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International Association of Emergency Medical Services Chiefs

October 28, 2014

UPDATE EV-005-2014

Ebola Outbreak in Western Africa – EMS Response Issues

With the increasing media coverage about the Ebola outbreak in Western Africa the IAEMSC constituency has increasingly looked for policy and operational guidance. In an effort to satisfy these requests, the leadership has assembled this reference document for your use. It is important to be cognizant that at present, this public health crisis is limited to the region of Western Africa and has not presented a direct threat to North America at this time. Nevertheless, given the globalization of air transportation and modern travel capabilities, several IAEMSC members have had situations where an individual who had traveled to the region reported similar symptoms and required EMS assistance. As of this writing, there is one (1) CDC confirmed case in the United States (<http://www.cdc.gov/vhf/ebola> last accessed 9/30/2014) .

What is Ebola?

Ebola is a severe and often fatal illness. At this time, Ebola does not pose a significant risk to the U.S. It is currently spreading in four West African countries: Guinea, Liberia, Sierra Leone and Nigeria. The outbreak, which began in March 2014, is the worst Ebola outbreak in history.

Ebola is caused by a virus. The virus is spread through direct contact (through broken skin or mucous membranes) with blood and body fluids (urine, feces, saliva, vomit, and semen) of a person who is sick with Ebola, or with objects (like needles) that have been contaminated with the virus. Symptoms of Ebola include sudden fever, headaches, muscle pain, fatigue, vomiting, diarrhea, bruising, and bleeding. There is no cure or vaccine; however, some people can recover with intensive treatment in a hospital setting.

Transmission (SOURCE: CDC Transmission - <http://www.cdc.gov/vhf/ebola/transmission/index.html>)

Because the natural reservoir host of Ebola viruses has not yet been identified, the manner in which the virus first appears in a human at the start of an outbreak is unknown. However, researchers believe that the first patient becomes infected through contact with an infected animal.



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When an infection does occur in humans, the virus can be spread in several ways to others. Ebola is spread through direct contact (through broken skin or mucous membranes) with:

- Blood or body fluids (including but not limited to urine, saliva, feces, vomit, and semen) of a person who is sick with Ebola
- Objects (like needles and syringes) that have been contaminated with the virus
- Infected animals
- Ebola is not spread through the air or by water, or in general, food. However, in Africa, Ebola may be spread as a result of handling bushmeat (wild animals hunted for food) and contact with infected bats.

Healthcare providers caring for Ebola patients and the family and friends in close contact with Ebola patients are at the highest risk of getting sick because they may come in contact with infected blood or body fluids of sick patients.

During outbreaks of Ebola, the disease can spread quickly within healthcare settings (such as a clinic or hospital). Exposure to Ebola can occur in healthcare settings where hospital staff are not wearing appropriate protective equipment, including masks, gowns, and gloves and eye protection.

Dedicated medical equipment (preferable disposable, when possible) should be used by healthcare personnel providing patient care. Proper cleaning and disposal of instruments, such as needles and syringes, is also important. If instruments are not disposable, they must be sterilized before being used again. Without adequate sterilization of the instruments, virus transmission can continue and amplify an outbreak.

Once someone recovers from Ebola, they can no longer spread the virus. However, Ebola virus has been found in semen for up to 3 months. People who recover from Ebola are advised to abstain from sex or use condoms for 3 months.

Treatment of Ebola (SOURCE: CDC Treatment - <http://www.cdc.gov/vhf/ebola/treatment/index.html>)

No specific vaccine or medicine (e.g., antiviral drug) has been proven to be effective against Ebola.

Symptoms of Ebola are treated as they appear. The following basic interventions, when used early, can significantly improve the chances of survival:

- Providing intravenous fluids (IV) and balancing electrolytes (body salts)
- Maintaining oxygen status and blood pressure
- Treating other infections if they occur

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Some experimental treatments developed for Ebola have been tested and proven effective in animals but have not yet been tested in randomized trials in humans. Recovery from Ebola depends on individual patient's immune responses. People who recover from Ebola infection develop antibodies that last for at least 10 years, possibly longer.

After review of the issues surrounding this event and researching this matter with competent authorities from EMS leadership, Emergency Medicine, Infectious Disease Specialists and Public Health professionals, the IAEMSC has constructed a guidance doctrine to assist EMS Chiefs with revisiting the public health preparedness and personnel safety measures of their existing policy and operational doctrine.

Included in this package for your reference are valuable resources that will assist you with reducing research time and prepare you to respond to questions from the public, your members, and elected officials. Included in this IAEMSC Advisory is:

- IAEMSC Suggested actions for EMS Chiefs including:
 - Pre-Event Response Actions for Addressing Ebola Patient Contact
 - Internal Agency Procedures
 - Planning and Coordination with Other Agencies
- Response to Ebola: CDC Request for Assistance to EMS at U.S. Ports of Entry
- The CDC Ebola Hemorrhagic Fever Information Packet
- Southwest Texas Regional Advisory Council (STRAC) -- Regional First Responder Process to Exposure to Suspected Ebola Virus v2 (SAMHD-Reg-8)
- Interim Guidance for Emergency Medical Services (EMS) Systems and 9-1-1 Public Safety Answering Points (PSAPs) for Management of Patients with Known or Suspected Ebola Virus Disease in the United States
- NYS DOH – Ebola Concerns Letter
- NYC Regional Emergency Medical Services Council (REMSCO), Regional Medical Advisory Committee Advisory 2014-06 - Ebola hemorrhagic fever (Ebola HF) General Information for EMS Personnel
- CDC Sequence for Donning and Doffing PPE

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We will continue to monitor this situation as well as the Enterovirus D68 which is presently influencing call volume / demand for service in 22 states. As always please contact the IAEMSC leadership if you need any assistance or would like to assist with monitoring and response activities in support of your peers and IAEMSC.

Fraternally Yours,
IAEMSC OFFICERS & DIRECTORS



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SUMMARY OF RECOMMENDED ACTIONS FOR EMS CHIEF EXECUTIVE OFFICERS

RESPONSE ACTIONS FOR EBOLA PATIENT CONTACTS	
<p>Reinforce daily infection control procedures to all EMS providers and review of available minimums.</p>	<p>Review the current agency infection control procedures—including decontamination procedures for durable medical equipment. Review of PPE minimum stock on all active apparatus, including PPE stocking on apparatus not normally stocked.</p> <p>If CDC and/or DOH indicates /notifies that this threat is an issue for your jurisdiction or region:</p> <ul style="list-style-type: none"> • Consider increased stocking of PPE supplies for potential surge needs • Consider proactive distribution of PPE to all first responding personnel when not arriving with apparatus. • Reminders of basic infection control procedures, such as frequent hand washing and use of alcohol-based hand cleaners and disinfectant in the absence of water, should be issued to all personnel.
<p>Ongoing monitoring of CDC and local public health information and advisories</p>	<p>Maintain ongoing awareness of information being issued by the CDC and State Department of Health regarding the Ebola Virus situation both nationally and internationally. Guidance and situational awareness can also be located via the World Health Organization.</p>
<p>Verification of availability of proper PPE for workforce protection of EMS personnel</p>	<p>Verify that appropriate PPE is available for agency personnel, to include contact with vendors for maintenance of uninterrupted supply of disposable goods. Contact appropriate Public Health agencies to determine availability of cached supplies to support pre-hospital EMS delivery.</p> <p>Consider revision of minimum stocking levels on active apparatus as required to satisfy operational requirements.</p>
<p>Consultation with medical direction for identification of patients that may require additional protective measures</p>	<p>Consideration for identification of potential high risk cases during initial call receipt at the dispatch center may be beneficial. For instance, amending questions to include whether the patient has recently traveled from Guinea, Liberia, Nigeria, and Sierra Leone who may have a fever, severe headache, muscle pain, vomiting, diarrhea, stomach pain, or unexplained bleeding or bruising. Advanced notice of symptoms may provide EMS responders with added preparatory time for deployment of PPE and avoidance of exposures. <i>(Refer to CDC PSAP recommendations for modified caller queries)</i></p>



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<p>Consultation & planning with receiving hospitals to coordinate continuation of personal protective measures, and facilitate notification to EMS agency regarding cases resulting in potential exposure to EMS personnel</p>	<p>The maintaining enhanced communications between receiving facilities and EMS agencies will assist in identifying cases that are later determined to be potentially infectious. Receiving hospitals should also be contacted to assist with availability of appropriate decontamination solutions for durable medical equipment if that capability does not exist within your agency.</p>
<p>Review of local public health plans and contingencies</p>	<p>Review of local public health plans and contingencies, to include contingencies for maintaining EMS operational staff following potential exposures. EMS chiefs should verify that these plans and contingencies address EMS personnel issues; especially dealing with direct patient care for the EMS member should they become infected in the line of duty.</p>
<p>INTERNAL AGENCY PROCEDURES</p>	
<p>Post exposure policies</p>	<p>EMS agencies, in conjunction with their occupational health providers, medical direction and risk management should have procedures for documentation of potential exposures by pre-hospital providers.</p>
<p>Return to work clearances</p>	<p>EMS agencies should have a clearly established policy on how a previously ill employee or provider may obtain medical clearance to return to work following an illness. The medical clearance will reduce the likelihood of an ill provider infecting fellow workers or patients.</p>
<p>Delivery of support services to EMS providers and their families</p>	<p>EMS agencies should have policies for support of EMS providers that are in isolation or quarantine following a potential or verified exposure. In some cases, alternate housing arrangements may be necessary to prevent infection of family members. The EMS agency should have contingency plans for support of provider's families during an isolation or quarantine situation.</p>
<p>Review and prepare for implementation of Continuity of EMS Operations Plan (COEMSP) for agency</p>	<p>One of the challenges that EMS may face during any pandemic like event is to maintain operations despite increases in call volume, workforce shortages and absenteeism, supply chain disruptions and other threats to continued operations.</p>



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<p>Meet with medical direction for consideration of modification of agency clinical standards in the event of mass casualty events</p>	<p>If the incident exceeds the healthcare capacity of a community, it may be necessary to modify the provision of emergency medical care capabilities to the community. Altered standards of care or degraded capabilities are widely written about with respect to other events such as influenza pandemics. It is recommended that those practices be reviewed and used as a template for discussion and promulgation of your agencies operational capacity policy in the midst of an escalating incident. Moreover, this policy should also be reflected in your COEMSP.</p>
<p>EMS Chief Officers should maintain contact with their local Public Health office, Emergency Management Agency, PSAP/EMS dispatch administration and Medical Examiner</p>	<p>EMS and public health resources will likely be limited and normal services curtailed. In addition to identifying and assisting likely Ebola patients, PSAPs will need to safely triage other non-influenza related requests for help, appropriately matching need to resource, including alternative treatments, such as nurse assist lines.</p> <p>Telecommunicators need to know what to tell callers if no response is available or will be delayed. This should be part of the planning effort. PSAPs need to have pre-established links with other types of call centers (such as 2-1-1 or nurse assist lines) or alternate care centers to ensure these resources can effectively be utilized in transferring or referring callers.</p> <p>PSAPs should ensure that any such plans are in concert with the appropriate medical and legal authority. (Refer to the references section of this document for the link to the CDC Interim Guidance for Emergency Medical Services (EMS) Systems and 9-1-1 Public Safety Answering Points (PSAPs) for Management of Patients with Known or Suspected Ebola Virus Disease in the United States.</p>
<p>PLANNING AND COORDINATION WITH OTHER AGENCIES</p>	
<p>EMS Chief Officers should maintain contact with their local Public Health office, Emergency Management Agency, PSAP/EMS dispatch administration and Medical Examiner</p>	<p>Maintain active surveillance on the potential threat, to include immediate notification of any Ebola virus event in your region.</p> <p>Initial planning should be in place for potential handling of a patient surge in medical cases, to also include the potential for a surge in fatalities. All agencies will need to maintain an ongoing, consistent and unified message to the community during an event.</p>



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EMS Chief Officers should maintain contact with their local law enforcement agencies	Law enforcement resources may be needed for EMS force and resource protection.
EMS Chief Officers should interact with hospital administrators	Implementation of local or regional pandemic flu plans may include use of alternate care sites for patients. A surge in patients may require ongoing coordination of destination decisions for EMS agencies.



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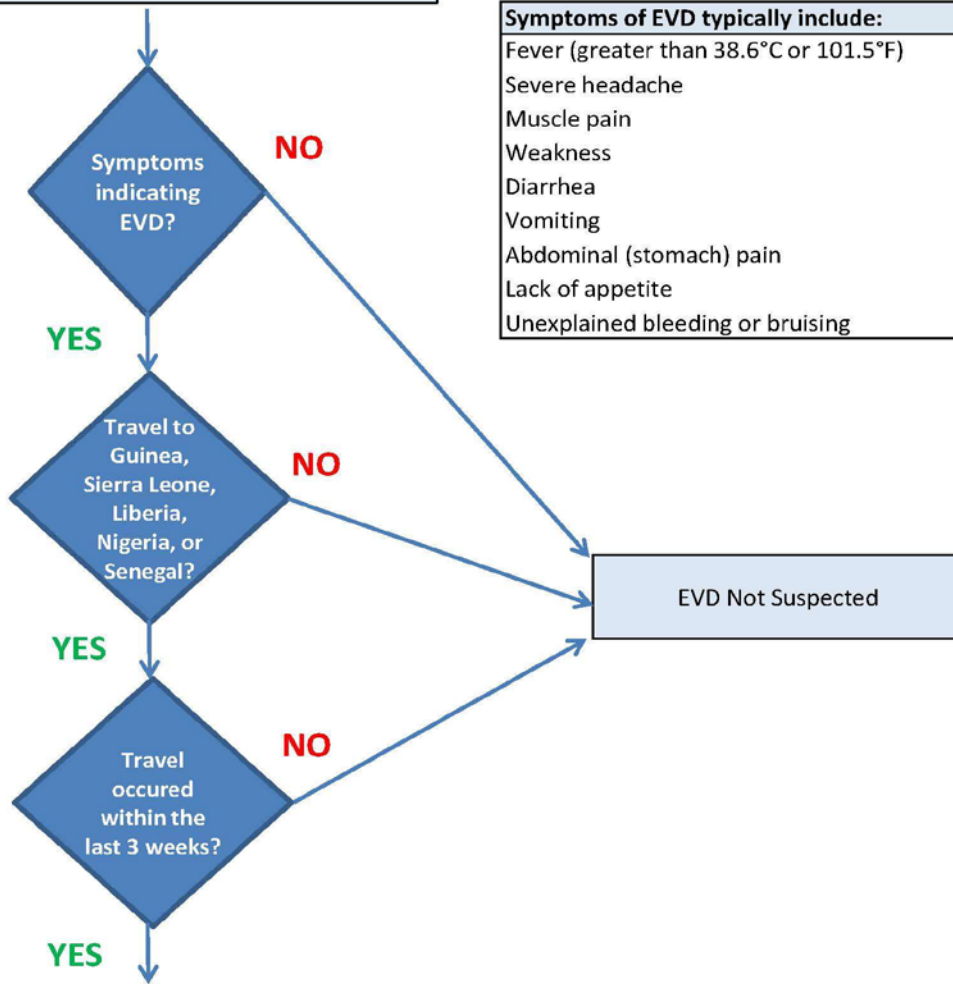


Regional First Responder Flowcharts

Original August 2014
Revised October 2014
RHMOC-SA:002

First Responder Process for Exposure to Suspect Ebola Virus Disease (EVD)

Appropriate personal protective equipment (PPE) should be used based on patient symptomology for all



- Symptoms of EVD typically include:**
- Fever (greater than 38.6°C or 101.5°F)
 - Severe headache
 - Muscle pain
 - Weakness
 - Diarrhea
 - Vomiting
 - Abdominal (stomach) pain
 - Lack of appetite
 - Unexplained bleeding or bruising

All responders should use the following PPE: gloves, gown (fluid resistant or impermeable), eye protection (goggles or face shield that fully covers the front and sides of the face), facemask.
 If encountering large amounts of body fluids, additional PPE should be utilized (double gloving, shoe/leg coverings).
 If performing intubation, CPR, or open suctioning use a N-95 mask instead of face mask along with double gloving and shoe/leg coverings. **(continue to page 2)**



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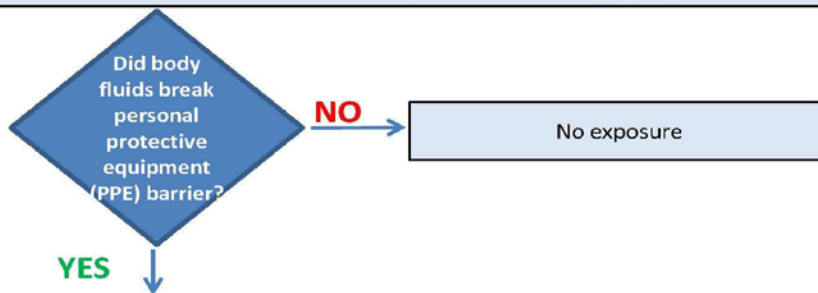


Regional First Responder Flowcharts

Original August 2014
Revised October 2014
RHMOC-SA:002

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First Responder Process for Exposure to Suspect Ebola Virus Disease (EVD) (continued from page 1):



1. Notify your supervisor immediately
2. Supervisor notifies public health epidemiology (San Antonio Metropolitan Health Department, Epidemiology (210) 207-8876, or if *outside* Bexar County contact DSHS Region-8 24hr Hotline (210) 949-2121)
3. Self isolate at home and self monitor twice daily for fever (greater than 38.6°C or 101.5°F) and other symptoms for 21 days

Frequently Asked Questions about Ebola Virus Disease (EVD):

1. As a First Responder, do I have to be concerned about exposure?

You are only at risk if you've had unprotected exposure to blood or other body fluids from an Ebola patient

2. When is a person with Ebola contagious?

A person infected with Ebola is not contagious until symptoms appear.

3. How soon after infection do symptoms show and how long is one contagious?

Commonly 8–10 days, but rarely ranges 2–21 days. Patients are contagious while showing symptoms of the disease.

4. How is Ebola spread?

Ebola is spread with **direct contact** (through broken skin or unprotected mucous membranes) with the blood or body fluids such as but not limited to feces, saliva, urine, vomit, and semen of a person who is sick with Ebola or with objects like needles that have been contaminated with the virus.

5. During the 21 days of self isolation due to an exposure, should normal daily activities be limited?

As long as you are asymptomatic (i.e. no symptoms), there is no restriction on daily activities. If you become symptomatic, you should seek physician care immediately and limit contact with family and others.

6. What PPE is needed if an aerosolized generating procedure (intubation, open suctioning of airways, cardiopulmonary resuscitation) is performed in the field by first responders?

In addition to recommended PPE, respiratory protection that is at least as protective as a NIOSH-certified fit-tested N95 filtering facepiece respirator or higher should be worn (instead of a facemask).

Additional PPE must be considered for these situations due to the potential increased risk for contact with blood and body fluids including, but not limited to, double gloving, disposable shoe covers, and leg coverings.

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Category A Waste Handling & Packaging Procedures Guidelines for a Suspected or Confirmed Case of Ebola

- With a suspected or confirmed Ebola case immediately contact the local/state health department and CDC.
- All waste generated from a suspected/confirmed patient should be treated as Category A waste as follows:
 1. Place soft waste or sealed sharps containers into a primary medical waste bag (1.5ml – ASTM tested; can be provided by Stericycle).
 2. Apply bleach or other virocidal disinfectant into the primary bag to sufficiently cover the surface of materials contained within the bag; securely tie the bag.



3. Treat the exterior surface of the primary container with bleach or other virocidal disinfectant.
 4. Place the primary bag into a secondary bag and securely tie the outer bag.
 5. Treat the exterior surface of the secondary bag with bleach or other virocidal disinfectant.
 6. The double bagged waste should then be placed into special Category A packaging provided by Stericycle with the liner tied securely and container closed per the packaging instructions provided.
 7. Store the Category A waste containers separate from other regulated medical waste and in a secure area preferably isolated and with limited access.
- Stericycle recommends using disposable sharps containers for suspected/confirmed Ebola cases. The disposable container should be sealed and disposed of as special Category A waste following the instructions above. If a reusable sharps container is inadvertently used that container should also be sealed and disposed of inside the bag with the Category A waste.
 - Contact your Stericycle representative who will arrange delivery of the special Category A waste containers as well as begin the process with the DOT to acquire a “Special Permit” as required.
 - *Stericycle has been advised by the DOT and CDC that we must address each situation on a case by case basis until such time that they have an all encompassing protocol.*
 - *Once the Special Permit has been granted, Stericycle will provide a current copy of the special permit to be maintained at the Generator’s site as per DOT regulations.*
 - *Contact your Stericycle representative should you need additional supplies to properly package Category A waste.*
 - *We will develop additional guidance for contingency planning as more information becomes available.*

Additional information sources:

CDC directly at CDC.gov <<http://CDC.gov>>

<http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vgnnextchannel=0f0b143389d8c010VgnVCM1000008049a8c0RCRD&vgnnextfmt=print>

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References:

2014 Ebola Outbreak in West Africa

<http://www.cdc.gov/vhf/ebola/outbreaks/guinea/index.html> Last accessed 9/19/2014 16:44 hrs

Ebola Hemorrhagic Fever Information Packet

[www.cdc.gov/.../mnpages/dispages/Fact Sheets/Ebola Fact Booklet.pdf](http://www.cdc.gov/.../mnpages/dispages/Fact_Sheets/Ebola_Fact_Booklet.pdf)

Last Accessed 9/18/2014 18:45 hrs

Interim Guidance for Emergency Medical Services (EMS) Systems and 9-1-1 Public Safety Answering Points (PSAPs) for Management of Patients with Known or Suspected Ebola Virus Disease in the United States

<http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-emergency-medical-services-systems-911-public-safety-answering-points-management-patients-known-suspected-united-states.html>

Last accessed 9/19/2014 15:44 hrs

Southwest Texas Regional Advisory Council (STRAC) -- Regional First Responder Process to Exposure to Suspected Ebola Virus v2 (SAMHD-Reg-8)

www.strac.org/index.php/ebola Last accessed 10/08/2014 23:06 hrs

<http://www.strac.org/index.php/2-uncategorised/216-ebola-exposure-algorithm>



August 26, 2014

Dear Colleague:

CDC is working to slow the spread of Ebola in affected countries (as of today these include Guinea, Liberia, Nigeria, and Sierra Leone) and prevent introduction of Ebola into the United States. We are working closely with EMS and other vital partners at U.S. international ports of entry to enhance awareness for detection of travelers with possible Ebola symptoms. This is an evolving situation and information may change quickly.

CDC requests your assistance in sharing with EMS units at international ports of entry the CDC update, *Response to Ebola: CDC Request for Assistance to EMS at U.S. Ports of Entry*. We request EMS support to

- Look for travelers arriving from Guinea, Liberia, Nigeria, and Sierra Leone, who are sick with symptoms of Ebola: fever, severe headache, muscle pain, vomiting, diarrhea, stomach pain, or unexplained bleeding or bruising.
- Contact 24/7 your CDC Quarantine Station of jurisdiction. Station staff will evaluate with EMS the travelers' symptoms and possible exposures to Ebola.
- If CDC staff are not present at the port of entry, EMS assistance with this evaluation may be requested.

CDC also requests assistance in providing information to ill travelers. CDC has created health information cards for ill travelers depending on the Quarantine Station staff's assessment of the traveler's symptoms and potential exposure risk.

- When EMS calls the CDC Quarantine Station, CDC will advise EMS staff whether to give an information card to the sick traveler, and provide the correct card.

If you have any questions, please feel free to contact the CDC Quarantine Station in your jurisdiction at www.cdc.gov/quarantine/QuarantineStationContactListFull.html

Thank you for your outstanding support and service,

A handwritten signature in black ink, appearing to read "NP", written in a cursive style.

Nicki Pesik, MD
Chief, Quarantine and Border Health Services Branch
Division of Global Migration and Quarantine
Centers for Disease Control and Prevention

Encls: CDC update

Response to Ebola

CDC Request for Assistance to EMS at U.S. Ports of Entry

Symptoms of Ebola

Fever (101.5°F or 38.6°C or higher), severe headache, muscle pain, vomiting, diarrhea, stomach pain, or unexplained bleeding or bruising

How you can help

- **Be especially vigilant for sick travelers with possible Ebola symptoms who arrive from affected countries in West Africa:** Guinea, Liberia, Nigeria, and Sierra Leone.
- **Isolate suspected Ebola patients and protect yourself**
 - See link to EMS guidance below.
 - Follow additional agency protocols as applicable.

Contact your CDC Quarantine Station

Contact information for your quarantine station is provided on your CDC EMS card and sticker. You can also find your CDC Quarantine Station of jurisdiction at:

www.cdc.gov/quarantine/QuarantineStationContactListFull.html

- Call 24/7 your CDC Quarantine Station of jurisdiction to report any sick travelers from an Ebola-affected country.
- CDC will make an assessment and instruct whether to give them a health information card (provided by the Quarantine Station supporting your port).

For updated Ebola information

This is a rapidly evolving situation, and information may change quickly.

- CDC Interim [Guidance for Emergency Medical Services](#) (EMS) Systems and 9-1-1 Public Safety Answering Points (PSAPs) for Management of Patients with Known or Suspected Ebola Virus Disease in the United States
- CDC Ebola updates: www.cdc.gov/vhf/ebola/
- CDC Travelers' Health updates: www.cdc.gov/travel



MENU

CDC A-Z



SEARCH

Ebola (Ebola Virus Disease)

[CDC](#) > [Ebola \(Ebola Virus Disease\)](#) > [Healthcare Workers](#)

Interim Guidance for Emergency Medical Services (EMS) Systems and 9-1-1 Public Safety Answering Points (PSAPs) for Management of Patients with Known or Suspected Ebola Virus Disease in the United States

Language: English

October 28, 2014

Special note: The guidance provided in this document reflects lessons learned from the recent experience caring for patients with Ebola in U.S. healthcare settings. This document references the CDC's "[Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On \(Donning\) and Removing \(Doffing\)](#)". Although hospital settings generally present higher risk of transmission than ambulatory settings, transfers by emergency medical services (EMS) present unique challenges because of the uncontrolled and critical care nature of the work, enclosed space during transfer, and a varying range of patient acuity. These factors may increase the risk of exposure to blood and body fluids relative to other ambulatory settings and make it more difficult to change personal protective equipment (PPE) into higher levels of protection based upon a changing clinical scenario. Close coordination and frequent communications among 9-1-1 Public Safety Answering Points (PSAPs), the EMS system, healthcare facilities, and the public health system is important when preparing for and responding to patients with suspected Ebola Virus Disease (EVD).

Who this is for: Managers of 9-1-1 Public Safety Answering Points (PSAPs), EMS Agencies, EMS systems, law enforcement agencies and fire service agencies as well as individual emergency medical services providers (including emergency medical technicians (EMTs), paramedics, and medical first responders, such as law enforcement and fire service personnel).

What this is for: Guidance keeping workers safe while handling inquiries and responding to patients with suspected

Ebola symptoms.

How to use: Managers should use this information to understand and explain to staff how to respond and stay safe. Individual providers can use this information to respond to patients suspected to have Ebola and to stay safe.

Key Points:

- The likelihood of contracting Ebola in the United States is extremely low unless a person has direct unprotected contact with the blood or body fluids (like urine, saliva, feces, vomit, sweat, and semen) of a person who is sick with Ebola Virus Disease
- When risk of Ebola is elevated in their community, it is important for PSAPs to question callers about:
 - Residence in, or travel to, a country where an Ebola outbreak is occurring (Liberia, Guinea, Sierra Leone);
 - Signs and symptoms of Ebola (such as fever, vomiting, diarrhea); **and**
 - Other risk factors, such as direct contact with someone who is sick with Ebola.
- PSAPs should tell EMS personnel this information before they get to the location so they can put on the correct PPE following proper procedures as described in CDCs guidance: "[Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On \(Donning\) and Removing \(Doffing\)](#)".
- EMS staff should immediately check for symptoms and risk factors for Ebola. Staff should notify the receiving healthcare facility in advance when they are bringing a patient with suspected Ebola, so that proper infection control precautions can be taken at the healthcare facility before EMS arrives with the patient.

The guidance provided in this document is based on current knowledge of Ebola. Updates will be posted as needed on the [CDC Ebola webpage](#). The information contained in this document is intended to complement existing guidance for healthcare personnel, [Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Virus Disease in U.S. Hospitals](#).

Background

The current Ebola outbreak in West Africa has increased the possibility of patients with Ebola traveling from the affected countries to the United States.¹ The likelihood of contracting Ebola is extremely low unless a person has direct unprotected contact with the body fluids of a person (like urine, saliva, feces, vomit, sweat, and semen) of a person who is sick with Ebola. Initial signs and symptoms of Ebola include sudden fever, chills, and muscle aches, with diarrhea, nausea, vomiting, and abdominal pain occurring after about 5 days. Other symptoms such as chest pain, shortness of breath, headache, or confusion, may also develop. Symptoms may become increasingly severe and may include jaundice (yellow skin), severe weight loss, mental confusion, bleeding inside and outside the body, shock, and multi-organ failure.²

Ebola is an often-fatal disease and extra care is needed when coming into direct contact with a recent traveler who has symptoms of Ebola and is traveling from a country with an Ebola outbreak. The initial signs and symptoms of Ebola are similar to many other more common diseases found in West Africa (such as malaria and typhoid). Ebola should be considered in anyone with a fever who has traveled to, or lived in, an area where Ebola is present.³

The incubation period for Ebola, from exposure to when signs or symptoms appear, ranges from 2 to 21 days (most commonly 8-10 days). Any Ebola patient with signs or symptoms should be considered infectious. **Ebola patients without signs or symptoms are not contagious.** The prevention of Ebola includes actions to avoid:

- Exposure to blood or body fluids of infected patients through contact with skin, mucous membranes of the eyes, nose, or mouth, or
- Injuries with contaminated needles or other sharp objects.

Emergency medical services (EMS) personnel, along with other emergency services staff, have a vital role in responding to requests for help, triaging patients, and providing emergency treatment to patients. Unlike patient care in the controlled environment of a hospital or other fixed medical facility, EMS patient care is provided in an uncontrolled environment before getting to a hospital. This setting is often confined to a very small space and frequently requires rapid medical decision-making and interventions with limited information. EMS personnel are frequently unable to determine the patient history before having to administer emergency care.

Coordination among 9-1-1 Public Safety Answering Points (PSAPs), the EMS system, healthcare facilities, and the public health system is important when responding to patients with suspected Ebola. Each 9-1-1 and EMS system should include an EMS medical director to provide appropriate medical supervision.

Case Definition for Ebola Virus Disease (EVD)

The CDC's most current case definition for EVD may be accessed here: [Case Definition for Ebola Virus Disease \(EVD\)](#)

Recommendations for 9-1-1 Public Safety Answering Points (PSAPs)

State and local EMS authorities may authorize PSAPs and other emergency call centers to use modified caller queries about Ebola when they consider the risk of Ebola to be elevated in their community (e.g., in the event that patients with confirmed Ebola are identified in the area). This will be decided from information provided by local, state, and federal public health authorities, including the city or county health department(s), state health department(s), and CDC.

For modified caller queries:

It will be important for PSAPs to question callers and determine if anyone at the incident possibly has Ebola. This should be communicated immediately to EMS personnel before arrival and to assign the appropriate EMS resources. Local and state public health officials should also be notified. PSAPs should review existing medical dispatch procedures and coordinate any changes with their EMS medical director and with their local public health department.

- PSAP call takers should consider screening callers for symptoms and risk factors of Ebola. Callers should be asked if they, or if the affected person, has fever of 38.0 degrees Celsius or 100.4 degrees Fahrenheit or greater, and if they have additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained bleeding.
 - If PSAP call takers suspect a caller is reporting symptoms of Ebola, they should screen callers for risk factors

within the past 3 weeks before onset of symptoms. Risk factors include:

- Contact with blood or body fluids of a patient known to have or suspected to have Ebola; or
- Residence in or travel to a country where an Ebola outbreak is occurring (a list of countries can be accessed at the following link: [2014 Ebola Outbreak in West Africa](#)).
- If PSAP call takers have information alerting them to a person with possible Ebola, they should make sure any first responders and EMS personnel are made aware of the potential for a patient with possible exposure/symptoms of Ebola **before the responders arrive on scene**.
- If responding at an airport or other port of entry to the United States, the PSAP should notify the CDC Quarantine Station for the port of entry. Contact information for CDC Quarantine Stations can be accessed at the following link: [Quarantine Station Contact List, Map, and Fact Sheets](#).

Recommendations for EMS and Medical First Responders, Including Firefighters and Law Enforcement Personnel

For the purposes of this section, “EMS personnel” means pre-hospital EMS, law enforcement, and fire service first responders. These EMS personnel practices should be based on the most up-to-date Ebola clinical recommendations and information from appropriate public health authorities and EMS medical direction.

When state and local EMS authorities determine there is an increased risk (based on information provided by local, state, and federal public health authorities, including the city or county health department(s), state health department(s), and the CDC), they may direct EMS personnel to modify their practices as described below.

Patient assessment

Interim recommendations:

1. Address scene safety:
 - If PSAP call takers advise that the patient is suspected of having Ebola, [EMS personnel should put on the PPE appropriate for suspected cases of Ebola](#) **before** entering the scene.
 - Keep the patient separated from other persons as much as possible.
 - Use caution when approaching a patient with Ebola. Illness can cause delirium, with erratic behavior that can place EMS personnel at risk of infection, e.g., flailing or staggering.
2. During patient assessment and management, EMS personnel should consider the symptoms and risk factors of Ebola:
 - A relevant exposure history should be taken including:
 - Residence in or travel to a country where an Ebola outbreak is occurring (a list of countries can be accessed at the following link: [2014 Ebola Outbreak in West Africa - Outbreak Distribution Map](#), or
 - Contact with blood or body fluids of a patient known to have or suspected to have Ebola within the previous 21 days.
 - Because the signs and symptoms of Ebola may be nonspecific and are present in other infectious and noninfectious conditions which are more frequently encountered in the United States, relevant exposure history should be first elicited to determine whether Ebola should be considered further.

- Patients who meet this criteria should be further questioned regarding the presence of signs or symptoms of Ebola Virus Disease, including:
 - Fever (subjective or $\geq 100.4^{\circ}\text{F}$ or 38.0°C), and
 - Headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain, or bleeding.
- Based on the presence of risk factors and symptoms, put on or continue to wear appropriate PPE and follow the scene safety guidelines for suspected case of Ebola.
- If during initial patient contact and assessment and before an EMS provider has donned the appropriate PPE, it becomes apparent that the patient is a suspected case of Ebola, the EMS provider must immediately remove themselves from the area and assess whether an exposure occurred. The provider should implement their agency's exposure plan, if indicated by assessment.
 - To minimize potential exposure, it may be prudent to perform the initial screening from at least 3 feet away from the patient.
 - In addition, EMS crews may – keeping scene safety in mind – consider separating so that all crew members do not immediately enter the patient area.
- If there are no risk factors, proceed with normal EMS care.

EMS Transfer of Patient Care to a Healthcare Facility

EMS personnel should notify the receiving healthcare facility when transporting a suspected Ebola patient, so that appropriate infection control precautions may be prepared prior to patient arrival.

Interfacility Transport

EMS personnel involved in the air or ground interfacility transfer of patients with suspected or confirmed Ebola [should wear recommended PPE](#).

Infection Control

EMS personnel can safely manage a patient with suspected or confirmed Ebola by following [recommended PPE guidance](#). Early recognition and identification of patients with potential Ebola is critical. An EMS agency managing a suspected Ebola patient should follow these CDC recommendations:

- Limit activities, especially during transport that can increase the risk of exposure to infectious material
- Limit the use of needles and other sharps as much as possible. All needles and sharps should be handled with extreme care and disposed in puncture-proof, sealed containers.
- Phlebotomy, procedures, and laboratory testing should be limited to the minimum necessary for essential diagnostic evaluation and medical care.

Use of Personal protective equipment (PPE)

Both **advanced planning and practice are critical** – in putting on PPE in a variety of circumstances, in the transfer of the patient to the hospital, and in the taking off of the PPE.

EMS workers who may be involved in the care of Ebola patients should receive training and have demonstrated

competency in performing all Ebola-related infection control practices and procedures, and specifically in donning/doffing proper PPE. When treating a suspected Ebola patient, EMS personnel should wear PPE and follow proper procedures for putting on and taking off (donning and doffing) PPE as described in CDC's guidance: "[Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On \(Donning\) and Removing \(Doffing\)](#)".

Pre-hospital patient care, however, is frequently provided in an uncontrolled environment with unique operational challenges. EMS systems must design their procedures to accommodate their local operational challenges while still following the principles and procedures of the CDC PPE guidance.

- For instance, it may be as simple as having one provider put on PPE and manage the patient while the other provider does not engage in patient care but serves in the role of trained observer and driver.
- Or, there may be situations where a patient must be picked up and carried and multiple providers are required to put on PPE. EMS personnel wearing PPE who have cared for the patient must remain in the back of the ambulance and not be the driver.
- EMS agencies may consider sending additional resources (for example, a dedicated driver for the EMS unit who may not need to wear PPE if the patient compartment is isolated from the cab) to eliminate the need for putting on PPE (field-donning) by additional personnel. This driver should not provide any patient care or handling.

Pre-hospital resuscitation procedures such as endotracheal intubation, open suctioning of airways, and cardiopulmonary resuscitation frequently result in a large amount of body fluids, such as saliva and vomit. Performing these procedures in a less controlled environment (e.g., moving vehicle) increases risk of exposure for EMS personnel. If conducted, perform these procedures under safer circumstances (e.g., stopped vehicle, hospital destination).

If blood, body fluids, secretions, or excretions from a patient with suspected Ebola come into direct contact with the EMS provider's skin or mucous membranes, then the EMS provider should immediately stop working. They should wash the affected skin surfaces with soap and water and mucous membranes (e.g., conjunctiva) should be irrigated with a large amount of water or eyewash solution. Report exposure to an occupational health provider or supervisor for follow-up.

Recommended PPE should be used by EMS personnel as follows:

- PPE should be put on before entering the scene and continued to be worn until personnel are no longer in contact with the patient. PPE should be carefully put on under observation as specified in the CDC's "[Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On \(Donning\) and Removing \(Doffing\)](#)".
- PPE should be carefully removed while under observation, in an area designated by the receiving hospital, and following proper procedures as specified in the CDC's "[Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On \(Donning\) and Removing \(Doffing\)](#)".

Cleaning EMS Transport Vehicles after Transporting a Patient with Suspected or Confirmed Ebola

The following are general guidelines for cleaning or maintaining EMS transport vehicles and equipment after transporting a patient with suspected or confirmed Ebola:

- An EPA-registered hospital disinfectant with label claims for viruses that share some technical similarities to Ebola (such as, norovirus, rotavirus, adenovirus, poliovirus)⁴ and instructions for cleaning and decontaminating surfaces or objects soiled with blood or body fluids should be used according to those instructions. After the bulk waste is wiped up, the surface should be disinfected as described below.
- EMS personnel performing cleaning and disinfection should follow the [“Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On \(Donning\) and Removing \(Doffing\)”](#). There should be the same careful attention to the safety of the EMS personnel during the cleaning and disinfection of the transport vehicle as there is during the care of the patient.
- Patient-care surfaces (including stretchers, railings, medical equipment control panels, and adjacent flooring, walls and work surfaces), as well as stretcher wheels, brackets, and other areas are likely to become contaminated and should be cleaned and disinfected after each transport.
- A blood spill or spill of other body fluid or substance (e.g., feces or vomit) should be managed by trained personnel wearing correct PPE, through removal of bulk spill matter, cleaning the site, and then disinfecting the site. For large spills, a chemical disinfectant with sufficient potency is needed to overcome the tendency of proteins in blood and other body substances to neutralize the disinfectant’s active ingredient. Contaminated reusable patient care equipment (e.g., glucometer, blood pressure cuff) should be placed in biohazard bags and labeled for cleaning and disinfection according to agency policies. Reusable equipment should be cleaned and disinfected according to manufacturer’s instructions by trained personnel wearing correct PPE. Avoid contamination of reusable porous surfaces that cannot be made single use.
- Use only a mattress and pillow with plastic or other covering that fluids cannot get through. To reduce exposure among staff to potentially contaminated textiles (cloth products) while laundering, discard all linens, non-fluid-impermeable pillows or mattresses as appropriate.

The Ebola virus is a Category A infectious substance regulated by the U.S. Department of Transportation’s (DOT) Hazardous Materials Regulations (HMR, 49 C.F.R., Parts 171-180). Any item transported for disposal that is contaminated or suspected of being contaminated with a Category A infectious substance must be packaged and transported in accordance with the HMR. This includes medical equipment, sharps, linens, and used health care products (such as soiled absorbent pads or dressings, kidney-shaped emesis pans, portable toilets, used PPE, [e.g., gowns, masks, gloves, goggles, face shields, respirators, booties] or byproducts of cleaning) contaminated or suspected of being contaminated with a Category A infectious substance.⁵

Follow-up and/or reporting measures by EMS personnel after caring for a suspected or confirmed Ebola patient

- EMS personnel should be aware of the follow-up and/or reporting measures they should take after caring for a suspected or confirmed Ebola patient.
- EMS agencies should develop policies for monitoring and management of EMS personnel potentially exposed to Ebola.
- EMS agencies should develop sick leave policies for EMS personnel that are non-punitive, flexible and consistent with public health guidance
- Ensure that all EMS personnel, including staff who are not directly employed by the healthcare facility but provide essential daily services, are aware of the sick leave policies.
- EMS personnel with exposure to blood, bodily fluids, secretions, or excretions from a patient with suspected or confirmed Ebola should immediately:
 - Stop working and wash the affected skin surfaces with soap and water. Mucous membranes (e.g., conjunctiva) should be irrigated with a large amount of water or eyewash solution;
 - Contact occupational health/supervisor for assessment and access to post-exposure management services; and
 - Receive medical evaluation and follow-up care, including fever monitoring twice daily for 21 days, after the last known exposure. They may continue to work while receiving twice daily fever checks, based upon EMS agency policy and discussion with local, state, and federal public health authorities.
- EMS personnel who develop sudden onset of fever, intense weakness or muscle pains, vomiting, diarrhea, or any signs of hemorrhage after an unprotected exposure (i.e., not wearing recommended PPE at the time of patient contact or through direct contact to blood or body fluids) to a patient with suspected or confirmed Ebola should:
 - Not report to work or immediately stop working and isolate themselves;
 - Notify their supervisor who should notify local and state health departments;
 - Contact occupational health/supervisor for assessment and access to post-exposure management services; and
 - Comply with work exclusions until they are deemed no longer infectious to others.

¹ <http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/distribution-map.html>

² <http://www.cdc.gov/vhf/ebola/hcp/clinician-information-us-healthcare-settings.html>

³ <http://www.cdc.gov/vhf/ebola/hcp/case-definition.html>

⁴ http://www.epa.gov/oppad001/list_g_norovirus.pdf 

⁵ <http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vgnnextchannel=d248724dd7d6c010VgnVCM10000080e8>



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Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus

On August 1, 2014, CDC released guidance titled, "[Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals.](#)"

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

As part of the care of patients who are [persons under investigation, or with probable or confirmed Ebola virus infections](#), hospitals are recommended to:

- **Be sure environmental services staff wear recommended personal protective equipment (PPE) including, at a minimum, disposable gloves, gown (fluid resistant/ impermeable), eye protection (goggles or face shield), and facemask to protect against direct skin and mucous membrane exposure of cleaning chemicals, contamination, and splashes or spatters during environmental cleaning and disinfection activities.** Additional barriers (e.g., leg covers, shoe covers) should be used as needed. If reusable heavy-duty gloves are used for cleaning and disinfecting, they should be disinfected and kept in the room or anteroom. Be sure staff are instructed in the proper use of personal protective equipment including safe removal to prevent contaminating themselves or others in the process, and that contaminated equipment is disposed of appropriately. (see question 8).
- **Use a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) to disinfect environmental surfaces in rooms of patients with suspected or confirmed Ebola virus infection.** Although there are no products with specific label claims against the Ebola virus, enveloped viruses such as Ebola are susceptible to a broad range of hospital disinfectants used to disinfect hard, non-porous surfaces. In contrast, non-enveloped viruses are more resistant to disinfectants. As a precaution, selection of a disinfectant product with a higher potency than what is normally required for an enveloped virus is being recommended at this time. EPA-registered hospital disinfectants with label claims against non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus) are broadly antiviral and capable of inactivating both enveloped and non-enveloped viruses.
- **Avoid contamination of reusable porous surfaces that cannot be made single use.** Use only a mattress and pillow with plastic or other covering that fluids cannot get through. Do not place patients with suspected or confirmed Ebola virus infection in carpeted rooms and remove all upholstered furniture and decorative curtains from patient rooms before use.
- **To reduce exposure among staff to potentially contaminated textiles (cloth products) while laundering, discard all linens, non-fluid-impermeable pillows or mattresses, and textile privacy curtains into the waste stream and disposed of appropriately.**
- **The Ebola virus is classified as a Category A infectious substance by and regulated by the U.S. Department of Transportation's (DOT) Hazardous Materials Regulations (HMR, 49 C.F.R., Parts 171-180). Any item transported offsite for disposal that is contaminated or suspected of being contaminated with a Category A infectious substance must be packaged and transported in accordance with the HMR. This includes medical equipment, sharps, linens, and used health care products (such as soiled absorbent pads or dressings, kidney-shaped emesis pans, portable toilets, used Personal Protection Equipment (gowns, masks, gloves, goggles, face shields, respirators, booties, etc.) or byproducts of cleaning) contaminated or suspected of being contaminated with a Category A infectious substance.^{4,5} (see question 8).**

Frequently Asked Questions

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

Begin by looking at the product label or product insert or, if these are not available, search the [EPA search engine \(http://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1\)](http://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1) for this information. Users should be aware that an 'enveloped' or 'non-enveloped virus' designation may not be included on the container label. Instead check the disinfectant's label for at least one of the common non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus).

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

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

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

The basic principles for blood or body substance spill management are outlined in the United States Occupational Safety and Health Administration (OSHA) [Bloodborne Pathogen Standards \(https://www.osha.gov/SLTC/bloodbornepathogens/standards.html\)](https://www.osha.gov/SLTC/bloodbornepathogens/standards.html) (29 CFR 1910.1030).⁵ CDC guidelines recommend removal of bulk spill matter, cleaning the site, and then disinfecting the site.⁴ For large spills, a chemical disinfectant with sufficient potency is needed to overcome the tendency of proteins in blood and other body substances to neutralize the disinfectant's active ingredient. An EPA-registered hospital disinfectant with label claims for non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus) and instructions for cleaning and decontaminating surfaces or objects soiled with blood or body fluids should be used according to those instructions.

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

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

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

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

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

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

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

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

As long as facilities treating Ebola virus-infected patients follow the CDC's [Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals](#); waste generated during delivery of care to Ebola virus-infected patients would not be subject to Federal select agent regulations (See the exclusion provision 42 CFR § 73.3(d)(1)). However, this would not apply to any facility that intentionally collected or otherwise extracted the Ebola virus from waste generated during the delivery of patient care.

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

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

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

References

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3. Bausch DG et al. Assessment of the Risk of Ebola Virus Transmission from Bodily Fluids and Fomites. *J Infect Dis* 2007; 196:S142-7
4. CDC Guidelines for Environmental Infection Control in Healthcare Facilities [PDF - 249 pages] (http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf) (see: Environmental Surfaces Section).
5. OSHA Bloodborne Pathogen Standard 29 CFR 1910.1030 (<https://www.osha.gov/SLTC/bloodbornepathogens/standards.html>)
6. DOT. Guidance for Transporting Ebola Contaminated Items, a Category A Infectious Substance (<http://phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=4d1800e36b978410VgnVCM100000d2c97898RCRD&vgnnextchannel=d248724dd7d6c010VgnVCM10000080e8a8c0RCRD&vgnnextfmt=print>)
7. DOT. Hazardous Materials Regulations [49 CFR Parts 100-1999; 49 CFR 172.700; 49 CFR 173.134(a)(5)] (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfrv2_02.tpl)

File Formats Help:

How do I view different file formats (PDF, DOC, PPT, MPEG) on this site? (<http://www.cdc.gov/Other/plugins/>)

(<http://www.cdc.gov/Other/plugins/#pdf>)

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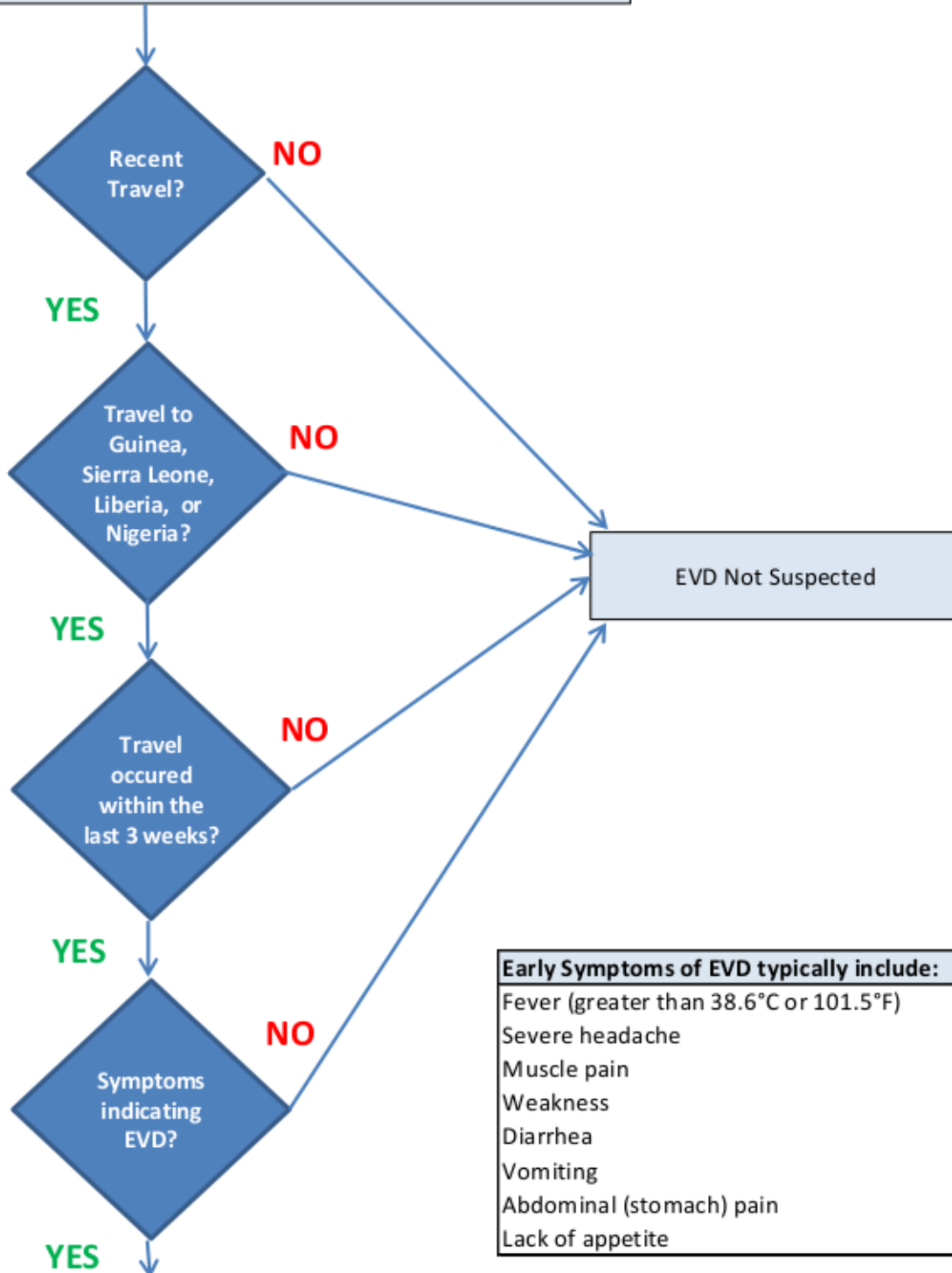
Division of High-Consequence Pathogens and Pathology (DHCPP) (/ncezid/dhcpp/index.html)

Viral Special Pathogens Branch (VSPB) (/ncezid/dhcpp/vspb/index.html)



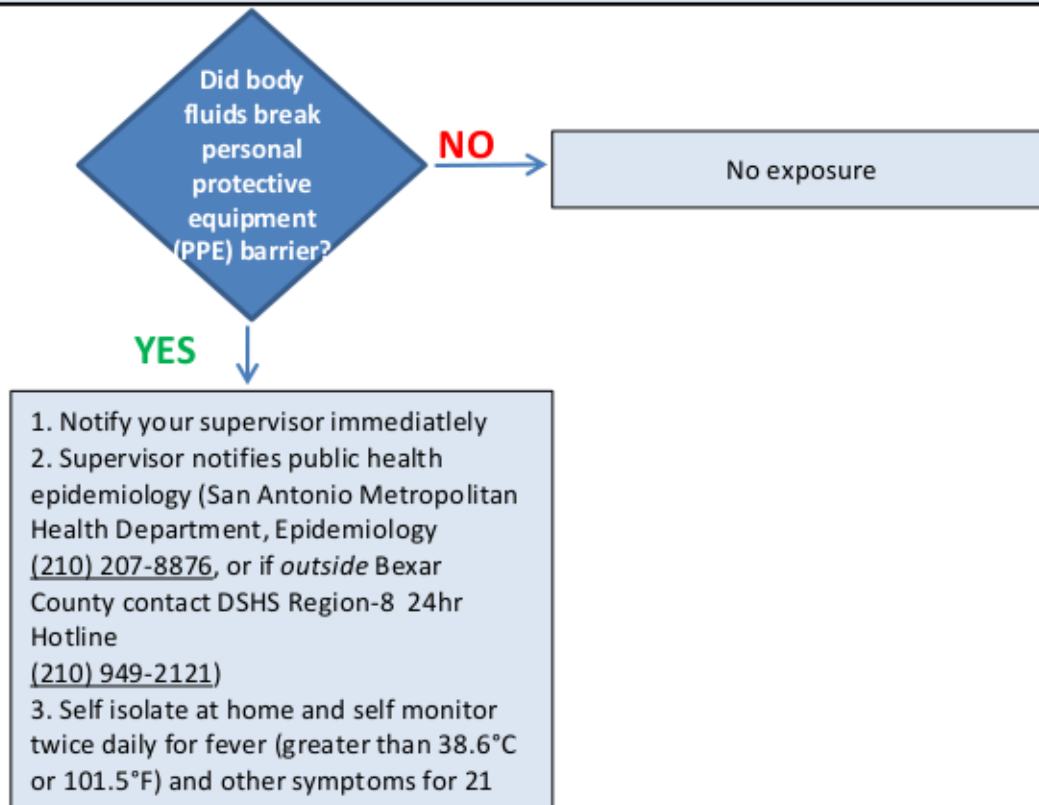
First Responder Process for Exposure to Suspect Ebola Virus Disease (EVD)

Appropriate personal protective equipment (PPE) should be used based on patient symptomology for all personnel responding to the patient



All responders should use the following PPE: gloves, gown (fluid resistant or impermeable), eye protection (goggles or face shield that fully covers the front and sides of the face), facemask.
If encountering large amounts of body fluids, additional PPE should be utilized (double gloving, shoe/leg coverings)
If performing intubation, CPR, or open suctioning use a N-95 mask instead of face mask along with double gloving and shoe/leg coverings
(continue to page 2)

First Responder Process for Exposure to Suspect Ebola Virus Disease (EVD)
(continued from page 1):



Frequently Asked Questions about Ebola Virus Disease (EVD):

1. As a First Responder, do I have to be concerned about exposure?

You are only at risk if you've had unprotected exposure to blood or other body fluids from an Ebola patient

2. When is a person with Ebola contagious?

A person infected with Ebola is not contagious until symptoms appear.

3. How soon after infection do symptoms show and how long is one contagious?

Commonly 8–10 days, but rarely ranges 2–21 days. Patients are contagious while showing symptoms of the disease.

4. How is Ebola spread?

Ebola is spread with **direct contact** (through broken skin or unprotected mucous membranes) with the blood or body fluids such as but not limited to feces, saliva, urine, vomit, and semen of a person who is sick with Ebola or with objects like needles that have been contaminated with the virus.

5. During the 21 days of self isolation due to an exposure, should normal daily activities be limited?

As long as you are asymptomatic (i.e. no symptoms), there is no restriction on daily activities. If you become symptomatic, you should seek physician care immediately and limit contact with family and others.

6. What PPE is needed if an aerosolized generating procedure (intubation, open suctioning of airways, cardiopulmonary resuscitation) is performed in the field by first responders?

In addition to recommended PPE, respiratory protection that is at least as protective as a NIOSH-certified fit-tested N95 filtering facepiece respirator or higher should be worn (instead of a facemask).

Additional PPE must be considered for these situations due to the potential increased risk for contact with blood and body fluids including, but not limited to, double gloving, disposable shoe covers, and leg coverings.

August 8, 2014

To: All NYS EMS Agencies and Personnel
From: Bureau of Emergency Medical Services
Re: Recent Ebola Concerns

The New York State Department of Health (NYSDOH) Bureau of Emergency Medical Services (BEMS) has been closely monitoring the most recent outbreak of Ebola in Africa and the potential for transmission of the virus to citizens in the State of New York.

NYSDOH BEMS has been working closely with the New York City Department of Health and Mental Hygiene (NYCDOHMH), the Center for Disease Control and Prevention (CDC), the Fire Department of New York City (FDNY) as well as other state and national entities.

As of the date of this letter, there have been no confirmed cases of Ebola in the State of New York. However, EMS providers and agencies must be vigilant in their daily operations to assure that they are prepared for potential cases of Ebola and any other communicable diseases they may encounter. With this in mind, BEMS is issuing this guidance document and attached documents to provide EMS with the most up-to-date information we have.

The NYC Regional EMS Council (NYC REMSCO) has already had an EMS protocol approved by NYSDOH BEMS for Acute Febrile Respiratory Illness, Including Influenza-Like-Symptoms. This protocol contains concise information that should be utilized everyday by EMS for any potential communicable disease, including Ebola. The NYC REMSCO has updated their information to now include Ebola. BEMS strongly encourages EMS providers and agencies to review the attached information so they have a better understanding of patient symptoms as well as what is needed and not needed to appropriately treat the patient and protect themselves.

Important items to remember:

- Vigilant usage of standard PPE is crucial in your daily operations,
- Assuring EMS personnel have been properly fit tested and/or provided the proper N95 mask and other PPE such as goggles, shoe covers, suits, etc.,
- Placing a surgical type mask on the patient if the patient's condition allows for its usage,
- Questioning patients on any recent travel outside of the state or contact with others who have traveled to parts of the world where an outbreak is currently happening,
- Utilization of respiratory devices with one-way-valves for the delivery of nebulized medications, etc.,

- Timely notification to the hospital that you are transporting a patient with signs and symptoms of potential communicable disease. This will provide the hospital the ability to prepare resources and determine where and how the patient will enter their facility,
- Assuring proper disposal or cleaning of PPE, patient linens and any other equipment utilized during the call.
- Hospitals and the EMS agencies who are contracted to provide transport of patients to other healthcare facilities should be communicating with each other to develop policies and procedures concerning the transfer of these patients with unconfirmed or confirmed communicable diseases.

The CDC is continuously providing updates on the current situation world-wide, as well as providing healthcare workers with pertinent information to protect themselves and to better treat their patients. BEMS encourages all EMS personnel to monitor the CDC web site for the most up-to-date information at: <http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html>.

BEMS is also monitoring the recent developments regarding the Middle East Respiratory Syndrome (MERS). The most up-to-date information on MERS can be found at <http://www.cdc.gov/coronavirus/MERS/US.html>.

The BEMS will continue to provide updated information on our web site at <http://www.health.ny.gov/professionals/ems/> and through email correspondences as they are warranted.



BUREAU OF EMS
EMS OPERATIONS ORDER 2014-186B
October 23, 2014

**RESPONSE AND OPERATIONS FOR
SUSPECTED EBOLA VIRUS DISEASE (EVD)
REVISED**

1. PURPOSE

- 1.1 To establish procedures for response to and mitigation of suspected Ebola Virus Disease (EVD) assignments, while minimizing provider exposure.

2. SCOPE

- 2.1 This order applies to all FDNY EMS providers (EMTs, Paramedics and Officers) and Voluntary Hospital ambulance personnel who provide prehospital emergency medical treatment in the New York City 911 system.

3. PROCEDURE

- 3.1 Dispatch – based on current Department policies and procedures, a Telephone Triage Algorithm to help identify suspected EVD patients has been put into effect.

- 3.2 Response – when a Fever/Travel (FT) call type has been identified, Emergency Medical Dispatch shall assign the following resources:

- (1) Haz-Tac BLS (dedicated) or Haz-Tac / Rescue ALS (non-dedicated), based on call type.
- (1) EMS Haz-Tac Officer.

NOTE: *The Citywide Radio Dispatcher shall notify the closest Deputy Chief of active Fever/Travel call types.*

- 3.3 On scene – Haz Tac members shall maintain body substance isolation and don their appropriate PPE **prior to** making patient contact.

3.3.1 Patient assessment and treatment shall be initiated according to Department policies, procedures and protocols. All resources shall remain vigilant of the potential for exposure to bodily fluids, and protect themselves accordingly.

3.3.2 If it has been determined by Haz-Tac there is a patient present, the following units shall be requested through the Citywide Radio Dispatcher:

- (1) Additional Non Haz-Tac BLS
- (1) Conditions Officer

- 3.4 If a non Haz-Tac unit responds to a location with a patient that meets the criteria for a Fever/Travel Call Type but was not assigned as a Fever/Travel Call Type, the crew shall maintain a safe distance and shall request the appropriate resources to respond.
- 3.4.1 Only Haz-Tac resources shall provide patient care. The initial responding unit shall act in support of Haz-Tac units.
- 3.4.2 The non Haz-Tac crew will then be responsible for vehicle movement upon a transport determination.
- 3.4.3 An on scene Officer (Haz-Tac or Conditions) shall consult with On Line Medical Control (OLMC) for hospital transport selection.
- 3.4.4 The transporting unit shall contact the Notifications Desk for hospital notifications. All notifications shall be requested as follows:
- 99A2 with a notification.
- 99A2 transporting to hospital xx a 30 year old male complaining of Fever with Nausea or Vomiting. B/P 120/80, P110, R24 with recent travel eta 10 minutes.
- 3.5 To the extent possible, ONLY the patient is to be transported in the ambulance.
- 3.6 At the hospital - the patient shall be delivered to the hospital's designated receiving area. EMS crews shall await further direction from the hospital staff prior to transfer of care.
- 3.7 Decontamination – EMS Haz-Tac units will be met by members of the Special Operations Command (SOC) for assistance. The members of SOC shall assist EMS members in doffing their PPE and with vehicle and equipment decontamination.
- 3.7.1 The Haz-Tac Officer shall contact the citywide radio dispatcher to request a Haz-Mat Technician unit to respond to a designated location (e.g. call location, Hospital).
- 3.7.2 All disposable materials should be red bagged and left at the destination hospital, whenever possible.
- 3.7.3 Members of SOC will be responsible for the decontamination of the vehicle and equipment used in accordance with FDNY Infection Control Program procedures.

NOTE: *Following the use of PPE, members shall exercise caution when removing protective garments to prevent contamination with body fluids. PPE/Bunker pants do not need to be decontaminated unless there is known contact with or visible evidence of bodily fluids.*

- A. During cleaning of non-disposable equipment, members should wear appropriate PPE.

- B. Aggressive hand washing with soap and water immediately following patient contact is essential in limiting disease transmission.
- 3.8 Members shall fill out a Biological Exposure Report (MD-X3) upon completion of all FT call types. After identifying the tasks performed they should go to section VIII and check off in the Patient Care Section – Suspected Ebola.

4. OFFICERS

4.1 EMS Officers shall:

- 4.1.1 As dispatched respond to cases involving *Fever/Travel call types*.
- 4.1.2 Ensure all members are aware of this procedure and monitor assignments for compliance.

5. RELATED PROCEDURES

- 5.1 Office of Medical Affairs Directive 2014-05B, Ebola Virus Disease (EVD) Advisory
- 5.2 EMS Operations Order 2014-181 – Donning and Doffing procedures for the FDNY Isolation kit
- 5.3 EMS OGP 108-15 – Aeroeclipse II Breath Actuated Nebulizer
- 5.4 EMS OGP 109-13 – Hospital Notifications Frequency
- 5.5 EMS OGP 115-08 – Delivery of Patients to an Appropriate Hospital
- 5.6 EMS OGP 125-04 – Infection Control Procedures
- 5.7 EMS OGP 125-09 – Respiratory Protection Program
- 5.8 MAD 2010-02 – Aeroeclipse II Breath Actuated Nebulizer
- 5.9 CFRD Manual Chapter 3 – Infection Control Procedures
- 5.10 NYS DOH Policy Statement 03-11, Respiratory Disease Precautions

BY ORDER OF THE CHIEF OF EMS



CFR-D MANUAL, CHAPTER 6
OFFICE OF MEDICAL AFFAIRS DIRECTIVE 2014-05B
October 23, 2014

EBOLA VIRUS DISEASE (EVD) ADVISORY (ADDENDUM)

1. PURPOSE

- 1.1 To increase the awareness by all EMS providers of the concerns associated with treating and transporting patients who may have Ebola Virus Disease (EVD).

2. SCOPE

- 2.1 This directive applies to all FDNY EMS providers (CFRs, EMTs, Paramedics and Officers) and Voluntary Hospital ambulance personnel who provide prehospital emergency medical treatment in the New York City 911 system.

3. BACKGROUND

- 3.1 Human to human transmission of EVD occurs through direct contact with body fluids (saliva, blood, breast milk, sweat, semen, and other body substances – such as fecal material and vomitus – contaminated with blood) or following contaminated sharps injuries (e.g. needle sticks). Although the Ebola Virus is not transmitted via casual contact or through the air, airborne transmission of the virus may occur during aerosol-generating procedures (e.g. intubation, nebulized treatments).
- 3.2 Patients are not contagious prior to the development of symptoms. Patients can transmit the virus from onset of fever or symptoms through later stages of the disease, as well as post mortem.
- 3.3 EVD symptoms can appear from 2 to 21 days after exposure with 8 to 10 days being the most common. Symptoms typically include: fever, headache, myalgia (muscle pain), arthralgia (joint pain), diarrhea, vomiting, and abdominal pain. Some patients may also experience: rash, conjunctival injection (redness and swelling), cough, pharyngitis (sore throat), chest pain, dyspnea, and hemorrhagic symptoms (conjunctival hemorrhage, easy bruising, GI bleeding).
- 3.4 The largest ever EVD outbreak currently is taking place in the West African countries of Guinea, Liberia, and Sierra Leone. EVD has also been diagnosed in the United States. An updated list from the CDC is maintained and can be viewed at <http://www.cdc.gov/vhf/ebola/resources/distribution-map-guinea-outbreak.html>

4. PROCEDURE

- 4.1 EMS providers must be alert for and suspect patients as possibly having EVD who have (1) fever and/or any of the symptoms listed above and (2) have traveled to one of the West African countries affected by the EVD outbreak within the three weeks prior to the onset of symptoms.

- 4.2 *All members should don their appropriate PPE and body substance isolation precautions prior to making patient contact for all assignments where the call-type has an **FT (fever/travel)**, **RF (rash/fever)** or **FC (fever/cough)** suffix.*
- 4.3 For Call Types not assigned as a Fever/Travel Call Type, pre-hospital care providers shall maintain a safe distance (at least 3 feet) and shall assess the patient regarding recent travel to West African countries outlined above. If positive response, members should withdraw and request the appropriate resources.
- 4.4 Patient assessment and treatment shall be initiated by Haz-Tac members according to Department policies and procedures and REMAC protocols.
- 4.5 If the patient is coughing, have the patient wear a surgical mask to limit droplet transmission. Patients should not wear an N-95 respirator. If indicated, administer high concentration oxygen via non-rebreather mask (NRB).
 - 4.5.1 Administration of nebulized (aerosolized) medications (e.g. Albuterol) may only be done via a nebulizer with a one-way valve (e.g. Aeroeclipse II Breath Actuated Nebulizer) or via a disposable metered dose inhaler (MDI) with spacer.
 - 4.5.2 Use of the bag valve mask and endotracheal intubation may continue per current REMAC protocols unless otherwise notified through future directives.
- 4.6 An on scene Officer (Haz-Tac or Conditions) shall consult with On Line Medical Control (OLMC) for Hospital transport selection.
- 4.7 Providers shall give a hospital notification through the EMD notification frequency for any patient with possible EVD.
 - 4.7.1 When possible, **ONLY** the patient is to be transported in the ambulance (i.e., no other individuals besides the crew) unless the patient is a minor, in which case parents or guardians may accompany the patient.
 - 4.7.2 In cases where the patient has asymptomatic children, all attempts to have other family members care for the children shall be made. If no such guardian is available, the children may be transported with the patient.
- 4.8 All disposable materials should be red bagged and whenever possible left at the destination hospital.
 - 4.8.1 Members shall clean all non-disposable equipment used in the treatment of the patient in accordance with FDNY Infection Control Program procedures.

NOTE: *Non disposable garments do not need to be decontaminated unless there is known contact with or visible evidence of bodily fluids.*

- A. During cleaning of non-disposable equipment, members should wear gloves, N95 respirator, eye protection, shoe covers and gown.

- B. Aggressive hand washing with soap and water immediately following patient contact is essential in limiting disease transmission. If soap and water is unavailable alcohol based sanitizer may be used until soap and water becomes available.

5. POST ASSIGNMENT DOCUMENTATION AND NOTIFICATIONS

- 5.1 Members shall fill out a Biological Exposure Report MD-X3 upon completion of all FT call types. A check box for suspected Ebola has been added.
- 5.2 In High Index cases, DOHMH shall notify the OLMC Physician of any results (positive or negative) determined by the receiving hospital.
 - 5.2.1 OLMC shall notify the on call Medical Director (5M) as well as the BHS Medical Officer of these findings.

6. ADDITIONAL UPDATES

- 6.1 Will be provided as new information and recommendations become available.

7. RELATED PROCEDURES

- 7.1 EMS Operations Order 2014-186B - *Response and Operations for Suspected Ebola Virus EVD*
- 7.2 EMS OGP 108-15 – *Aeroclipse II Breath Actuated Nebulizer*
- 7.3 EMS OGP 109-13 – *Hospital Notifications Frequency*
- 7.4 EMS OGP 115-08 – *Delivery of Patients to an Appropriate Hospital*
- 7.5 EMS OGP 125-04 – *Infection Control Procedures*
- 7.6 EMS OGP 125-09 – *Respiratory Protection Program*
- 7.7 MAD 2010-02 – *Aeroclipse II Breath Actuated Nebulizer*
- 7.8 CFRD Manual Chapter 3 – *Infection Control Procedures*
- 7.9 NYS DOH Policy Statement 03-11, *Respiratory Disease Precautions*

**BY ORDER OF THE FIRE COMMISSIONER, CHIEF OF DEPARTMENT,
CHIEF OF EMS AND THE OFFICE OF MEDICAL AFFAIRS**



<h1>NYC REMAC</h1>			
Advisory No.	2014-06		
Title:	Ebola hemorrhagic fever (Ebola HF) General Information for EMS Personnel		
Issue Date:	August 7, 2014		
Effective Date:	Immediate		
Re-Issued:			
Supercedes:	N/A	Page:	1 of 2

The Regional Emergency Medical Advisory Committee (REMAC) of New York City created **General Operating Procedure: Acute Febrile Respiratory Illness, Including Influenza-Like-Illness (ILI)** in 2009.

Currently, as a precaution due to the outbreak of Ebola HF in Guinea, Liberia, Sierra Leone, and Nigeria, EMS Personnel must review this protocol (attached).

EMS providers should refer to **General Operating Procedure: Acute Febrile Respiratory Illness, Including Influenza-Like-Illness (ILI)**, whenever they encounter patients as described below:

1. Patient with fever of greater than 101.5 degrees Fahrenheit, and additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; AND
2. Within the past 3 weeks before the onset of symptoms:
 - a. Contact with blood or other body fluids of a patient known to have or suspected to have Ebola HF, OR
 - b. Has traveled to an area where Ebola HF transmission is active, OR
 - c. Is a person (or had contact with a person) who has direct handling of bats, rodents, or primates from disease-endemic areas.

Attachments:

- NYC DOHMH Outpatient Ebola guidance_8 6 14
- NYSDOH Ebola HF Notification_17047

Current and Updated Protocols can be accessed at the Regional EMS Council website: www.nycremsco.org.

Owners/operators of Ambulance and ALS First Response Services providing prehospital medical treatment within the five boroughs of the City of New York are responsible to provide copies of the NYC REMAC Prehospital Treatment Protocols to their personnel, and to ensure that Service Medical Directors and EMS personnel are informed of all changes/updates to the NYC REMAC Prehospital Treatment Protocols.

Lewis W. Marshall, Jr., MD, JD
Chair,
Regional Emergency Medical Advisory Committee
of New York City

Marie C. Diglio, EMT-P
Executive Director Operations
Regional Emergency Medical Services Council
of New York City

THE REGIONAL EMERGENCY MEDICAL SERVICES COUNCIL OF NEW YORK CITY, INC.

Ebola hemorrhagic fever (Ebola HF) – General Information for EMS Personnel

Ebola hemorrhagic fever (Ebola HF), also known as Ebola Viral Disease (EVD), is one of numerous Viral Hemorrhagic Fevers. It is a severe, often fatal disease in humans and nonhuman primates (such as monkeys, gorillas, and chimpanzees). Ebola HF is characterized by sudden onset of fever and malaise, accompanied by other nonspecific signs and symptoms, such as myalgia, headache, vomiting, and diarrhea. Patients with severe forms of the disease may develop hemorrhagic symptoms and multi-organ dysfunction, including hepatic damage, renal failure, and central nervous system involvement, leading to shock and death. The fatality rate can vary from 40-90%.

Ebola is spread person-to-person through direct contact with bodily fluids such as, but not limited to, blood, urine, sweat, semen, and breast milk. The incubation period is usually 8–10 days (ranges from 2–21 days). Patients can transmit the virus while febrile and through later stages of disease, as well as postmortem, when persons touch the body during funeral preparations.

EMS Providers and Agencies should have decontamination procedures for personnel and vehicles in place. This includes the disposal of used PPE, linens and decontamination of the interior of the ambulance. **PPE should be maintained during decontamination of the ambulance and equipment.**

Additional Educational Resources:

Please review the information provided at the following web sites:

- <http://www.nyc.gov/html/doh/html/em/ebola.shtml>
- <http://www.cdc.gov/vhf/ebola/prevention/index.html>
- <http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html>
- <http://www.cdc.gov/HAI/prevent/ppe.html>
- <http://www.cdc.gov/vhf/ebola/index.html>

ACUTE FEBRILE RESPIRATORY ILLNESS, INCLUDING INFLUENZA-LIKE-ILLNESS (ILI)

In the event that a competent authority determines that a severe communicable respiratory illness [acute febrile respiratory illness, including influenza-like-illness (ILI)] is being transmitted in the New York City region:

1. The safety of both the EMS crew and public is paramount. Do not endanger yourselves or others.
2. EMS personnel shall wear appropriate Personal Protective Equipment (PPE), which includes an N95 respirator, gloves and eye protection.
 - Fit-tested N-95 respirators, eye protection (goggles or face shields), and gowns should ALWAYS be worn by EMS personnel performing aerosol-generating procedures on patients with febrile respiratory illness
 - Aerosol-generating procedures include nebulized treatments, intubation, tracheal suctioning, and laryngoscopy performed on patients with acute febrile respiratory illness
3. If possible, a surgical mask should be placed on the patient to contain droplets during coughing.
4. Oxygen delivery with a non re-breather face mask may be used to provide oxygen support during transport.
5. In addition, **the following shall be implemented:**
 - Administration of nebulized (aerosolized) medications (e.g., Albuterol) may only be done via a nebulizer with a one-way valve or via a disposable metered dose inhaler (MDI) with spacer.
 - As an alternative, epinephrine IM (including via an epinephrine auto-injector for BLS providers) should be considered as a Medical Control Option.
 - Endotracheal intubation may continue (unless otherwise notified through a separate class order), but it is preferable to use a Bag Valve Mask when assisted ventilation is required.
 - **ONLY** the patient is to be transported in the ambulance (i.e., no other individuals besides the crew) unless the patient is a minor, in which case parents or guardians may accompany the patient, but should also wear a surgical mask.
 - When possible, an attempt should be made to notify healthcare facilities **in advance** that they are receiving a patient with suspected communicable respiratory illness.

NOTE: THIS PROTOCOL SHALL NOT BE UTILIZED UNLESS ACTIVATED BY NYC REMAC AND/OR THE FDNY OFFICE OF MEDICAL AFFAIRS.

EBOLA GUIDANCE DOCUMENT: Evaluation of patients presenting to primary care, urgent care, or other outpatient settings with signs, symptoms, and travel history concerning for Ebola virus disease

BACKGROUND: Several outbreaks of Ebola virus disease (EVD) are occurring in parts of West Africa. On August 1, 2014, Centers for Disease Control and Prevention (CDC) released a health advisory with guidelines for the evaluation of patients presenting to a health care setting and suspected of having Ebola virus disease (EVD) (<http://emergency.cdc.gov/han/han00364.asp>).

SYMPTOMS AND RISK FACTORS: Fever greater than 38.6° Celsius (101.5°F), and travel to or residence in an affected country within 3 weeks prior to symptom onset. Currently involved countries are Guinea, Sierra Leone, and Liberia; check CDC travel notification website for most up to date information: <http://wwwnc.cdc.gov/travel/notices>).

WHAT TO DO IF YOU HAVE A SUSPECT PATIENT:

1. For any ill patient reporting recent travel (3 weeks prior to onset of symptoms) to an area with ongoing EVD transmission as mentioned above
 - a. Screen upon presentation and immediately place patient in a private room with closed door
 - b. Provide the patient with surgical mask and demonstrate proper use
 - c. Minimize number of staff interacting with the patient
 - d. Staff interacting with the patient should follow standard, droplet, and contact precautions (<http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html>).
 - e. Call the NYC Health Department for consultation (Provider Access Line: 1-866-692-3641) to determine if further evaluation is needed
2. When you call the NYC Health Department, be prepared to:
 - a. Describe the patient's risk factors and travel history, including contact with sick patients in areas with ongoing EVD transmission
 - b. Describe the patient's presenting symptoms, signs, and duration of illness
3. When you call the NYC Health Department, you can expect:
 - a. Doctor on call will discuss the case and possible recommendations for testing
 - b. Doctor on call will provide consultation on need to transport the individual to a hospital for further workup and testing
 - c. Doctor on call will assist to arrange transport to another medical facility if needed
4. Do NOT refer patients to Emergency Department, hospital, or other facility without consulting the NYC Health Department by calling the Provider Access Line at 1-866-692-3641

ADDITIONAL INFORMATION:

<http://www.nyc.gov/html/doh/html/em/ebola.shtml>

<http://www.cdc.gov/vhf/ebola/index.html>

August 2, 2014

TO: Healthcare providers, Hospitals, Local Health Departments
FROM: NYSDOH Bureaus of Communicable Disease Control (BCDC) and Healthcare Associated Infections (BHAI)

**HEALTH ADVISORY: GUIDELINES FOR EVALUATION OF U.S. PATIENTS
SUSPECTED OF HAVING EBOLA VIRUS DISEASE (CDC HAN 364)**

For healthcare facilities, please distribute immediately to infectious disease specialists, intensive care physicians, primary care physicians, hospital epidemiologists, infection control professionals, hospital administration, emergency departments, microbiology laboratories, and all patient care areas.

On August 1, 2014, the Centers for Disease Control and Prevention (CDC) issued HAN 364: Guidelines for Evaluation of US Patients Suspected of Having Ebola Virus Disease (EVD). The purpose of this CDC HAN is to update guidelines for Ebola virus disease patient evaluation, to clarify specimen collection, and to provide guidance for infection control. The HAN is attached in its entirety below and can also be accessed at <http://www.bt.cdc.gov/han/han00364.asp>.

Healthcare providers who are evaluating patients with suspected Ebola virus disease should immediately contact the Local Health Department where the patient resides.

Further questions should be appropriately directed to the Bureau of Communicable Disease Control at 518-473-4439 or the Bureau of Healthcare Associated Infection's Healthcare Epidemiology and Infection Control (HEIC) program at 518-474-1142.

This is an official **CDC HEALTH ADVISORY**

Distributed via the CDC Health Alert Network
August 1, 2014 20:00 ET (8:00 PM ET)
CDCHAN-00364

Guidelines for Evaluation of US Patients Suspected of Having Ebola Virus Disease

Summary

The Centers for Disease Control and Prevention (CDC) continues to work closely with the World Health Organization (WHO) and other partners to better understand and manage the public health risks posed by Ebola Virus Disease (EVD). To date, no cases have been reported in the United States. The purpose of this health update is 1) to provide updated guidance to healthcare providers and state and local health departments regarding who should be suspected of having EVD, 2) to clarify which specimens should be obtained and how to submit for diagnostic testing, and 3) to provide hospital infection control guidelines.

U.S. hospitals can safely manage a patient with EVD by following recommended isolation and infection control procedures. Please disseminate this information to infectious disease specialists, intensive care physicians, primary care physicians, hospital epidemiologists, infection control professionals, and hospital administration, as well as to emergency departments and microbiology laboratories.

Background

CDC is working with the World Health Organization (WHO), the ministries of health of Guinea, Liberia, and Sierra Leone, and other international organizations in response to an outbreak of EVD in West Africa, which was first reported in late March 2014. As of July 27, 2014, according to WHO, a total of 1,323 cases and 729 deaths (case fatality 55-60%) had been reported across the three affected countries. This is the largest outbreak of EVD ever documented and the first recorded in West Africa.

EVD is characterized by sudden onset of fever and malaise, accompanied by other nonspecific signs and symptoms, such as myalgia, headache, vomiting, and diarrhea. Patients with severe forms of the disease may develop hemorrhagic symptoms and multi-organ dysfunction, including hepatic damage, renal failure, and central nervous system involvement, leading to shock and death. The fatality rate can vary from 40-90%.

In outbreak settings, Ebola virus is typically first spread to humans after contact with infected wildlife and is then spread person-to-person through direct contact with bodily fluids such as, but not limited to, blood, urine, sweat, semen, and breast milk. The incubation period is usually 8–10 days (ranges from 2–21 days). Patients can transmit the virus while febrile and through later stages of disease, as well as postmortem, when persons touch the body during funeral preparations.

Patient Evaluation Recommendations to Healthcare Providers

Healthcare providers should be alert for and evaluate suspected patients for Ebola virus infection who have both consistent symptoms and risk factors as follows: 1) Clinical criteria, which includes fever of greater than 38.6 degrees Celsius or 101.5 degrees Fahrenheit, and additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; AND 2) Epidemiologic risk factors within the past 3 weeks before the onset of symptoms, such as contact with blood or other body fluids of a patient known to have or suspected to have EVD; residence in—or travel to—an area where EVD transmission is active; or direct handling of bats, rodents, or primates from disease-endemic areas. Malaria diagnostics should also be a part of initial testing because it is a common cause of febrile illness in persons with a travel history to the affected countries.

Testing of patients with suspected EVD should be guided by the risk level of exposure, as described below:

CDC recommends testing for all persons with onset of fever within 21 days of having a high-risk exposure. A high-risk exposure includes any of the following:

- percutaneous or mucous membrane exposure or direct skin contact with body fluids of a person with a confirmed or suspected case of EVD without appropriate personal protective equipment (PPE),
- laboratory processing of body fluids of suspected or confirmed EVD cases without appropriate PPE or standard biosafety precautions, or
- participation in funeral rites or other direct exposure to human remains in the geographic area where the outbreak is occurring without appropriate PPE.

For persons with a high-risk exposure but without a fever, testing is recommended only if there are other compatible clinical symptoms present and blood work findings are abnormal (i.e., thrombocytopenia $<150,000$ cells/ μL and/or elevated transaminases) or unknown.

Persons considered to have a low-risk exposure include persons who spent time in a healthcare facility where EVD patients are being treated (encompassing healthcare workers who used appropriate PPE, employees not involved in direct patient care, or other hospital patients who did not have EVD and their family caretakers), or household members of an EVD patient without high-risk exposures as defined above. Persons who had direct unprotected contact with bats or primates from EVD-affected countries would also be considered to have a low-risk exposure. Testing is recommended for persons with a low-risk exposure who develop fever with other symptoms and have unknown or abnormal blood work findings. Persons with a low-risk exposure and with fever and abnormal blood work findings in absence of other symptoms are also recommended for testing. Asymptomatic persons with high- or low-risk exposures should be monitored daily for fever and symptoms for 21 days from the last known exposure and evaluated medically at the first indication of illness.

Persons with no known exposures listed above but who have fever with other symptoms and abnormal bloodwork within 21 days of visiting EVD-affected countries should be considered for testing if no other diagnosis is found. Testing may be indicated in the same patients if fever is present with other symptoms and blood work is abnormal or unknown. Consultation with local and state health departments is recommended.

If testing is indicated, the local or state health department should be immediately notified. Healthcare providers should collect serum, plasma, or whole blood. A minimum sample volume of 4 mL should be shipped refrigerated or frozen on ice pack or dry ice (no glass tubes), in accordance with IATA guidelines as a Category B diagnostic specimen. Please refer

to <http://www.cdc.gov/ncezid/dhcpp/vspb/specimens.html> for detailed instructions and a link to the specimen submission form for CDC laboratory testing.

Recommended Infection Control Measures

U.S. hospitals can safely manage a patient with EVD by following recommended isolation and infection control procedures, including standard, contact, and droplet precautions. Early recognition and identification of patients with potential EVD is critical. Any U.S. hospital with suspected patients should follow CDC's Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals (<http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html>). These recommendations include the following:

- **Patient placement:** Patients should be placed in a single patient room (containing a private bathroom) with the door closed.
- **Healthcare provider protection:** Healthcare providers should wear: gloves, gown (fluid resistant or impermeable), shoe covers, eye protection (goggles or face shield), and a facemask. Additional PPE might be required in certain situations (e.g., copious amounts of blood, other body fluids, vomit, or feces present in the environment), including but not limited to double gloving, disposable shoe covers, and leg coverings.
- **Aerosol-generating procedures:** Avoid aerosol-generating procedures. If performing these procedures, PPE should include respiratory protection (N95 filtering facepiece respirator or higher) and the procedure should be performed in an airborne isolation room.
- **Environmental infection control:** Diligent environmental cleaning and disinfection and safe handling of potentially contaminated materials is paramount, as blood, sweat, emesis, feces and other body secretions represent potentially infectious materials. Appropriate disinfectants for Ebola virus and other filoviruses include 10% sodium hypochlorite (bleach) solution, or hospital-grade quaternary ammonium or phenolic products. Healthcare providers performing environmental cleaning and disinfection should wear recommended PPE (described above) and consider use of additional barriers (e.g., shoe and leg coverings) if needed. Face protection (face shield or facemask with goggles) should be worn when performing tasks such as liquid waste disposal that can generate splashes. Follow standard procedures, per hospital policy and manufacturers' instructions, for cleaning and/or disinfection of environmental surfaces, equipment, textiles, laundry, food utensils and dishware.

Recommendations to Public Health Officials

If public health officials have a patient that is suspected of having EVD or has potentially been exposed and intends to travel, please contact CDC's Emergency Operations Center 1 (770) 488-7100.

The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national and international organizations.

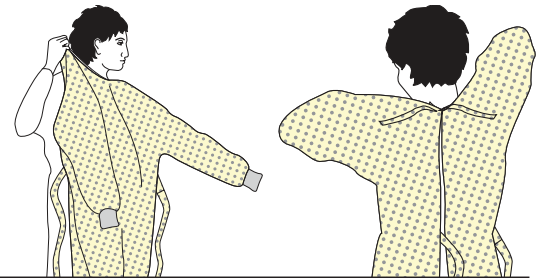
DEPARTMENT OF HEALTH AND HUMAN SERVICES

SEQUENCE FOR **PUTTING ON** PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



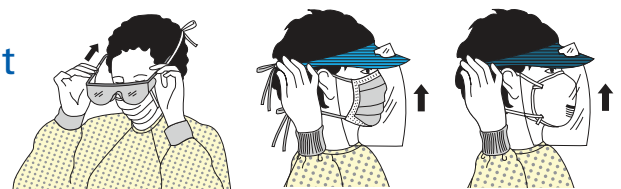
2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator



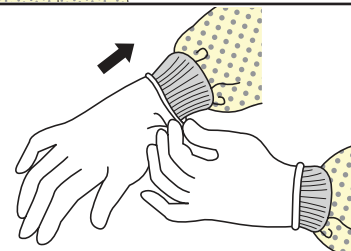
3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit



4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

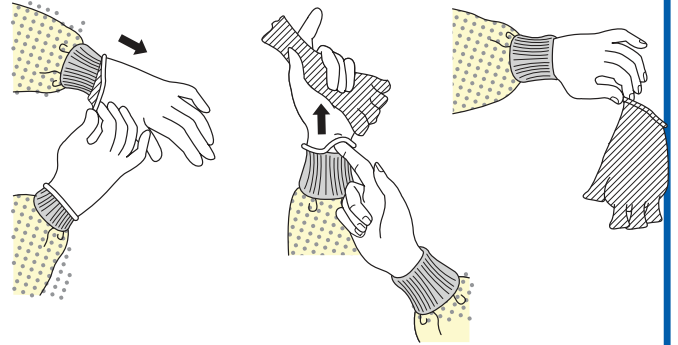


SEQUENCE FOR REMOVING PERSONAL PROTECTIVE EQUIPMENT (PPE)

Except for respirator, remove PPE at doorway or in anteroom. Remove respirator after leaving patient room and closing door.

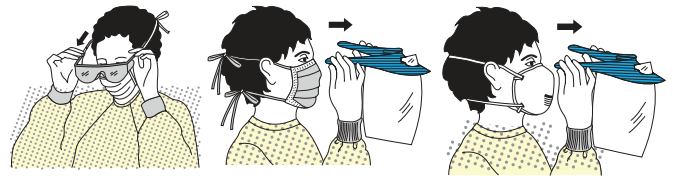
1. GLOVES

- Outside of gloves is contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist
- Peel glove off over first gloved hand
- Discard gloves in waste container



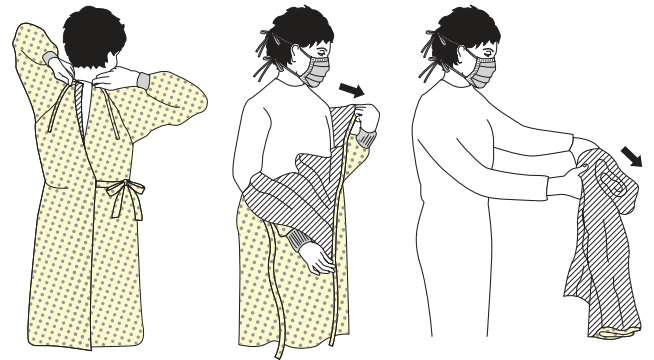
2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield is contaminated!
- To remove, handle by head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container



3. GOWN

- Gown front and sleeves are contaminated!
- Unfasten ties
- Pull away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard



4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- Grasp bottom, then top ties or elastics and remove
- Discard in waste container



**PERFORM HAND HYGIENE BETWEEN STEPS
IF HANDS BECOME CONTAMINATED AND
IMMEDIATELY AFTER REMOVING ALL PPE**





Interim Guidance for Emergency Medical Services (EMS) Systems and 9-1-1 Public Safety Answering Points (PSAPs) for Management of Patients with Known or Suspected Ebola Virus Disease in the United States

September 5, 2014

Who this is for: Managers of 9-1-1 Public Safety Answering Points (PSAPs), EMS Agencies, EMS systems, law enforcement agencies and fire service agencies as well as individual emergency medical services providers (including emergency medical technicians (EMTs), paramedics, and medical first responders, such as law enforcement and fire service personnel).

What this is for: Guidance for handling inquiries and responding to patients with suspected Ebola symptoms, and for keeping workers safe.

How to use: Managers should use this information to understand and explain to staff how to respond and stay safe. Individual providers can use this information to respond to suspected Ebola patients and to stay safe.

Key Points:

- The likelihood of contracting Ebola is extremely low unless a person has direct unprotected contact with the blood or body fluids (like urine, saliva, feces, vomit, sweat, and semen) of a person who is sick with Ebola or direct handling of bats or nonhuman primates from areas with Ebola outbreaks.
- When risk of Ebola is elevated in their community, it is important for PSAPs to question callers about:
 - Residence in, or travel to, a country where an Ebola outbreak is occurring;
 - Signs and symptoms of Ebola (such as fever, vomiting, diarrhea); and
 - Other risk factors, like having touched someone who is sick with Ebola.
- PSAPS should tell EMS personnel this information before they get to the location so they can put on the correct personal protective equipment (PPE) ([described below](#)).

- EMS staff should check for symptoms and risk factors for Ebola. Staff should notify the receiving healthcare facility in advance when they are bringing a patient with suspected Ebola, so that proper infection control precautions can be taken.

The guidance provided in this document is based on current knowledge of Ebola. Updates will be posted as needed on the [CDC Ebola webpage](#). The information contained in this document is intended to complement existing guidance for healthcare personnel, [Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals](#)

Background

The current Ebola outbreak in West Africa has increased the possibility of patients with Ebola traveling from the affected countries to the United States.¹ The likelihood of contracting Ebola is extremely low unless a person has direct unprotected contact with the body fluids of a person (like urine, saliva, feces, vomit, sweat, and semen) of a person who is sick with Ebola or direct handling of bats or nonhuman primates from areas with Ebola outbreaks.² Initial signs and symptoms of Ebola include sudden fever, chills, and muscle aches, with diarrhea, nausea, vomiting, and abdominal pain occurring after about 5 days. Other symptoms such as chest pain, shortness of breath, headache, or confusion, may also develop. Symptoms may become increasingly severe and may include jaundice (yellow skin), severe weight loss, mental confusion, bleeding inside and outside the body, shock, and multi-organ failure.³

Ebola is an often-fatal disease and care is needed when coming in direct contact with a recent traveler from a country with an Ebola outbreak who has symptoms of Ebola. The initial signs and symptoms of Ebola are similar to many other more common diseases found in West Africa (such as malaria and typhoid). Ebola should be considered in anyone with fever who has traveled to, or lived in, an area where Ebola is present.² The incubation period for Ebola, from exposure to when signs or symptoms appear, ranges from 2 to 21 days (most commonly 8-10 days). Any Ebola patient with signs or symptoms should be considered infectious. Ebola patients without symptoms are not contagious. The prevention of Ebola includes actions to avoid exposure to blood or body fluids of infected patients through contact with skin, mucous membranes of the eyes, nose, or mouth, or injuries with contaminated needles or other sharp objects.

Emergency medical services (EMS) personnel, along with other emergency services staff, have a vital role in responding to requests for help, triaging patients, and providing emergency treatment to patients. Unlike patient care in the controlled environment of a hospital or other fixed medical facility, EMS patient care before getting to a hospital is provided in an uncontrolled environment.

This setting is often confined to a very small space and frequently requires rapid medical decision-making and interventions with limited information. EMS personnel are frequently unable to determine the patient history before having to administer emergency care.

Coordination among 9-1-1 Public Safety Answering Points (PSAPs), the EMS system, healthcare facilities, and the public health system is important when responding to patients with suspected Ebola. Each 9-1-1 and EMS system should include an EMS medical director to provide appropriate medical supervision.

Case Definition for Ebola Virus Disease (EVD)

The CDC's most current case definition for EVD may be accessed here:<http://www.cdc.gov/vhf/ebola/hcp/case-definition.html>.

Recommendations for 9-1-1 Public Safety Answering Points (PSAPs)

State and local EMS authorities may authorize PSAPs and other emergency call centers to use modified caller queries about Ebola when they consider the risk of Ebola to be elevated in their community (e.g., in the event that patients with confirmed Ebola are identified in the area). This will be decided from information provided by local, state, and federal public health authorities, including the city or county health department(s), state health department(s), and CDC.

For modified caller queries:

It will be important for PSAPs to question callers and determine if anyone at the incident possibly has Ebola. This should be communicated immediately to EMS personnel before arrival and to assign the appropriate EMS resources. PSAPs should review existing medical dispatch procedures and coordinate any changes with their EMS medical director and with their local public health department.

- PSAP call takers should consider screening callers for symptoms and risk factors of Ebola. Callers should be asked if they, or someone at the incident, have fever of greater than 38.6 degrees Celsius or 101.5 degrees Fahrenheit, and if they have additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained bleeding.
 - If PSAP call takers suspect a caller is reporting symptoms of Ebola, they should screen callers for risk factors within the past 3 weeks before onset of symptoms. Risk factors include:
 - Contact with blood or body fluids of a patient known to have or suspected to have Ebola;
 - Residence in–or travel to–a country where an Ebola outbreak is occurring (a list of impacted countries can be accessed at the following link:
<http://www.cdc.gov/vhf/ebola/outbreaks/guinea/index.html>); or
 - Direct handling of bats or nonhuman primates from disease-endemic areas.

- If PSAP call takers have information alerting them to a person with possible Ebola, they should make sure any first responders and EMS personnel are made confidentially aware of the potential for Ebola before the responders arrive on scene.
- If responding at an airport or other port of entry to the United States, the PSAP should notify the CDC Quarantine Station for the port of entry. Contact information for CDC Quarantine Stations can be accessed at the following link:

<http://www.cdc.gov/quarantine/quarantinestationcontactlistfull.html>

Recommendations for EMS and Medical First Responders, Including Firefighters and Law Enforcement Personnel

For the purposes of this section, “EMS personnel” means pre-hospital EMS, law enforcement and fire service first responders. These EMS personnel practices should be based on the most up-to-date Ebola clinical recommendations and information from appropriate public health authorities and EMS medical direction.

When state and local EMS authorities consider the threat to be elevated (based on information provided by local, state, and federal public health authorities, including the city or county health department(s), state health department(s), and the CDC), they may direct EMS personnel to modify their practices as described below.

Patient assessment

Interim recommendations:

1. Address scene safety:
 - If PSAP call takers advise that the patient is suspected of having Ebola, EMS personnel should put on the PPE appropriate for suspected cases of Ebola (described below) before entering the scene.
 - Keep the patient separated from other persons as much as possible.
 - Use caution when approaching a patient with Ebola. Illness can cause delirium, with erratic behavior that can place EMS personnel at risk of infection, e.g., flailing or staggering.
2. During patient assessment and management, EMS personnel should consider the symptoms and risk factors of Ebola:
 - All patients should be assessed for symptoms of Ebola (fever of greater than 38.6 degrees Celsius or 101.5 degrees Fahrenheit, and additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage). If the patient has symptoms of Ebola, then ask the patient about risk factors within the past 3 weeks before the onset of symptoms, including:
 - Contact with blood or body fluids of a patient known to have or suspected to have Ebola;

- Residence in—or travel to— a country where an Ebola outbreak is occurring (a list of impacted countries can be accessed at the following link: <http://www.cdc.gov/vhf/ebola/outbreaks/guinea/index.html>); or
- Direct handling of bats or nonhuman primates from disease-endemic areas.
- Based on the presence of symptoms and risk factors, put on or continue to wear appropriate PPE and follow the scene safety guidelines for suspected case of Ebola.
- If there are no risk factors, proceed with normal EMS care.

EMS Transfer of Patient Care to a Healthcare Facility

EMS personnel should notify the receiving healthcare facility when transporting a suspected Ebola patient, so that appropriate infection control precautions may be prepared prior to patient arrival. Any U.S. hospital that is following [CDC's infection control recommendations](#) and can isolate a patient in a private room is capable of safely managing a patient with Ebola.

Interfacility Transport

EMS personnel involved in the air or ground interfacility transfer of patients with suspected or confirmed Ebola should wear recommended PPE ([described below](#)).

Infection Control

EMS personnel can safely manage a patient with suspected or confirmed Ebola by following recommended isolation and infection control procedures, including standard, contact, and droplet precautions. Particular attention should be paid to protecting mucous membranes of the eyes, nose, and mouth from splashes of infectious material, or self-inoculation from soiled gloves. Early recognition and identification of patients with potential Ebola is critical. An EMS agency managing a suspected Ebola patient should follow these CDC recommendations:

- Limit activities, especially during transport, that can increase the risk of exposure to infectious material (e.g., airway management, cardiopulmonary resuscitation, use of needles).
- Limit the use of needles and other sharps as much as possible. All needles and sharps should be handled with extreme care and disposed in puncture-proof, sealed containers.
- Phlebotomy, procedures, and laboratory testing should be limited to the minimum necessary for essential diagnostic evaluation and medical care.

Use of Personal protective equipment (PPE)

Use of standard, contact, and droplet precautions is sufficient for most situations when treating a patient with a suspected case of Ebola as defined above. EMS personnel should wear:

- Gloves

- Gown (fluid resistant or impermeable)
- Eye protection (goggles or face shield that fully covers the front and sides of the face)
- Facemask
- Additional PPE might be required in certain situations (e.g., large amounts of blood and body fluids present in the environment), including but not limited to double gloving, disposable shoe covers, and leg coverings.

Pre-hospital resuscitation procedures such as endotracheal intubation, open suctioning of airways, and cardiopulmonary resuscitation frequently result in a large amount of body fluids, such as saliva and vomit. Performing these procedures in a less controlled environment (e.g., moving vehicle) increases risk of exposure for EMS personnel. If conducted, perform these procedures under safer circumstances (e.g., stopped vehicle, hospital destination).

During pre-hospital resuscitation procedures (intubation, open suctioning of airways, cardiopulmonary resuscitation):

- In addition to recommended PPE, respiratory protection that is at least as protective as a NIOSH-certified fit-tested N95 filtering facepiece respirator or higher should be worn (instead of a facemask).
- Additional PPE must be considered for these situations due to the potential increased risk for contact with blood and body fluids including, but not limited to, double gloving, disposable shoe covers, and leg coverings.

If blood, body fluids, secretions, or excretions from a patient with suspected Ebola come into direct contact with the EMS provider's skin or mucous membranes, then the EMS provider should immediately stop working. They should wash the affected skin surfaces with soap and water and report exposure to an occupational health provider or supervisor for follow-up.

Recommended PPE should be used by EMS personnel as follows:

- PPE should be worn upon entry into the scene and continued to be worn until personnel are no longer in contact with the patient.
- PPE should be carefully removed without contaminating one's eyes, mucous membranes, or clothing with potentially infectious materials.
- PPE should be placed into a medical waste container at the hospital or double bagged and held in a secure location.
- Re-useable PPE should be cleaned and disinfected according to the manufacturer's reprocessing instructions and EMS agency policies.
- Instructions for putting on and removing PPE have been published online at <http://www.cdc.gov/HAI/prevent/ppe.html> (<http://www.cdc.gov/HAI/prevent/ppe.html>) and <http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf> [PDF - 2 pages].

- Hand hygiene should be performed immediately after removal of PPE.

Environmental infection control

Environmental cleaning and disinfection, and safe handling of potentially contaminated materials is essential to reduce the risk of contact with blood, saliva, feces, and other body fluids that can soil the patient care environment. EMS personnel should always practice standard environmental infection control procedures, including vehicle/equipment decontamination, hand hygiene, cough and respiratory hygiene, and proper use of U.S. Food and Drug Administration (FDA) cleared or authorized medical PPE. For additional information, see CDC's [Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus](#).

EMS personnel performing environmental cleaning and disinfection should:

- Wear recommended PPE (described above) and consider use of additional barriers (e.g., shoe and leg coverings) if needed.
- Wear face protection (facemask with goggles or face shield) when performing tasks such as liquid waste disposal that can generate splashes.
- Use an EPA-registered hospital disinfectant with a label claim for one of the non-enveloped viruses (e.g., norovirus, rotavirus, adenovirus, poliovirus) to disinfect environmental surfaces. Disinfectant should be available in spray bottles or as commercially prepared wipes for use during transport.
- Spray and wipe clean any surface that becomes potentially contaminated during transport. These surfaces should be immediately sprayed and wiped clean (if using a commercially prepared disinfectant wipe) and the process repeated to limit environmental contamination.

Cleaning EMS Transport Vehicles after Transporting a Patient with Suspected or Confirmed Ebola

The following are general guidelines for cleaning or maintaining EMS transport vehicles and equipment after transporting a patient with suspected or confirmed Ebola:

- EMS personnel performing cleaning and disinfection should wear recommended PPE (described above) and consider use of additional barriers (e.g., rubber boots or shoe and leg coverings) if needed. Face protection (facemask with goggles or face shield) should be worn since tasks such as liquid waste disposal can generate splashes.
- Patient-care surfaces (including stretchers, railings, medical equipment control panels, and adjacent flooring, walls and work surfaces) are likely to become contaminated and should be cleaned and disinfected after transport.

- A blood spill or spill of other body fluid or substance (e.g., feces or vomit) should be managed through removal of bulk spill matter, cleaning the site, and then disinfecting the site. For large spills, a chemical disinfectant with sufficient potency is needed to overcome the tendency of proteins in blood and other body substances to neutralize the disinfectant's active ingredient.
- An EPA-registered hospital disinfectant with label claims for viruses that share some technical similarities to Ebola (such as, norovirus, rotavirus, adenovirus, poliovirus) and instructions for cleaning and decontaminating surfaces or objects soiled with blood or body fluids should be used according to those instructions. After the bulk waste is wiped up, the surface should be disinfected as described in the bullet above.
- Contaminated reusable patient care equipment should be placed in biohazard bags and labeled for cleaning and disinfection according to agency policies. Reusable equipment should be cleaned and disinfected according to manufacturer's instructions by trained personnel wearing correct PPE. Avoid contamination of reusable porous surfaces that cannot be made single use.
- Use only a mattress and pillow with plastic or other covering that fluids cannot get through. To reduce exposure among staff to potentially contaminated textiles (cloth products) while laundering, discard all linens, non-fluid-impermeable pillows or mattresses as a regulated medical waste.

Follow-up and/or reporting measures by EMS personnel after caring for a suspected or confirmed Ebola patient

- EMS personnel should be aware of the follow-up and/or reporting measures they should take after caring for a suspected or confirmed Ebola patient.
- EMS agencies should develop policies for monitoring and management of EMS personnel potentially exposed to Ebola.
- EMS agencies should develop sick leave policies for EMS personnel that are non-punitive, flexible and consistent with public health guidance
- Ensure that all EMS personnel, including staff who are not directly employed by the healthcare facility but provide essential daily services, are aware of the sick leave policies.
- EMS personnel with exposure to blood, bodily fluids, secretions, or excretions from a patient with suspected or confirmed Ebola should immediately:
 - Stop working and wash the affected skin surfaces with soap and water. Mucous membranes (e.g., conjunctiva) should be irrigated with a large amount of water or eyewash solution;
 - Contact occupational health/supervisor for assessment and access to post-exposure management services; and
 - Receive medical evaluation and follow-up care, including fever monitoring twice daily for 21 days, after the last known exposure. They may continue to work while receiving twice daily

fever checks, based upon EMS agency policy and discussion with local, state, and federal public health authorities.

- EMS personnel who develop sudden onset of fever, intense weakness or muscle pains, vomiting, diarrhea, or any signs of hemorrhage after an unprotected exposure (i.e., not wearing recommended PPE at the time of patient contact or through direct contact to blood or body fluids) to a patient with suspected or confirmed Ebola should:
 - Not report to work or immediately stop working and isolate themselves;
 - Notify their supervisor, who should notify local and state health departments;
 - Contact occupational health/supervisor for assessment and access to post-exposure management services; and
 - Comply with work exclusions until they are deemed no longer infectious to others.

¹ <http://www.cdc.gov/vhf/ebola/hcp/patient-management-us-hospitals.html>

² <http://www.cdc.gov/vhf/ebola/hcp/case-definition.html>

³ <http://www.cdc.gov/vhf/ebola/hcp/clinician-information-us-healthcare-settings.html>

File Formats Help:

How do I view different file formats (PDF, DOC, PPT, MPEG) on this site?

(<http://www.cdc.gov/Other/plugins/>)

(<http://www.cdc.gov/Other/plugins/#pdf>)

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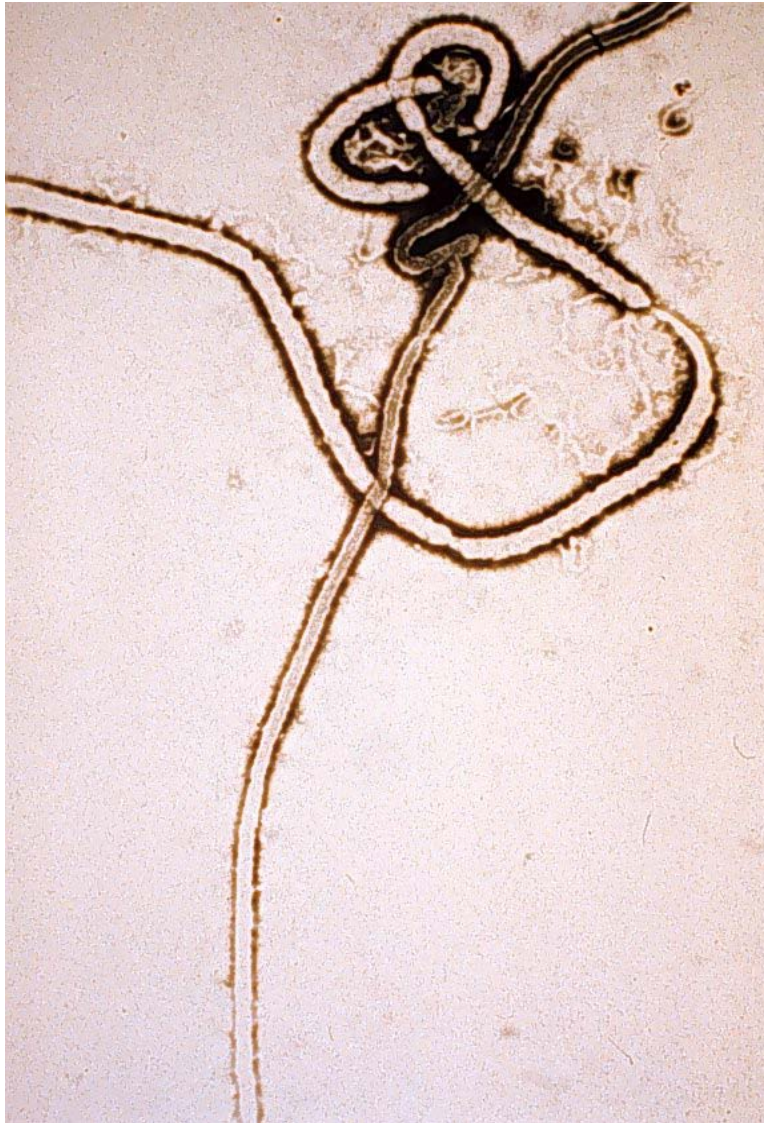
Content source: Centers for Disease Control and Prevention (/index.htm)

National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) (/ncezid/index.html)

Division of High-Consequence Pathogens and Pathology (DHCPP) (/ncezid/dhcpp/index.html)

Viral Special Pathogens Branch (VSPB) (/ncezid/dhcpp/vspb/index.html)

Ebola Hemorrhagic Fever Information Packet



Picture: an Electron Micrograph of the Ebola Virus
Courtesy: Centers for Disease Control and Prevention



2009 Special Pathogens Branch
Division of High-Consequence Pathogens and Pathology
National Center for Emerging Zoonotic Infectious Diseases
Centers for Disease Control and Prevention
U.S. Department of Health and Human Services





Ebola Hemorrhagic Fever

Fact Sheet

What is Ebola hemorrhagic fever?

Ebola hemorrhagic fever (Ebola HF) is a severe, often-fatal disease in humans and nonhuman primates (monkeys, gorillas, and chimpanzees) that has appeared sporadically since its initial recognition in 1976. The disease is caused by infection with Ebola virus, named after a river in the Democratic Republic of the Congo (formerly Zaire) in Africa, where it was first recognized. The virus is one of two members of a family of RNA viruses called the Filoviridae. There are five identified subtypes of Ebola virus. Four of the five have caused disease in humans: Ebola-Zaire, Ebola-Sudan, Ebola-Ivory Coast and Ebola-Bundibugyo. The fifth, Ebola-Reston, has caused disease in nonhuman primates, but not in humans.

Where is Ebola virus found in nature?

The exact origin, locations, and natural habitat (known as the "natural reservoir") of Ebola virus remain unknown. However, on the basis of available evidence and the nature of similar viruses, researchers believe that the virus is zoonotic (animal-borne) with four of the five subtypes occurring in an animal host native to Africa. A similar host, most likely in the Philippines, is probably associated with the Ebola-Reston subtype, which was isolated from infected cynomolgous monkeys that were imported to the United States and Italy from the Philippines. The virus is not known to be native to other continents, such as North America.

Where do cases of Ebola hemorrhagic fever occur?

Confirmed cases of Ebola HF have been reported in the Democratic Republic of the Congo, Gabon, Sudan, the Ivory Coast, Uganda, and the Republic of the Congo. No case of the disease in humans has ever been reported in the United States. Ebola-Reston virus caused severe illness and death in monkeys imported to research facilities in the United States and Italy from the Philippines; during these outbreaks, several research workers became infected with the virus, but did not become ill.

Ebola HF typically appears in sporadic outbreaks, usually spread within a health-care setting (a situation known as amplification). It is likely that sporadic, isolated cases occur as well, but go unrecognized. A table showing a chronological list of known cases and outbreaks is available below.

How is Ebola virus spread?

Infections with Ebola virus are acute. There is no carrier state. Because the natural reservoir of the virus is unknown, the manner in which the virus first appears in a human at the start of an outbreak has not been determined. However, researchers have hypothesized that the first patient becomes infected through contact with an infected animal.

After the first case-patient in an outbreak setting is infected, the virus can be transmitted in several ways. People can be exposed to Ebola virus from direct contact with the blood and/or secretions of an infected person. Thus, the virus is often spread through families and friends because they come in close contact with such secretions when caring for infected persons. People can also be exposed to Ebola virus through contact with objects, such as needles, that have been contaminated with infected secretions.

Nosocomial transmission refers to the spread of a disease within a health-care setting, such as a clinic or hospital. It occurs frequently during Ebola HF outbreaks. It includes both types of transmission described above. In African health-care facilities, patients are often cared for without the use of a mask, gown, or gloves. Exposure to the virus has occurred when health care workers treated individuals with Ebola HF without wearing these types of protective clothing. In addition, when needles or syringes are used, they may not be of the disposable type, or may not have been sterilized, but only rinsed before reinsertion into multi-use vials of medicine. If needles or syringes become contaminated with virus and are then reused, numerous people can become infected.

Ebola Hemorrhagic Fever Fact Sheet

How is Ebola virus spread? (continued)

Ebola-Reston appeared in a primate research facility in Virginia, where it may have been transmitted from monkey to monkey through the air. While all Ebola virus species have displayed the ability to be spread through airborne particles (aerosols) under research conditions, this type of spread has not been documented among humans in a real-world setting, such as a hospital or household.

What are the symptoms of Ebola hemorrhagic fever?

The incubation period for Ebola HF ranges from 2 to 21 days. The onset of illness is abrupt and is characterized by fever, headache, joint and muscle aches, sore throat, and weakness, followed by diarrhea, vomiting, and stomach pain. A rash, red eyes, hiccups and internal and external bleeding may be seen in some patients.

Researchers do not understand why some people are able to recover from Ebola HF and others are not. However, it is known that patients who die usually have not developed a significant immune response to the virus at the time of death.

How is Ebola hemorrhagic fever clinically diagnosed?

Diagnosing Ebola HF in an individual who has been infected only a few days is difficult because early symptoms, such as red eyes and a skin rash, are nonspecific to the virus and are seen in other patients with diseases that occur much more frequently. However, if a person has the constellation of symptoms described above, and infection with Ebola virus is suspected, isolate the patient and notify local and state health departments and the CDC.

What laboratory tests are used to diagnose Ebola hemorrhagic fever?

Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing, IgM ELISA, polymerase chain reaction (PCR), and virus isolation can be used to diagnose a case of Ebola HF within a few days of the onset of symptoms. Persons tested later in the course of the disease or after recovery can be tested for IgM and IgG antibodies; the disease can also be diagnosed retrospectively in deceased patients by using immunohistochemistry testing, virus isolation, or PCR.

How is Ebola hemorrhagic fever treated?

There is no standard treatment for Ebola HF. Patients receive supportive therapy. This consists of balancing the patient's fluids and electrolytes, maintaining their oxygen status and blood pressure, and treating them for any complicating infections.

How is Ebola hemorrhagic fever prevented?

The prevention of Ebola HF in Africa presents many challenges. Because the identity and location of the natural reservoir of Ebola virus are unknown, there are few established primary prevention measures.

If cases of the disease do appear, current social and economic conditions often favor the spread of an epidemic within health-care facilities. Therefore, health-care providers must be able to recognize a case of Ebola HF should one appear. They must also have the capability to perform diagnostic tests and be ready to employ practical viral hemorrhagic fever isolation precautions, or barrier nursing techniques. These techniques include the wearing of protective clothing, such as masks, gloves, gowns, and goggles; the use of infection-control measures, including complete equipment sterilization; and the isolation of Ebola HF patients from contact with unprotected persons. The aim of all of these techniques is to avoid any person's contact with the blood or secretions of any patient. If a patient with Ebola HF dies, it is equally important that direct contact with the body of the deceased patient be prevented.

Ebola Hemorrhagic Fever Fact Sheet

How is Ebola hemorrhagic fever prevented? (continued)

CDC has developed a set of tools to meet health-care facilities' needs. In conjunction with the World Health Organization, CDC has developed practical, hospital-based guidelines, entitled Infection Control for Viral Haemorrhagic Fevers in the African Health Care Setting. The manual describes how to recognize cases of viral hemorrhagic fever, such as Ebola HF, and prevent further nosocomial transmission by using locally available materials and few financial resources. Similarly, a practical diagnostic test that uses tiny samples from patients' skin has been developed to retrospectively diagnose Ebola HF in suspected case-patients who have died.

What challenges remain for the control and prevention of Ebola hemorrhagic fever?

Scientists and researchers are faced with the challenges of developing additional diagnostic tools to assist in early diagnosis of Ebola HF and conducting ecological investigations of Ebola virus and its possible reservoir. In addition, one of the research goals is to monitor suspected areas to determine the incidence of the disease. More extensive knowledge of the natural reservoir of Ebola virus and how the virus is spread must be acquired to prevent future outbreaks effectively.

Unsure about some of the terms used above? See the **glossary of terms** enclosed in the packet.

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**For more information on viral hemorrhagic fevers,
see the SPB web page at <http://www.cdc.gov/ncidod/dvrd/spb/index.htm>.**



Ebola Hemorrhagic Fever Case Count and Location List

Year	Ebola Species	Country	No. of Human Cases	Reported no.(%) of Deaths Among Cases	Situation
1976	Ebola-Zaire	Zaire	318	280(88%)	Occurred in Yambuku and surrounding area. Disease was spread by close personal contact and by use of contaminated needles and syringes in hospitals/clinics. This was the first recognition of the disease.
1976	Ebola-Sudan	Sudan	284	151(53%)	Occurred in Nzara, Maridi and the surrounding area. Disease was spread mainly through close personal contact within hospitals. Many medical care personnel were infected.
1976	Ebola-Sudan	England	1	0(0%)	Laboratory infection by accidental stick of contaminated needle.
1977	Ebola-Zaire	Zaire	1	1(100%)	Noted retrospectively in the village of Tandala.
1979	Ebola-Sudan	Sudan	34	22(65%)	Occurred in Nzara. Recurrent outbreak at the same site as the 1976 Sudan epidemic.
1989	Ebola-Reston	USA	0	0(0%)	Ebola-Reston virus was introduced into quarantine facilities in Virginia and Pennsylvania by monkeys imported from the Philippines.
1990	Ebola-Reston	USA	4 (Asymptomatic)	0(0%)	Ebola was introduced once again into quarantine facilities in Virginia and Texas by monkeys imported from the Philippines. Four humans developed antibodies but did not get sick.
1989-1990	Ebola-Reston	Philippines	3 (asymptomatic)	0(0%)	High mortality among cynomolgus macaques in a primate facility responsible for exporting animals in the USA. Three workers in the animal facility developed antibodies but did not get sick.
1992	Ebola-Reston	Italy	0	0(0%)	Ebola-Reston was introduced into quarantine facilities in Sienna by monkeys imported from the same export facility in the Philippines that was involved in the episodes in the United States. No humans were infected.
1994	Ebola-Zaire	Gabon	52	31(60%)	Occurred in Mékouka and other gold-mining camps deep in the rain forest. Initially thought to be yellow fever; identified as Ebola hemorrhagic fever in 1995.
1994	Ebola-Ivory Coast	Ivory Coast	1	0(0%)	Scientist became ill after conducting an autopsy on a wild chimpanzee in the Tai Forest. The patient was treated in Switzerland.
1995	Ebola-Zaire	Zaire	315	250(81%)	Occurred in Kikwi and surrounding area. Traced to index case-patient who worked in forest adjoining the city. Epidemic spread through families and hospitals.
1996 (Jan-Apr)	Ebola-Zaire	Gabon	37	21(57%)	Occurred in Mayibout area. A chimpanzee found dead in the forest was eaten by people hunting for food. Nineteen people who were involved in the butchery of the animal became ill; other cases occurred in family members.
1996 (Jul-Jan)	Ebola-Zaire	Gabon	60	45(74%)	Occurred in Booué area with transport of patients to Libreville. Index case-patient was a hunter who lived in a forest camp. Disease was spread by close contact with infected persons. A dead chimpanzee found in the forest at the time was determined to be infected.
1996	Ebola-Zaire	South Africa	2	1(50%)	A medical professional traveled from Gabon to Johannesburg, South Africa, after having treated Ebola virus-infected patients and thus having been exposed to the virus there. He was hospitalized, and a nurse who took care of him became infected and died.

Year	Ebola Species	Country	No. of Human Cases	Reported No.(%) of Deaths Among Cases	Situation
1996	Ebola-Reston	USA	0	0(0%)	Ebola-Reston virus was introduced into a quarantine facility in Texas by monkeys imported from the Philippines. No human infections were identified.
1996	Ebola-Reston	Philippines	0	0(0%)	Ebola-Reston virus was identified in a monkey export facility in the Philippines. No human infections were identified.
2000-2001	Ebola-Sudan	Uganda	425	224(53%)	Occurred in Gulu, Masindi, and Mbarara districts of Uganda. The three most important risks associated with Ebola virus infection were attending funerals of Ebola hemorrhagic case-patients, having contact with case-patients in one's family, and providing medical care to Ebola case-patients without adequate personal protective measures.
2001-2001 (Oct'01-Mar'02)	Ebola-Zaire	Gabon	65	53(82%)	Outbreak occurred over the border of Gabon and the Republic of the Congo.
2001-2002 (Oct'01-Mar'02)	Ebola-Zaire	Republic of the Congo	57	43(75%)	Outbreak occurred over the border of Gabon and the Republic of the Congo. This was the first time Ebola hemorrhagic fever was reported in the Republic of the Congo.
2002-2003 (Dec'02-Apr'03)	Ebola-Zaire	Republic of Congo	143	128(89%)	Outbreak occurred in the districts of Mbomo and Kéllé in Cuvette Ouest Département.
2003 (Nov-Dec)	Ebola-Zaire	Republic of Congo	35	29(83%)	Outbreak occurred in Mbomo and Mbandza villages located in the Mbomo district, Cuvette Ouest Département
2004	Ebola-Sudan	Sudan	17	7(41%)	Outbreak occurred in Yambio county of southern Sudan. This was concurrent with an outbreak of measles in the same area, and several suspected EHF cases were later reclassified as measles cases.
2007	Ebola-Zaire	Democratic Republic of the Congo	264	187(71%)	Outbreak occurred in Kasai Occidental Province. The outbreak was declared over November 20. Last confirmed case on October 4 and last death on October 10.
Dec 2007-Jan 2008	Ebola-Bundibugyo	Uganda	149	37(25%)	Outbreak occurred in Bundibugyo District in Uganda. First reported occurrence of a new strain.
Nov 2008	Ebola-Reston	Philippines	6 (asymptomatic)	0(0%)	First known occurrence of Ebola-Reston in pigs. Strain closely related to earlier strains. Six workers from the pig farm and slaughterhouse developed antibodies but did not become sick.
Dec 2008-Feb 2009	Ebola-Zaire	Democratic Republic of the Congo	32	15(47%)	Outbreak occurred in the Mweka and Luebo health zones of the Province of Kasai Occidental.



Glossary of Terms

Below you will find an alphabetical listing of common terms used in articles about viral hemorrhagic fevers. These terms occur frequently in epidemiological and health prevention literature.

aerosol:

A fine mist or spray which contains minute particles.

antibody:

Proteins produced by an organism's immune system to recognize foreign substances.

antigen:

Any substance that stimulates an immune response by the body. The immune system recognizes such substances as being foreign, and produces cellular antibodies to fight them. Antigen/antibody response is an important part of a person's immunity to disease.

assay:

Quantitative or qualitative evaluation, or test, of a substance. Frequently used to describe tests of the presence or concentration of infectious agents, antibodies, etc.

biosafety level:

Specific combinations of work practices, safety equipment, and facilities, which are designed to minimize the exposure of workers and the environment to infectious agents. Biosafety level 1 applies to agents that do not ordinarily cause human disease. Biosafety level 2 is appropriate for agents that can cause human disease, but whose potential for transmission is limited. Biosafety level 3 applies to agents that may be transmitted by the respiratory route which can cause serious infection. Biosafety level 4 is used for the diagnosis of exotic agents that pose a high risk of life-threatening disease, which may be transmitted by the aerosol route and for which there is no vaccine or therapy.

carrier:

A person or animal that harbors a specific infectious agent without visible symptoms of the disease. A carrier acts as a potential source of infection.

case-fatality proportion:

The number of cases of a disease ending in death compared to the number of cases of the disease. Usually expressed as a percentage. While deaths from other diseases are often expressed as mortality rates, SPB normally uses case-fatality proportions. This is due to the fact that rates include a time determinant - for example, 100 deaths per 1000 cases per year. However, the diseases with which SPB works break out sporadically, and occur as brief epidemics.

case-to-infection ratio or proportion:

The number of cases of a disease (in humans) compared to the number of infections with the agent that causes the disease (in humans).

disease:

Formally speaking, a disease is the condition in which the functioning of the body or a part of the body is interfered with or damaged. In a person with an infectious disease, the infectious agent that has entered the body causes it to function abnormally in some way or ways. The type of abnormal functioning that occurs is the disease. Usually the body will show some signs and symptoms of the problems it is having with functioning. Disease should not be confused with infection.

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ELISA (enzyme-linked-immunosorbent serologic assay):

A technique that relies on an enzymatic conversion reaction. It is used to detect the presence of specific substances, such as enzymes, viruses, antibodies or bacteria.

endemic:

Disease that is widespread in a given population.

enzootic:

A disease which is constantly present in the animal community, but only occurs in a small number of cases.

epidemic:

The occurrence of cases of an illness in a community or region which is in excess of the number of cases normally expected for that disease in that area at that time.

epizootic:

An outbreak or epidemic of disease in animal populations.

host:

An organism in which a parasite lives and by which it is nourished.

IgG:

One of many antibodies present in blood serum which is usually indicative of a recent or remote infection. IgG is most prevalent about 3 weeks after an infection begins.

IgM:

One of many antibodies present in blood serum which is usually indicative of an acute infection.

immunohistochemistry:

A type of assay in which specific antigens are made visible by the use of fluorescent dye or enzyme markers.

infection:

The entry and development of an infectious agent in the body of a person or animal. In an apparent "manifest" infection, the infected person outwardly appears to be sick. In an apparent infection, there is no outward sign that an infectious agent has entered that person at all. For example, although humans have become infected with Ebola-Reston, a species of Ebola virus, they have not shown any sign of illness. By contrast, in recorded outbreaks of Ebola hemorrhagic fever caused by Ebola-Zaire, another species of Ebola virus, severe illness followed infection with the virus, and a great proportion of the case-patients died. Infection should not be confused with disease.

noscomial infection:

An infection occurring in a patient which is acquired at a hospital or other healthcare facility. Commonly called a cross infection.

report of a disease:

An official report that notifies an appropriate health authority of the occurrence of a disease in a human or in an animal. Human diseases usually are reported first to the local health authority, such as a county health department.

reservoir:

Any person, animal, arthropod, plant, soil or substance in which an infective agent normally lives and multiplies. The infectious agent primarily depends on the reservoir for its survival.

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risk:

- A) The chance of being exposed to an infectious agent by its specific transmission mechanism.
- B) The chance of becoming infected if exposed to an infectious agent by its specific transmission mechanism.

RT-PCR (reverse transcriptase polymerase chain reaction):

Powerful technique for producing millions of copies of specific parts of the genetic code of an organism so that it may be readily analyzed. More specifically, RT-PCR produces copies of a specific region of complementary DNA that has been converted from RNA. The technique is often used to help in the identification of an infectious agent.

surveillance of disease:

The ongoing systematic collection and analysis of data and the provision of information which leads to action being taken to prevent and control an infectious disease.

transmission of infectious agents (such as a virus):

Any mechanism through which an infectious agent, such as a virus, is spread from a reservoir (or source) to a human being. Usually each type of infectious agent is spread by only one or a few of the different mechanisms.

There are several types of transmission mechanisms:**a) Direct transmission:**

This type of transmission is, at base, immediate. The transfer of the infectious agent is, as the name implies, directly into the body. Different infectious agents may enter the body using different routes. Some routes by which infectious diseases are spread directly include personal contact, such as touching, biting, kissing or sexual intercourse. In these cases the agent enters the body through the skin, mouth, an open cut or sore, or sexual organs. Infectious agents may spread by tiny droplets of spray directly into the conjunctiva (the mucus membranes of the eye), or the nose or mouth during sneezing, coughing, spitting, singing or talking (although usually this type of spread is limited to about within one meter's distance.) This is called droplet spread.

b) Indirect transmission:

Indirect transmission may happen in any of several ways:

Vehicle-borne transmission:

In this situation, a vehicle—that is, an inanimate object or material called in scientific terms a "fomite"—becomes contaminated with the infectious agent. The agent, such as a virus, may or may not have multiplied or developed in or on the vehicle. The vehicle contacts the person's body. It may be ingested (eaten or drunk), touch the skin, or be introduced internally during surgery or medical treatment. Examples of vehicles that can transmit diseases include cooking or eating utensils, bedding or clothing, toys, surgical or medical instruments (like catheters) or dressings. Water, food, drinks (like milk) and biological products like blood, serum, plasma, tissues or organs can also be vehicles.

Vector-borne transmission:

When researchers talk about vectors, often they are talking about insects, which as a group of invertebrate animals carry a host of different infectious agents. (However, a vector can be any living creature that transmits an infectious agent to humans.)

Vectors may mechanically spread the infectious agent, such as a virus or parasite. In this scenario the vector—for instance a mosquito—contaminates its feet or proboscis ("nose") with the infectious agent, or the agent passes through its gastrointestinal tract. The agent is transmitted from the vector when it bites or touches a person. In the case of an insect, the infectious agent may be injected with the insect's salivary fluid when it bites. Or the insect may regurgitate material or deposit feces on the skin, which then enter a person's body, typically through a bite wound or skin that has been broken by scratching or rubbing. In the case of some infectious agents, vectors are only capable of transmitting the disease during a certain time period. In these situations,

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Vector-borne transmission (continued):

vectors play host to the agent. The agent needs the host to develop and mature or to reproduce (multiply) or both (called cyclopropagative). Once the agent is within the vector animal, an incubation period follows during which the agent grows or reproduces, or both, depending on the type of agent. Only after this phase is over does the vector become infective. That is, only then can it transmit an agent that is capable of causing disease in the person.

c) Airborne transmission:

In this type of transmission, infective agents are spread as aerosols, and usually enter a person through the respiratory tract. Aerosols are tiny particles, consisting in part or completely of the infectious agent itself, which become suspended in the air. These particles may remain suspended in the air for long periods of time, and some retain their ability to cause disease, while others degenerate due to the effects of sunlight, dryness or other conditions. When a person breathes in these particles, they become infected with the agent—especially in the alveoli of the lungs. (see also "aerosolization")

How do infectious aerosols get into the air?

Small particles of many different sizes contaminated with the infective agent may rise up from soil, clothes, bedding or floors when these are moved, cleaned or blown by wind. These dust particles may be fungal spores— infective agents themselves—tiny bits of infected feces, or tiny particles of dirt or soil that have been contaminated with the agent.

Droplet nuclei can remain in the air for a long time. Droplet nuclei are usually the small residues that appear when fluid emitted from an infected host evaporates. In the case of the virus causing hantavirus pulmonary syndrome, the rodent carriers produce urine. The act of spraying the urine may create the aerosols directly, or the virus particles may rise into the air as the urine evaporates. In other situations, the droplets may occur as an unintended result of mechanical or work processes or atomization by heating, cooling, or venting systems in microbiology laboratories, autopsy rooms, slaughterhouses or elsewhere.

Both kinds of particles are very tiny. Larger droplets or objects that may be sprayed or blown but that immediately settle down on something rather than remaining suspended, are not considered to belong to the airborne transmission mechanism. Such sprays are considered direct transmission.

vector:

A carrier which transmits infective agent from one host to another.

virus:

A virus is an extremely tiny infectious agent that is only able to live inside a cell. Basically, viruses are composed of just two parts. The outer part is a protective shell made of protein. This shell is often surrounded by another protective layer or envelope, made of protein or lipids (fats). The inner part is made of genetic material, either RNA or DNA. A virus does not have any other structures (called organelles) that living cells have, like a nucleus or mitochondria. These organelles are the tiny organs that maintain a cell's metabolism (life processes). A virus has no metabolism at all.

Because a virus lacks organelles, it cannot reproduce itself by itself. To reproduce, it invades a cell within the body of a human or other creature, called the host. Each type of virus has particular types of host creatures and host cells that it will invade successfully.

Once within the host cell, the virus uses the cell's own organelles to produce more viruses. In essence, the virus forces the cell to replicate the virus' own genetic material and protective shell. Once replicated, the new viruses leave the host cell and are ready to invade others.

zoonotic disease or infection:

An infection or infectious disease that may be transmitted from vertebrate animals (such as a rodent) to humans.

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