing:

PPE should be doffed in a designated removal area, particularly when using a PAPR. Care should be taken to avoid self-contamination during removal. Place all PPE waste in a labeled, leak-proof biohazard bag. PAPR should be placed in a separate biohazard bag and/or managed by service protocol.

1. Inspect the PPE for visible contamination, cuts, or tears before removal. Disinfect any visible contamination with an EPA-registered disinfectant wipe.
2. Disinfect outer-gloved hands with either an EPA-registered disinfectant wipe or ABHR. Remove and discard outer gloves into biohazard bag, taking care not to contaminate inner gloves in the process.
3. Inspect the inner glove outer surfaces for visible contamination, cuts, or tears.
 - Visible contamination, cut, or tear - If an inner glove is visibly soiled, then disinfect the glove with either an EPA-registered disinfectant wipe or ABHR, remove the inner gloves, perform hand hygiene with ABHR on bare hands, and don a new pair of gloves. If the inner glove is cut or torn, check the underlying skin and review your occupational exposure protocol with your supervisor.
 - No visible contamination, cuts or tears - Disinfect the inner gloves with either an EPA-registered disinfectant wipe or ABHR.
4. Remove gown or coverall and discard.

(Note: Gown or coverall should be removed before face protection and respirator. If that is not possible due to the design of the PPE, remove the gown or coverall after face protection and respirator.)

 - Gown - Depending on gown design and location of fasteners, the HCW can either untie or gently break fasteners. Avoid contact with outer surface of gown during removal. Pull gown away from body, rolling inside out and touching only the inside of the gown.

Special Respiratory Precautions



- Coverall - Tilt head back to reach zipper or fasteners. Unzip or unfasten completely before rolling down while turning inside out. Avoid contact with outer surface of coverall during removal, touching only the inside of the coverall.
 - Dispose of gown or coverall into the biohazard bag.
5. Remove goggles or face shield (if used) sliding fingers under straps and sliding up and off away from face. Do not touch the front surface of the goggles/shield. Discard into biohazard bag. If re-using goggles must clean all surfaces with EPA-approved disinfecting wipes or dilute (1:100) chlorine bleach solution and allow to air dry prior to re-use.
 6. Respirator
 - N95 respirator mask: Tip head slightly forward, remove by sliding fingers under the elastic straps and sliding them off the ears/head allowing the mask to fall away from the face being careful not to touch the front of the mask. Discard into the biohazard bag.
 - Elastomeric half-face respirator: Remove mask by straps without touching the front surface of the mask, wipe surface with EPA-approved disinfectant cloth or dilute (1:100) chlorine bleach solution, allow to dry.
 - PAPR with External Belt-Mounted Blower: Remove PAPR belt and set PAPR down in front of you. Lean forward, grasp top of hood, (avoid grabbing hose), slowly remove hood by pulling off and straight down to floor. Retain the belt-mounted blower unit and reusable PAPR components in a designated bag or area for disinfection in accordance with manufacturer instructions (must be wiped down with EPA-approved disinfectant or dilute (1:100) chlorine bleach solution, and allowed to air dry.

Special Respiratory Precautions



7. 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. Dispose of inner gloves into the biohazard bag.
8. Perform hand hygiene.
 - Visibly dirty, contaminated, or soiled with blood or body fluids - Wash hands with soap and water, then perform hand hygiene with ABHR. Refer to the Occupational/Health Exposures information in the Resources/Special Considerations section for additional guidance to ensure that occupational health is aware of potential exposure.
 - Not visibly soiled - Perform hand hygiene with ABHR.
9. HCW should inspect for any contamination of their uniform. If there is contamination, remove and secure garment for cleaning.



PATIENT CARE CONSIDERATIONS

- Ask the patient to wear a surgical mask (not an N95 respirator) if they are able to tolerate it
- Exercise caution when performing aerosol-producing procedures (endotracheal intubation, airway suctioning, administration of nebulized medication, CPAP/BiPAP, CPR). Only perform these procedures if medically necessary and cannot be postponed.
- If clinically indicated and available, rapid sequence intubation should be considered for patient requiring definitive airway management to avoid aerosol production from coughing.
- Patients who are intubated should be ventilated with a bag-valve device or ventilator with a HEPA filter on the exhalation port.

Special Respiratory Precautions



TRANSPORT CONSIDERATIONS

- Notify the receiving hospital of the need for an AIIR room for patient placement.
- The patient compartment exhaust vent should be on high and the driver compartment should be isolated from the patient compartment if possible. The driver compartment ventilation fan set to high without recirculation
- The vehicle operator should wear a NIOSH approved fit-tested N95 respirator if the patient compartment and cab cannot be isolated.
- For persons under investigation for smallpox or novel influenza, consider transport by isopod or ambulance preparation as described for EVD-VHF Precautions.



AMBULANCE DECONTAMINATION

- Absorb/wipe any liquid or solid spills.
- Disinfect with standard EPA-registered bacteriocidal/virucidal wipes (chlorine, quaternary disinfectants, etc.) all potentially contaminated surfaces including the stretcher.
- Medical equipment (stethoscope, BP cuff, etc.) making patient contact should be disposable or cleaned and disinfected using appropriate disinfectants before use on another patient.

RESOURCES



- + **Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation with Novel Influenza A Viruses Associated with Severe Disease**
- + **Middle East Respiratory Syndrome (MERS)**



EVD/VHF Precautions



EXAMPLE DISEASES

EVD • Marburg virus • Lassa fever • Crimean-Congo fever



GOAL OF PRECAUTIONS

- Provide maximal impermeable barrier and respiratory protection against highly pathogenic VHF viruses.



DISPATCH ACTIONS

1. Inquire about travel and direct exposure history within the previous 21 days.
 - Has patient traveled to or lived in a country with hemorrhagic fever virus transmission?
 - Has patient had direct contact with a person who is confirmed or suspected to have EVD/VHF? (including local cases, if applicable)
 - » If yes, does the patient have any fever, severe headache, muscle pain, weakness, fatigue, diarrhea, vomiting, abdominal (stomach) pain, or unexplained hemorrhage (bleeding or bruising)?

EVD/VHF Precautions



- Notify responding units of any affirmative answer to these questions. Provide guidance below/ask crew to reference guidance and cancel first responder units if no life-threatening symptoms (unconscious/ altered mental status, difficulty breathing, chest pain).
2. Instructions to patients and EMS providers for EVD/VHF positive screen:
- Instruct other people at the scene to restrict contact with patient unless wearing appropriate PPE. Provide usual pre-arrival instructions (porch light, control animals, gather medications, etc.) Request family member to meet arriving personnel at door. Ask family to assure clean clothing for the patient prior to EMS arrival, if possible.
 - Alert any first responders (if required for emergent symptoms) and EMS providers being dispatched of potential for a patient with possible exposure/signs and symptoms of EVD/VHF before they arrive on scene. This may best be done via CAD, text messaging, or other secure means.
 - Advise EMS providers to apply appropriate PPE before direct contact with the patient.
 - » Advise EMS providers before entering the scene to wear the highest level of PPE recommended if complaints include bleeding, vomiting, or diarrhea.
 - If responding to an airport or other port of entry to the United States, dispatch should notify the Centers for Disease Control and Prevention (CDC) Quarantine Station for the port of entry. Contact information for CDC Quarantine Stations can be accessed at <http://www.cdc.gov/quarantine/quarantinestationcontactlistfull.html>.
 - Dispatch should notify the local or state public health authority to advise them of the response if a suspect case is transported.
 - Dispatch should notify EMS supervisor and others per service protocols.
 - Alert EVD/VHF specialized EMS ambulance if available as secondary responder.

EVD/VHF Precautions



ARRIVING EMS ACTIONS/CONSIDERATIONS

- Be aware of any international and/or community-based outbreaks of EVD/VHF and obtain relevant history as indicated regardless of dispatch information.
- Assure appropriate training and education on PPE use and patient management.
- ‘Doorway evaluation’ – If stable and verbal, first responders or EMS personnel can maintain verbal contact while caregivers don appropriate PPE. One EMS provider should begin the donning process immediately on arrival to the scene while the other provides a doorway assessment.
- Assure history consistent with dispatch.
 - » Inquire specifically about travel and relevant exposures.
 - » If initial assessment confirms suspect case EVD/VHF and patient is stable and alert, then continue specialized EMS ambulance response to your location, if available.
- Adjust infection prevention precautions as required based on symptoms. Change to standard precautions guideline if no significant concern for special pathogen. Maintain strict adherence to standard precautions.
- Minimize number of direct caregivers.
- Perform hand hygiene before and after all patient care activities.
- Assure that appropriate ALS/BLS care is provided. The vast majority of cases identified as suspect will not have EVD/VHF.

EVD/VHF Precautions



PPE

Initial responders to **suspect** case **without** active bleeding, vomiting, or diarrhea

Donning:

1. Use a checklist and a trained observer.
2. Personal items (e.g., jewelry [including rings], watches, cell phones, pagers, pens) should be stowed. Long hair should be tied back. Eye glasses should be secured with a tie.
3. Visually inspect the PPE to ensure that it is not torn or ripped, all required PPE and supplies are available, and that the correct sizes are selected.
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.
6. Put on gown or coverall. Ensure gown or coverall is large enough to allow unrestricted movement. Ensure cuffs of inner gloves are tucked under the sleeve cuff.
7. Put on facemask (simple surgical mask).
8. 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 face shield: Put on full face shield over the surgical facemask to protect the eyes, as well as the front and sides of the face. Consider use of a head cover.
10. Verify the integrity of the ensemble (e.g., there should be no cuts or tears in the PPE). The HCW should be comfortable and able to extend the arms, bend at the waist, and go through a range of motions while all areas of the body remain covered.

EVD/VHF Precautions



Doffing:

PPE should be doffed in a designated PPE removal area. Meticulous care should be taken during this process to avoid self-contamination as this is the major contributor to HCW disease. Place all PPE waste in a labeled leak-proof biohazard bag.

1. Use a checklist and a trained observer.
2. Inspect the PPE for visible contamination, cuts, or tears before starting to remove. If any visible contaminant, disinfect using an EPA-registered disinfectant wipe.
3. 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 in the process. Dispose of outer gloves into biohazard bag.
4. Inspect the inner glove outer surfaces for visible contamination, cuts, or tears.
 - Visibly soiled, cut or tear - Disinfect the glove with either an EPA-registered disinfectant wipe or ABHR, remove the inner gloves, and discard into biohazard bag, perform hand hygiene with ABHR on bare hands, and don a new pair of gloves. For cut or tear, inspect skin for injury and report potential exposure immediately to supervisor.
 - No visible contamination and no cuts or tears - Disinfect the inner gloves with either an EPA-registered disinfectant wipe or ABHR.
5. Remove the face shield (and head cover/hood if used) by tilting the head slightly forward, grabbing the rear strap, and pulling it over the head, allowing the face shield to fall forward. Avoid touching the front surface of the face shield. Discard the face shield into the designated biohazard bag.
6. Disinfect inner gloves with either an EPA-registered disinfectant wipe or ABHR.



EVD/VHF Precautions



7. Remove gown or coverall.

- Gown - Depending on gown design and location of fasteners, either untie or gently break fasteners. Avoid contact with outer surface of gown during removal. Pull gown away from body, rolling inside out and touching only the inside of the gown.
- Coverall - Tilt head back to reach zipper or fasteners. Unzip or unfasten coverall completely before rolling down while turning inside out. Avoid contact with outer surface of coverall during removal, touching only the inside of the coverall.
- Dispose of gown or coverall into the biohazard bag.

8. 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.

9. Perform hand hygiene with ABHR and don a new pair of gloves.

10. Remove the surgical facemask by tilting the head slightly forward, grasping the elastic straps, and pull the straps off the ears and/or top of head to release the mask allowing it to fall forward off the face. Avoid touching the front of the mask. Discard mask into the biohazard bag.

11. Disinfect 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. Dispose of inner gloves into the biohazard bag.

12. Perform hand hygiene with ABHR.

13. Inspect for any contamination of the HCW uniform. If there is contamination, remove the soiled garment and place it into the biohazard bag, cleanse skin with ABHR and immediately inform your supervisor of the potential exposure.

EVD/VHF Precautions



PPE

Transport of confirmed case or those **with** active bleeding, vomiting, or diarrhea

Note: Services may elect to use N95 mask in combination with impermeable hood that covers head and shoulders and a full face shield. The above PPE section may be modified for use of this ensemble. This section covers donning/doffing with PAPR with impermeable drape-style hood. Services may elect to add a heavier impermeable apron for high-risk situations.

Donning:

1. Identify trained observer and use a checklist.
2. Hydrate/use restroom if possible.
3. Personal items (e.g., jewelry [including rings], watches, cell phones, pagers, pens) should ideally be stowed. Long hair should be tied back. Eye glasses should be secured with a tie.
4. Visually inspect the PPE ensemble to ensure it is in good condition (e.g., not torn or ripped), all required PPE and supplies are available, and correct sizes selected. Test the PAPR motor and airflow, check that the filters fit securely, and ensure all filter caps are off.
5. Don and test two-way radio headset microphone (if using).
6. Perform hand hygiene with ABHR; allow hands to dry before moving to next step.
7. Put on first pair of gloves.
8. Put on coverall, ensure unrestricted movement. Ensure cuffs of inner gloves are tucked under the sleeve cuff.
9. Put on boots, pull coverall material over top of boot and tape (leaving tab).

EVD/VHF Precautions



10. Put on second pair of gloves (with extended cuffs). Ensure the cuffs are pulled over the sleeves of the coverall.
11. Turn PAPR on and put on belt and then hood. Assure inner hood (if present) is tucked into coverall and outer hood drapes over shoulders. Assure comfortable airflow and adjust headband if required.
12. Observer and HCW should verify the integrity of the ensemble (e.g., there should be no cuts or tears in the PPE). The HCW should be comfortable and able to extend the arms, bend at the waist, and go through a range of motions without stressing or binding the coverall.

Doffing:

PPE should be doffed in a designated PPE removal area. Meticulous care should be taken during this process to avoid self-contamination as this is the major contributor to HCW disease. Place all PPE waste in a labeled leak-proof biohazard bag.

1. Identify a trained observer and use a checklist.
2. Inspect the PPE for visible contamination, cuts, or tears before starting to remove. If any visible contaminant, disinfect using an EPA-registered disinfectant wipe.
3. Remove apron if using (e.g., by breaking or untying neck strap and releasing waist ties) and roll the apron away from you, containing the soiled outer surface as you roll; discard apron into biohazard bag being careful not to contact other surfaces. Re-inspect underlying coverall.
4. 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 in the process. Dispose of outer gloves into biohazard bag.

EVD/VHF Precautions



5. Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears.
 - Visibly soiled, cut or tear - Disinfect the glove with either an EPA-registered disinfectant wipe or ABHR, remove the inner gloves and discard into biohazard bag, perform hand hygiene with ABHR on bare hands, and don a new pair of gloves. For cut or tear, inspect skin for injury and report any potential exposure immediately to supervisor.
 - No visible contamination and no cuts or tears - Disinfect the inner gloves with either an EPA-registered disinfectant wipe or ABHR.
6. Remove PAPR with External Belt-Mounted Blower: Remove PAPR belt and set PAPR down in front of you. Lean forward, grasp top of hood (avoid grabbing hose), slowly remove hood by pulling off and straight down to floor.
7. Retain the belt-mounted blower unit and reusable PAPR components in a separate bag for disinfection.
8. Disinfect inner gloves with either an EPA-registered disinfectant wipe or ABHR.
9. Remove coverall.
 - Tilt head back to reach zipper or fasteners. Unzip or unfasten coverall completely and release tape at boot cuff.
 - Avoid contact with outer surface of coverall during removal, touching only the inside of the coverall as you slide your hands down the inside of the suit, rolling it inside-out as you go.
 - Step out of boots onto clean surface.
 - Boots
 - » Disposable – Discard both boots and coverall into biohazard bag.
 - » Re-usable – After stepping out of boots, dispose of coverall into biohazard bag, then place boots into separate bag for later decontamination.



EVD/VHF Precautions



10. 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. Dispose of inner gloves into the biohazard bag.
11. Perform hand hygiene with ABHR.
12. Observer and HCW inspect for any contamination of their uniform. If there is contamination, remove the soiled garment and place it into a leak-proof biohazard bag, cleanse skin with ABHR and inform the supervisor of potential exposure.
13. Step into clean area.



PATIENT CARE CONSIDERATIONS

- Advise the designated receiving hospital as early as possible about a suspect case to allow them preparation time.
- The biggest risk to the patient is withholding appropriate treatment from suspect EVD/VHF patients, as few will actually have the disease.
- The more body fluids, the higher the transmission risk.
- Anticipate additional stool/vomit to reduce contamination of the HCW and the ambulance (emesis bags, towels, and/or impermeable sheet placed on stretcher).
- Minimize the number of HCWs who make patient contact.
- Dedicated medical equipment (ideally disposable) should be used for the provision of patient care whenever possible.
- If patient is ambulatory, strongly consider a barrier garment, surgical mask and gloves if tolerated.
- If patient is having large volumes of diarrhea, patient should wear an adult undergarment.

EVD/VHF Precautions



- If patient is non-ambulatory, the patient may be comfortably shrouded in a barrier sheet, and surgical mask applied.
- Exercise caution when performing aerosol-producing procedures (endotracheal intubation, airway suctioning, administration of nebulized medication, CPAP/BiPAP, CPR). Only perform these procedures if medically necessary and cannot be postponed. Note that cardiac arrest early in the illness may be due to electrolyte imbalance and may be survivable. Late cardiac arrest from multi-organ failure likely carries a dismal prognosis.
- Do not perform phlebotomy or any other invasive procedures unless urgently required for patient care or stabilization. Handle any needles and sharps with extreme care and dispose in puncture-proof, sealed containers that are specific to the single patient. Do not dispose of used needles and sharps in containers that have sharps from other patients in them.
- Consider giving oral or nasal medicine to reduce nausea and/or pain per service protocols rather than injectable.



TRANSPORT CONSIDERATIONS - GENERAL

- If the patient is a highly suspect case and stable, consider specialized ambulance preparation and transport (see below) if time and acuity allow.
- Confirmed case or interfacility transport should be performed by EMS personnel with properly prepared ambulances (see below).
- For emergency transport, consider applying an impermeable barrier sheet or cocoon to the patient to protect the HCW and environmental surfaces in the presence of excessive wound drainage, fecal incontinence, or other discharges.
- The driver's compartment should remain clean! No family members or belongings in the driver's compartment!

EVD/VHF Precautions



- Suspect EVD/VHF cases should be transported to a designated regional hospital capable of evaluation and initial management and arrived into a dedicated isolation room.
- If EVD/VHF cannot be quickly ruled out by history and travel during initial hospital assessment, consider deferring ambulance decontamination for a brief period.
- Formal decontamination after transport of a suspect/confirmed case should occur in a designated area by designated personnel as below.



SPECIALIZED AMBULANCE PREPARATION/ INTERFACILITY TRANSFER⁴

Assumptions:

- All involved HCWs (hospital and out-of-hospital) have received education and training and demonstrated competencies for EVD/VHF PPE and patient management.
- Healthcare facilities and transporting ambulance agencies have protocols for the management of patients, exposures, and ambulance preparation and decontamination.
- Facilities and transporting ambulance agencies conduct exercises to evaluate their integration.

⁴ Adapted from [Standard Operating Procedure \(SOP\) for Patient Handoff between a Healthcare Facility and a Transporting Ambulance](#).

EVD/VHF Precautions



Prior to Transport

- Ensure you have points of contact and means of communication with sending facility, receiving facility, public health authority, emergency management, law enforcement (or agency providing security for the transport), and (if applicable) aviation and hazardous materials management and disposal.
- Consider notifying your agency's public affairs official.
- Consider secure methods of communication to avoid monitoring by the media or public.
- Communicate with the sending facility to confirm patient's clinical condition and risk of contact with infectious body fluids (bleeding, vomiting, diarrhea, etc.).
- Determine if the patient will be ambulatory or non-ambulatory.
- Confirm whether additional passengers are being transported (family, etc.).
- Ensure adequate inventory of supplies and appropriately sized PPE for the personnel who are assigned to the transport mission using checklists.
- Ensure procedures and training to limit contamination of ambulance environmental surfaces (isolation of driver compartment, draping, etc.).
- Confirm for both origin and destination facility the location for patient hand-off. This location will likely be pre-determined by facilities and chosen in order to minimize environmental exposure at the facility and prevent exposure of unprotected staff, patients, and visitors.
- Confirm for both origin and destination facility the location for donning and doffing of PPE for transporting ambulance personnel and assure ambulance decontamination and disinfection location established.
- Assure plan at destination hospital and decontamination location for managing regulated (Category A) hazardous waste.



EVD/VHF Precautions



- Assure appropriate supervision for the doffing of ambulance personnel PPE as hospital PPE and doffing protocols may be different.
- Personnel doffing and ambulance decontamination locations must be prepared to manage regulated waste.
- Determine the need for additional security with sending and receiving facility security, as well as law enforcement personnel needs during transport and at the healthcare facilities.
- Ensure medical director (or appropriate person providing medical oversight) is immediately available throughout the transport.
- Communicate with sending facility for patient updates and to confirm patient transfer location.
- Contact sending facility to verify patient management steps have been taken to facilitate event-free transport and reduce risk of exposure.
- Hold mission briefing for transport team to review:
 - » Purpose and team primary contacts
 - » Transport provider health check
 - » Patient history and condition
 - » Infection control posture – ambulance configuration and personnel PPE
 - » Team member (paramedic, emergency medical technician (EMT), driver, supervisor/safety officer, EMS physician, etc.) roles and responsibilities, including supervision of donning and doffing procedures, etc.
 - » Relevant clinical care guidelines including appropriateness of interventions or invasive procedures
 - » Transportation of patient samples and medication, if applicable
 - » Transfer of paper or electronic ambulance patient care records in a way that avoids contaminating the receiving facility

EVD/VHF Precautions



- » Decontamination and disinfection procedure
- » Waste collection and mission recovery
- » Post-mission surveillance
- » Special considerations – transfer of patient across state borders, deterioration of patient condition in transit, vehicle malfunction and other contingencies, etc.
- » Media policies

During Transport

- Depart for patient location and provide ETA at sending facility.
- Communicate with designated point of contact at each facility the arrival of transporting ambulance at sending and receiving facilities.
- Observe donning of PPE and, when ready, proceed to make patient contact (only the minimum number of providers necessary to manage the patient should be present).
- Conduct brief patient assessment to determine patient's stability, "dry" or "wet" symptoms, and need for intervention before and/or during patient transport. Define appropriate interventions for patient deterioration. Minimize patient contact. For example, consider not obtaining vital signs if patient is "dry," has no visual evidence of distress or shock, and transport time is not prolonged.
- Transport patient in impervious suit if ambulatory, or in impervious sheets if non-ambulatory and stretcher-bound, as tolerated.
- Consider any patient belongings, which are typically bagged, labeled, and transported with the patient in the patient compartment, to be contaminated.
- Any documents provided by sending facility should be free of contamination. When in doubt, consider them contaminated and package as appropriate for transport by ambulance personnel.

EVD/VHF Precautions



- Report patient's condition and ETA to receiving facility to facilitate their readiness to receive patient from transport agency immediately upon arrival, thus avoiding PPE-induced fatigue/dehydration for patient, ambulance crew, and receiving staff.

Arrival to receiving facility

- Confirm arrival with receiving facility and specific route of travel within facility before patient leaves ambulance.
- Transport patient to designated location in receiving facility – via the most direct route to isolation unit – ambulatory vs. stretcher. If any concern for stretcher contamination, transfer patient to hospital cart upon exit from ambulance.
- Ensure route of travel is secured.
- Transfer patient care to receiving facility team as arranged (and exercised).
- Package waste from transport prior to doffing PPE. Transfer waste to hospital or appropriate agency as previously arranged and in accordance with applicable regulations.
- Ambulance personnel doff PPE under supervision of qualified personnel (transport agency PPE ensemble and hospital PPE may differ). If ambulance personnel are performing ambulance disinfection and have not exceeded service threshold for time in PPE, may proceed with disinfection prior to doffing.
- Return to ambulance driver's compartment and proceed to designated decontamination/disinfection station.
- Disinfect ambulance per protocol.
- Conclude mission, debrief providers, and initiate surveillance as appropriate.

EVD/VHF Precautions



Ambulance preparation

- If a commercial patient containment system is used these guidelines may be modified accordingly. EMS personnel must be carefully trained on these systems—including appropriate cleaning, disposition, and impact on mission recovery—and understand the limitations on patient care they impose.
- Apply clear plastic sheets (at least 4mil) or similar impermeable barrier cloth to ceiling and duct tape in place. If the ceiling is a flat impermeable surface, the agency may elect not to apply plastic to the ceiling.
- Overlap all seams by at least 1 inch.
- Apply sheets to walls, cutting holes for air supply/vents and exhaust.
- Seal any conduit between the driver compartment and the passenger compartment with plastic sheeting.
- Protect floor and benches with clear plastic sheets (at least 6mil), cutting holes for stretcher locks. At this point all surfaces should be protected by plastic. A large bag or plastic sheeting may be used for the 'jump' seat.
- Stretcher will be protected with impervious sheet.
- ABHR and a spill kit/absorbent disposable rags should be immediately available.
- Essential medical equipment will be stowed in patient compartment sealed inside a clear plastic bag for easy access.
- Pre-pack medical supplies into individual plastic bags (may elect to re-organize bags/kits to minimize extra contents and/or to make cleaning easier, e.g., plastic tray organizers instead of fabric bags, packed into sliding closure clear plastic bags).
- Additional medical equipment will be stowed in patient compartment behind disposable barriers, protecting it from unnecessary exposure, but available if needed by cutting plastic.

EVD/VHF Precautions



- Oxygen delivery kit should be stowed in patient compartment and sealed inside a clear plastic bag for easy access. Consider manual disposable suction unit.
- All climate controls should be set for fresh, not recirculating air!
- Ventilation system in driver compartment will be set on high and not recirculating; crack windows/vents open.
- Exhaust vent in patient compartment will be set on high.



AMBULANCE DECONTAMINATION⁵

1. Identify Decontamination Area:

- Select an appropriate site for ambulance decontamination that protects the vehicle and the team from the weather, preferably a well-ventilated, climate controlled, large enclosed garage/structure.
- Establish a secure perimeter.
- Include considerations for waste management, security plan, public perception, and media visibility when selecting decontamination site.
- Define and mark the clean/dirty zone boundary around the ambulance that requires PPE to cross.

2. Before Decontamination and Disinfection:

- Assure appropriate supplies available.
 - » Yellow caution tape
 - » Appropriate sizes of PPE for personnel performing decontamination

⁵ Adapted from [Example: Standard Operating Procedure \(SOP\) for Decontamination of an Ambulance that has Transported a Person Under Investigation or Patient with Confirmed Ebola.](#)

EVD/VHF Precautions



- » Leak proof Biohazard bags
 - » Garbage bags
 - » Autoclave bags with rubber bands
 - » EPA-registered disinfectant wipes
 - » Household bleach, measuring cups, bucket
 - » Spray bottles
 - » Bottled water
 - » Disposable rags
 - » Alcohol based hand sanitizer
 - » Absorbent compound or absorbent towels
 - » Spill Kit (absorbent, brush, pan, small red bag)
 - » Bio-safety check-off sheet, briefing template, donning check-off sheet, doffing check-off sheet, contact list
- The vehicle operator and patient care provider may be responsible for decontamination and disinfection of the transport unit or a separate team may be used. Both approaches have advantages.
 - All waste, including PPE, drapes, and wipes, should be considered Category A infectious substances, and should be packaged appropriately for disposal.
 - Personnel must be in appropriate PPE during decontamination and disinfection. A third person should also be available as a trained observer and to assist as needed.
 - PPE should be donned and doffed per above guidelines.
 - PPE selection should consider worker protection for biological exposures as well as based on the disinfectant used.⁶

⁶ [PPE Selection Matrix for Occupational Exposure to Ebola Virus](#)

EVD/VHF Precautions



3. Spill decontamination:

- Grossly contaminated and visibly soiled surfaces must be decontaminated prior to disinfection.
- Gross surface contamination, including barrier drapes, must be treated for 90 seconds with a fresh household bleach solution (1:10) mix ratio, (0.5% hypochlorite), before soaking up the fluid with absorbent materials.
 - » A fresh household bleach solution (1:10) mix ratio is prepared by using 1 part household bleach (5% hypochlorite) and 9 parts water.
- Used absorbent materials are placed in leak-proof biohazard bags.
- After removal of visible contaminant, surfaces require disinfection as below.

4. Disinfection:

- Disinfect the outside of any bags containing unused medical equipment as well as the stretcher, PAPR motor housings, etc. with an EPA-registered hospital grade disinfectant or a fresh household bleach solution (1:100 mix ratio) 0.05% hypochlorite concentration with attention to proper contact time.
 - » A fresh household bleach solution (1:100) mix ratio is prepared by using 1 part household bleach and 99 parts water.
- If 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. All non-dedicated, non-disposable medical equipment used for patient care should be cleaned and disinfected according to manufacturer's instructions and department policies.
- 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.

EVD/VHF Precautions



- 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.
- Personnel should manually disinfect the interior of the patient care compartment with an EPA-registered hospital grade disinfectant or a fresh household bleach solution (1:100 mix ratio) 0.05% hypochlorite concentration with attention to proper contact time and particular detail for high-touch surfaces such as door handles and steps using care to limit mechanically generated aerosols (e.g., no scrub brushes) and using the surface wipe method to disinfect.
- Once the manual interior wipe down has been completed, collect and package all waste as Category A waste. Place waste in biohazard bags for disposal. All bags will be closed using a gooseneck technique and the outer surface disinfected with an EPA-registered disinfectant or 0.05% hypochlorite solution. All waste is double-bagged and exterior surfaces disinfected. Biohazard bags may be inserted into autoclave bags provided by the receiving facility.
- Manually wipe with disinfectant the ambulance's exterior patient loading doors and handles, and any areas that may have been contaminated.
- The full exterior of the ambulance does not require a disinfectant wipe down.
- Once the outside of all surfaces (including waste bags) have been wiped with disinfectant, then supervised doffing of PPE can occur into a final biohazard bag, which is closed and disinfected.

EVD/VHF Precautions



5. After disinfection/decontamination:

- Dispose of all waste according to organization protocols as well as local and federal regulations for Category A infectious substances. Best practice may be to transfer waste to the hospital for disposition.
- Additional cleaning methods may also be used. While not required, this may provide additional assurance to personnel and public prior to 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.

EVD/VHF Precautions

RESOURCES



- + **Bloodborne Infectious Diseases: HIV/AIDS, Hepatitis B, Hepatitis C**
- + **Bloodborne Pathogens Standard, 29 CFR 1910.1030**
- + **Considerations for Safe Transport of Patients Infected with Ebola Virus**
- + **Ebola-Associated Waste Management**
- + **Ebola Patient Preparation for Transport, Patient Movement, and Decontamination Procedures**
- + **Ebola (Ebola Virus Disease): U.S. Healthcare Workers and Settings**
- + **Example: Standard Operating Procedure (SOP) for Decontamination of an Ambulance that has Transported a Person Under Investigation or Patient with Confirmed Ebola**
- + **For U.S. Healthcare Settings: Donning and Doffing Personal Protective Equipment (PPE) for Evaluating Persons Under Investigation (PUIs) for Ebola Who Are Clinically Stable and Do Not Have Bleeding, Vomiting, or Diarrhea**
- + **Guidance on Personal Protective Equipment (PPE) To Be Used by Healthcare Workers During Management of Patients with Confirmed Ebola or Persons Under Investigation (PUIs) for Ebola Who Are Clinically Unstable or Have Bleeding, Vomiting, or Diarrhea in U.S. Hospitals, Including Procedures for Donning and Doffing PPE**
- + **Interim - Planning Guidance for the Handling of Solid Waste Contaminated with a Category A Infectious Substance**
- + **List L: Disinfectants for Use Against the Ebola Virus**
- + **PPE Selection Matrix for Occupational Exposure to Ebola Virus**
- + **Quarantine Station Contact List, Map, and Fact Sheets**
- + **Safe Handling, Treatment, Transport, and Disposal of Ebola-Contaminated Waste**
- + **Transport and Management of Patients with Confirmed Ebola Virus Disease**



Resources/Special Considerations

HAND HYGIENE⁷

- During the delivery of healthcare, avoid unnecessary touching of surfaces in close proximity to the patient to prevent both contamination of clean hands from environmental surfaces and transmission of pathogens from contaminated hands to surfaces.
- When hands are visibly dirty, contaminated with proteinaceous material, or visibly soiled with blood or body fluids, wash hands with either a nonantimicrobial soap or an antimicrobial soap and water.
- If hands are not visibly soiled, or after removing visible material with soap and water, the preferred method of hand decontamination is with ABHR.
- Wash hands with non-antimicrobial soap or with antimicrobial soap and water if contact with spores (e.g., *C. difficile* or *Bacillus anthracis*) is likely to have occurred. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores.
- Do not wear artificial fingernails or extenders if duties include direct contact with patients at high risk for infection and associated adverse outcomes.

PANDEMIC INFLUENZA

- PPE guidance for novel influenza and pandemic influenza may change rapidly. EMS agencies should monitor information from CDC and regulatory organizations at the state and federal level and have established contacts with infection prevention and control professionals.
- Novel influenza strains are usually initially managed according to Special Respiratory or Airborne + contact + standard precautions. If in doubt, the service should apply Special Respiratory Precautions until disease-specific guidance is available.
- Dispatch should update questions to reflect any screening needed for international, domestic, or local cases.

⁷ [2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings](#)

Resources/Special Considerations

- Responding personnel should have a low threshold to mask the patient and wear appropriate PPE as influenza is transmissible prior to the onset of significant symptoms.
- Pandemics can place enormous strain on EMS services due to high call volumes and provider illness. Crisis standard of care plans may need to be implemented, including but not limited to:
 - » Adjusted resource assignments based on availability (e.g., police only on reported vehicle crash until non-ambulatory injuries confirmed)
 - » Auto-answer and caller deferral to information/prescribing lines for non-emergency situations
 - » Recommending private transport when appropriate
 - » Changing to 'closest hospital' transportation or 'batch' transports
 - » Deferral of selected 911 requests for service
 - » Expanding 'left at scene' discretion/guidelines
 - » Non-hospital destinations for appropriate patients
 - » Changes in staffing, crew configuration, and use of novel response structures ('jump cars', community paramedic response, etc.)
 - » Adoption of N95 conservation or re-use strategies
- Changes to EMS responses will require medical director and service director policy development and approval and may require local ordinance and state statutory relief. These policies and supporting governmental actions should be planned prior to an event that overwhelms EMS resources.

RESOURCES



- + **Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response**
- + **Crisis Standards of Care: A Toolkit for Indicators and Triggers**
- + **EMS Pandemic Influenza Guidelines for Statewide Adoption**



Resources/Special Considerations

PEDIATRIC ISSUES

- Children may be very fearful of caregivers in high-level PPE. Assure the ability to communicate with the child and explain what is happening and why in an age-appropriate manner.
- Assure that caregivers follow expected infectious precautions and may be kept with the child if they wear appropriate PPE and have been providing care for the child during the current illness to this point and there is no substantial risk of body fluid exposure during transport.
- Pediatric intravenous access can be difficult and the need for access must be balanced against the potential risk for needlesticks in the setting of potential blood-borne pathogens.
- Appropriate sizes of surgical masks should be available for children.
- Consider nasal/oral routes for analgesia and anxiolysis if intravenous access is not obtained.
- Assure that comfort objects (blanket, stuffed animal, etc.) can accompany the patient during transport.
- Do not avoid indicated procedures and medications for children simply because of a perceived risk of distress
- Children are able to compensate for hypovolemia much better than adults by increasing their heart rate. However, hypotension and cardiovascular collapse can occur with little warning. Elevated heart rates can also be seen with fever, anxiety, and pain, making a determination of origin difficult. Assess perfusion, history, and other signs before assuming tachycardia is not related to early shock/sepsis.
- When possible, specialized EVD/VHF transport units should include agencies that routinely provide pediatric critical care interfacility transport.
- EVD commonly induces miscarriage. Providers should be aware of this issue and potential exposures and complications.
- Portable pediatric isolation transport units are available, but should only be used by personnel trained in their operation and limitations. The use of these units may significantly increase the patient's anxiety during transport.



RESOURCES

- + **Q&A's About the Transport of Pediatric Patients (<18 years of age) Under Investigation or with Confirmed Ebola**



Resources/Special Considerations

AEROMEDICAL TRANSPORT

Note: This section refers to domestic air medical transport providers only.

- Assure dispatch provides sufficient information to anticipate potential infectious risks.
- Obtain patient information from origin hospital for mission planning including appropriate PPE, equipment, and medications.
- Contact destination hospital to assure appropriate reception planning including isolation room (if required) staff, cart, PPE, and traffic/patient movement plan.
- For flights involving interface with ground transport units, assure communications plan and confirm appropriately trained and equipped providers (define needs and role – driver only vs. assuming medical care) as well as special ambulance preparation if suspect EVD/VHF case. Maintain communications to verify arrival times.
- Provide information for ground unit or receiving hospital briefing as required.
- Assure records transfer occurs safely and that records are not contaminated (e.g., seal in zippered clear plastic bag which can be wiped with disinfectant prior to hand-off).
- See general patient care considerations for the specific infectious precautions above.
- Spill kit, alcohol-based hand disinfectant, suction, disposable rags, biohazard bags, and medical supplies should be organized similar to ground unit recommendations above for suspect EVD/VHF transports.
- Movement of known EVD patients must be reported to CDC/Federal Aviation Administration (FAA) due to Federal quarantine and isolation laws.
- Policies on rotor-wing and fixed-wing transport of potentially infectious patients should be in place in each agency including questions at the dispatch level and process to provide information to the crews.
- Patients with frequent/large volume diarrhea or uncontrolled emesis are generally poor candidates for rotor-wing transport unless the symptoms can be medically controlled.
- Because the cockpit cannot be isolated from the rest of the aircraft and the limitations of portable isolation units in the airframe, helicopters should not be used for transport of suspect EVD/VHF cases. These should generally be performed by ground units or dedicated fixed-wing assets arranged through HHS.

Resources/Special Considerations

- If a fixed wing asset is to be used, consider a portable isolation unit instead of draping the cabin interior.
- For long duration flights, consider a chemical toilet for ambulatory patients.
- Special respiratory and airborne precautions patients should not be transported by rotor-wing aircraft unless in emergency situations. Fixed wing transport is preferred with the cockpit isolated from the cabin by door and ventilation.
- Intubated cases with airborne, droplet, special respiratory precautions, and EVD/VHF should have a HEPA inline filter on the ventilator exhaust.
- Pilots in rotor-wing aircraft transporting airborne or special respiratory precautions patients that are not intubated should wear an appropriately fitted N95 respirator.
- Aeromedical clinical personnel should carefully plan and use PPE similar to ground units.
- Aeromedical clinical personnel should carefully plan in-flight medical contingencies and have appropriate medications and equipment available to reduce contamination of non-required materials.
- Intubation should be performed if there is any concern about respiratory insufficiency at the hospital of origin, or concern that it could develop in flight. Rapid sequence techniques should be used to intubate all potential respiratory infection patients (as opposed to sedation-only techniques).
- Providers should anticipate altitude-dependent changes in pulmonary mechanics as well as oxygen delivery. If a patient is not able to maintain oxygenation prior to transport despite intubation, positioning, paralysis, and 100% oxygen delivery, medical control consultation should be obtained.

RESOURCES



- + **Example: Standard Operating Procedure (SOP) for Air-to-Ground (Air-Ground) Patient Handoff**
- + **Guidance on Air Medical Transport (AMT) for Patients with Ebola Virus Disease (EVD)**



Resources/Special Considerations

OCCUPATIONAL HEALTH/EXPOSURES

- Significant blood and body fluid exposures should be reported immediately to a supervisor and medical evaluation ensured.
 - » Significant exposures for EMS include blood, bloody saliva or urine, amniotic fluid exposure to eyes, mucous membranes, non-intact skin or by needlestick or bites.
 - » Appropriate HIV and hepatitis screening/Hepatitis B antibody serology should be available whenever indicated.
 - » Anti-HIV prophylaxis should be available whenever indicated.
 - » An infection prevention and control provider should be available for consultation by the agency as needed.
- Contaminated clothing should be washed or discarded in accordance with disease-specific guidelines, generally with hot water, usual detergent, and the addition of household bleach.
- HCWs should be medically monitored after providing care to a confirmed special pathogen case, even in the absence of a recognized exposure, for subjective illness and fever for the duration of the incubation period to ensure that any developing illness is recognized and swiftly evaluated. TB and hepatitis exposures may require interval employee testing.
- EMS agencies should consider policies ensuring twice daily contact with exposed personnel to discuss potential symptoms and document fever checks for special pathogens.
- Any HCW who develops signs of illness should not report to work or should immediately stop working and notify their supervisor.
 - » Prompt medical evaluation should be arranged and notification of local and state health departments.
- Post-exposure prophylaxis is seldom indicated with the exception of direct contact with patients confirmed to have *Neisseria meningitidis* or after a needlestick or other high risk exposure to an HIV positive source patient. Prophylaxis may be considered in unprotected exposures to a novel influenza virus. In selected situations vaccination may be indicated after a viral exposure (e.g., smallpox, EVD).
- HCW may be assessed regarding possibility of post-exposure prophylaxis or treatment depending on the agent and exposure.



Resources/Special Considerations

In case of PPE breach for EVD/VHF precautions:

- Move immediately away from sources of contamination to an area where the breach can be evaluated and doffing of PPE is possible.
- Assess the nature of the breach.
- Assess the risk of exposure to skin and mucous membranes.
- Any exposure of skin will require the exposed area of skin to be washed thoroughly with soap and water, after which an ABHS can also be used. Care should be taken not to abrade or damage the skin.
- Exposed mucous membranes should be flushed thoroughly with water.
- Bleach solutions are not recommended for cleansing of skin and should not be used for that purpose as they may damage the protective outer layer of the skin.
- Supervisory personnel, occupational health, and public health authorities must be informed in the case of exposure to bodily fluids.
- HCW may be assessed regarding possibility of post-exposure prophylaxis or vaccination.

RESOURCES

- + Blood/Body Fluid Exposure Option
- + Bloodborne Infectious Diseases: HIV/AIDS, Hepatitis B, Hepatitis C
- + Updated US Public Health Service Guidelines for the Management of Occupational Exposure to Human Immunodeficiency Virus and Recommendations for Postexposure Prophylaxis



References and resources

American Medical Response. (2014). [Ebola Patient Preparation for Transport, Patient Movement, and Decontamination Procedures.](#)

This document provides AMR's protocol for ambulance preparation, patient movement, and decontamination.

CDC. (2007). [2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings.](#)

This document provides infection control guidelines for healthcare settings across the continuum of care.

CDC. (2007). [2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, Appendix A.](#)

Though somewhat dated, this table provides a good association of selected infections and conditions with the type and duration of precautions. Note that EMS will not have a diagnosis to work with at the time of the encounter and will need to be conservative when assessing risk.

CDC. (2013). [Blood/Body Fluid Exposure Option.](#)

This document assists healthcare facilities in recording HCW bloodborne pathogen exposures and their management.

CDC. (2015). [Ebola-Associated Waste Management.](#)

The information on this webpage helps healthcare providers and facility staff safely handle, transport, and dispose of waste associated with the care of patients with suspected or confirmed EVD.

CDC. (2015). [Ebola \(Ebola Virus Disease\): U.S. Healthcare Workers and Settings.](#)

This webpage provides a variety of general resources for HCWs who may manage patients with EVD.

CDC. (2016). [Example: Standard Operating Procedure \(SOP\) for Air-to-Ground \(Air-Ground\) Patient Handoff.](#)

This sample SOP is intended to enable the successful handoff of patients between air and ground ambulance agencies.



References and resources

CDC. (2016). [Example: Standard Operating Procedure \(SOP\) for Decontamination of an Ambulance that has Transported a Person Under Investigation or Patient with Confirmed Ebola.](#)

This sample SOP is intended to assist EMS agencies in standardizing procedures and responsibilities related to the decontamination and disinfection of ambulances used to transport patients with EVD.

CDC. (2016). [Example: Standard Operating Procedure \(SOP\) for Patient Handoff between a Healthcare Facility and a Transporting Ambulance.](#)

This sample SOP is intended to enable planning between an EMS agency and healthcare facility on the handoff of patients with serious communicable diseases.

CDC. (2015). [For U.S. Healthcare Settings: Donning and Doffing Personal Protective Equipment \(PPE\) for Evaluating Persons Under Investigation \(PUIs\) for Ebola Who Are Clinically Stable and Do Not Have Bleeding, Vomiting, or Diarrhea.](#)

This document provides guidance to healthcare workers on donning and doffing personal protective equipment while evaluating a clinically stable person under investigation who does not have bleeding, vomiting, or diarrhea.

CDC. (2012). [Frequently Asked Questions about Clostridium difficile for Healthcare Providers.](#)

This webpage provides answers to frequently asked questions related to C. difficile.

CDC. (2015). [Guidance on Air Medical Transport \(AMT\) for Patients with Ebola Virus Disease \(EVD\).](#)

This document provides guidance to air medical transport services on the safe transportation of patients with EVD.

CDC. (2015). [Guidance on Personal Protective Equipment \(PPE\) To Be Used by Healthcare Workers During Management of Patients with Confirmed Ebola or Persons Under Investigation \(PUIs\) for Ebola Who Are Clinically Unstable or Have Bleeding, Vomiting, or Diarrhea in U.S. Hospitals, Including Procedures for Donning and Doffing PPE.](#)

This CDC webpage includes guidance on the types of PPE that should be used by those caring for patients with Ebola. It also includes steps for donning and doffing PPE as well as what trained observers should do to ensure these steps are followed.



References and resources

CDC. (2007). [Part III: Precautions to Prevent Transmission of Infectious Agents.](#)

This section of the 2007 Guideline for Isolation Precautions describes the circumstances under which each type of infection control precaution is applied.

CDC. (2015). [Identify, Isolate, Inform: Emergency Medical Services \(EMS\) Systems and 9-1-1 Public Safety Answering Points \(PSAPs\) for Management of Patients Who Present with Possible Ebola Virus Disease \(Ebola\) in the United States.](#)

Though somewhat dated, this algorithm provides the steps that emergency medical service providers can take when providing patient care in the field to those with Ebola. The resource also lists steps for decontaminating transport vehicles.

CDC. (2016). [Interim Guidance for Infection Control within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases under Investigation with Novel Influenza A Viruses Associated with Severe Disease.](#)

This webpage provides guidance on avian influenza A (H7N9), Asian H5N1, and newly detected avian influenza H5 viruses in the U.S.

CDC. (2016). [Middle East Respiratory Syndrome \(MERS\).](#)

This page offers two checklists and other tools to assist HCWs and facilities in preparing for MERS.

CDC. (2015). [Q&A's About the Transport of Pediatric Patients \(<18 years of age\) Under Investigation or with Confirmed Ebola.](#)

This webpage provides first responders with information to help protect themselves, younger patients, and patients' family members by answering the most frequently asked questions.

CDC. (2014). [Quarantine Station Contact List, Map, and Fact Sheets.](#)

This page provides information on the 20 CDC quarantine stations.

Domestic Resilience Group. (2017). [Interim – Planning Guidance for the Handling of Solid Waste Contaminated with a Category A Infectious Substance.](#)

This federal inter-agency guidance approved by the Domestic Resilience Group of the National Security Council is for the safe handling of Category A contaminated solid waste.

References and resources

Environmental Protection Agency. (n.d.). [List L: Disinfectants for Use Against the Ebola Virus.](#)

The EPA lists products that meet the CDC's criteria for use against the Ebola virus on hard, non-porous surfaces. Products are listed by name and indicate whether they are approved for use in hospital/healthcare facilities, institutions such as schools and offices, and residences.

Environmental Protection Agency. (2016). [Selected EPA-Registered Disinfectants.](#)

This webpage lists antimicrobials registered by EPA as effective against a variety of pathogens.

InterAgency Board for Equipment Standardization and Interoperability. (2014). [Recommendations on Selection and Use of Personal Protective Equipment for First Responders against Ebola Exposure Hazards.](#)

The InterAgency Board for Equipment Standardization and Interoperability reviewed current U.S. government guidance related to PPE in order to develop recommendations for first responders on PPE selection and decontamination. The recommendations include descriptions of PPE items for high and low risk exposures and detailed specifications/standards for recommended PPE.

International Academies of Emergency Dispatch. (2014). [Emerging Infectious Disease Surveillance Tool \(SRI/MERS/Ebola\).](#)

This protocol is intended to guide the response of EMS agencies to a patient with a potential emerging infectious disease.

Isakov, A., Miles, W., Gibbs, S., et al. (2015). [Transport and Management of Patients with Confirmed Ebola Virus Disease.](#) *Annals of Emergency Medicine.* 66(3):297-305.

This article describes the partnerships between hospitals and EMS agencies in Nebraska and Georgia to develop policies and practices ensuring the safe transport and management of patients with serious communicable diseases.

Kuhar, D., Henderson, D., Struble, K., et al. (2013). [Updated US Public Health Service Guidelines for the Management of Occupational Exposure to Human Immunodeficiency Virus and Recommendations for Postexposure Prophylaxis.](#) *Infection Control and Hospital Epidemiology.* 34(9):875-892.

This document provides recommendations on the management of HCWs with occupational exposure to blood or other body fluids possibility containing HIV.

References and resources

Lowe, J., Jelden, K., Schenarts, P., et al. (2014). [Considerations for Safe Transport of Patients Infected with Ebola Virus](#). *Prehospital Emergency Care*. 19(2).

This article discusses the coordinated response between the Nebraska Biocontainment Unit and Omaha Fire Department EMS to transport patients with confirmed EVD from West Africa from the airport to the high-level isolation unit.

The National Academies of Science, Engineering, and Medicine. (2012). [Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response](#).

This report provides a foundation for the underlying principles of crisis standards of care, the steps needed for implementation, and the pillars of the emergency response system that ensures crisis standards of care planning and response occurs.

The National Academies of Science, Engineering, and Medicine. (2013). [Crisis Standards of Care: A Toolkit for Indicators and Triggers](#).

This toolkit includes indicators, triggers, and tactics for EMS pandemic planning in Toolkit Part 2: Emergency Medical Services, pages 145-158.

The National Institute for Occupational Safety and Health. (2016). [Bloodborne Infectious Diseases: HIV/AIDS, Hepatitis B, Hepatitis C](#).

This webpage includes various resources for HCWs potentially exposed to a bloodborne infectious disease through a needlestick or sharps injury.

Occupational Safety and Health Administration. (n.d.). [Bloodborne Pathogens Standards, 29 CFR 1910.1030](#).

This page contains the regulatory language for the bloodborne pathogens standard.

Occupational Safety and Health Administration. (2009). [Pandemic Influenza Preparedness and Response Guidance for Healthcare Workers and Healthcare Employers](#).

This document provides an overview of infection control and other standards appropriate for pandemic influenza.

Occupational Safety and Health Administration. (2014). [PPE Selection Matrix for Occupational Exposure to Ebola Virus](#).

The U.S. Department of Labor shares information on the type of PPE to be worn in various situations (e.g., normal work activities, casual interaction, providing medical and supportive care, cleaning and disinfecting environments, and dealing with waste).



References and resources

Occupational Safety and Health Administration. (n.d.). [Respiratory Protection Standards](#).

This page contains standards on standards on respirators, respiratory protection, and the medical evaluation program.

Occupational Safety and Health Administration. (2016). [Safe Handling, Treatment, Transport, and Disposal of Ebola-Contaminated Waste](#).

This fact sheet provides a step-by-step summary of actions workers should take from the point Ebola-contaminated waste is generated through final disposal.

Sehulster, L. and Chinn, R. (2003). [Guidelines for Environmental Infection Control in Health-Care Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee \(HICPAC\)](#). Morbidity and Mortality Weekly Reports. 52(RR10):1-42.

This report provides recommendations for environmental infection control in healthcare facilities. Note that an erratum to this report is also available.

U.S. Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response. (2015). [Air to Ground Transport Fact Sheet: Planning Considerations When Developing Standard Operating Procedures for the Transfer of an Ebola \(or Other Highly Infectious Disease\) Patient from/to an Air Transport Provider to/from a Ground Transport Provider](#).

This fact sheet helps transport providers and healthcare facilities develop SOPs for air-to-ground transfers of EVD patients. It focuses on six elements for consideration: securing and preparing the ground unit(s), communicating with state and local government partners, identifying and resolving airfield issues, securing an appropriate protective force, identifying and resolving travel route issues, and managing public and media communications.

U.S. Department of Transportation. (2007). [EMS Pandemic Influenza Guidelines for Statewide Adoption](#).

This document provides guidance to EMS agencies on the development of pandemic influenza plans and protocols. While the document precedes the 2009 H1N1 pandemic it is still the most comprehensive planning resource for EMS.

World Health Organization. (2007). [Standard Precautions in Health Care](#).

This fact sheet provides healthcare facility recommendations for standard precautions.

Index of abbreviations

ABHR	alcohol-based hand rub
AIDS	acquired immune deficiency syndrome
AIIR	airborne infection isolation room
ALS	advanced life support
ASPR	Office of the Assistant Secretary for Preparedness and Response
BiPAP	bilevel positive airway pressure
BLS	basic life support
BP	blood pressure
CAD	computer aided dispatch
CDC	Centers for Disease Control and Prevention
CPAP	continuous positive airway pressure
CPR	cardiopulmonary resuscitation
EMD	emergency medical dispatcher
EMS	emergency medical services
EMT	emergency medical technician
EPA	Environmental Protection Agency
EVD	Ebola virus disease
ETA	estimated time of arrival
FAA	Federal Aviation Administration
GI	gastrointestinal
HCW	health care worker
HEPA	high-efficiency particulate air
HHS	U.S. Department of Health and Human Services
HIV	human immunodeficiency virus
MERS	Middle East Respiratory Syndrome
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
PAPR	powered air-purifying respirator
PPE	personal protective equipment
PSAP	public safety answering point
RSV	respiratory syncytial virus
SARS	severe acute respiratory syndrome
SOP	standard operating procedure
TB	tuberculosis
TRACIE	Technical Resources, Assistance Center, and Information Exchange
VHF	viral hemorrhagic fever
VRE	Vancomycin-resistant enterococci



Acknowledgements to be added later.

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