



Infectious Disease Epidemiology Section
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Ebola Hemorrhagic Fever Ebola Virus Disease (EVD)

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“The bottom line with Ebola is we know how to stop it: traditional public health. Find patients, isolate and care for them; find their contacts; educate people; and strictly follow infection control in hospitals. Do those things with meticulous care and Ebola goes away.”
Tom Frieden, MD, MPH - Director of the Centers for Disease Control and Prevention

This manual is based on the CDC recommendations. It is presented in a very concise format to provide infection preventionists and epidemiologists a single document grouping all information necessary to understand Ebola transmission, patient management and epidemic prevention. The word Ebola is sometimes used as a synonym for Ebola Virus Disease.

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1-Epidemiology

The Ebola virus is the cause of a viral hemorrhagic fever disease. Symptoms at the beginning of the disease are fever, headache, joint and muscle aches, weakness, diarrhea, vomiting, stomach pain and lack of appetite. Such symptoms are common to many viral infections (influenza, for example). Abnormal bleeding is the most dangerous symptom.

1.1-Incubation period is important

Symptoms may appear anywhere from 2 to 21 days after exposure to the Ebola virus although 8-10 days is most common. An individual suspected of having been exposed to the Ebola virus will become sick before 21 days (often earlier). If healthy at 21 days, the individual definitely does not have Ebola disease and poses no risk to anyone.

1.2-Transmission

Individuals who are not symptomatic are not contagious. Ebola is transmitted through direct contact with the blood or bodily fluids of an infected symptomatic person, or through exposure to objects (such as needles) that have been contaminated with infected secretions.

In order for the virus to be transmitted, an individual would have to have direct contact with an individual who is experiencing symptoms. The source of infection is blood and internal fluids (spinal fluids, pleural fluid...). The patients most likely to transmit the virus are those that are at the bleeding stage. Their secretions and excretions (saliva, vomitus, sweat, any open skin wound, urine or stools) may contain small amounts of blood and would be a source for transmission.

EVD is not a respiratory disease like the flu, so it is not transmitted through the air. EVD is not a food-borne illness. It is not a water-borne illness. Therefore the risk of transmission of EVD throughout the world is very limited.

1.3-Source of virus

Virus culture and RT-PCR identified the Ebola virus in most fluids with visible blood. In specimens without visible blood, virus was identified in about 50% of specimens from saliva, stools, semen, breast milk, tears and 10% of skin swabs. No virus was found in urine, vomit, sputum, sweat or body lice. The absence of the Ebola virus in urine, low prevalence on the skin, and rapid clearance from the saliva in surviving patients provides some reassurance that the risk of secondary transmission from casual contacts, fomites, or the sharing of toilet facilities in the home after discharge from the hospital is minimal. This conclusion is supported by previous empirical observations.

1.4-Environmental source

The role of the environment in transmission has not been established. Limited laboratory studies under favorable conditions indicate that the Ebola virus can remain viable on solid surfaces, with concentrations falling slowly over several days (6 days in one study). 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. There is no epidemiologic evidence of Ebola virus transmission via either the environment or fomites that could become contaminated during patient care (e.g., bed rails, door knobs, laundry).

The Ebola virus 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.

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.

Bausch DG et al. Assessment of the Risk of Ebola Virus Transmission from Bodily Fluids and Fomites J Infect Dis. (2007) 196(Supplement 2): S142-S147.doi: 10.1086/520545

In a study of 33 environmental specimens none were culture positive, but 2 specimens (1 bloody glove and 1 bloody intravenous insertion site sampled as positive controls) were positive by RTPCR. Both specimens were visibly colored by blood (i.e., red or pink), whereas all 31 of the negative samples were clear. Many of the inanimate objects tested, such as bed frames and bedside chairs, would not routinely be specifically decontaminated with bleach solutions under existing guidelines unless they happened to be visibly contaminated, suggesting that environmental contamination did not occur. Taken together with empirical epidemiological observations during outbreaks, the results suggest that current recommendations for the decontamination of filoviruses in isolation wards are effective. The risk from environmental contamination and fomites might vary in the household or other settings where decontamination would be less frequent and thorough, especially if linens or other household materials were to become visibly soiled by blood. Taken together, the results support the conventional assumptions and field observations that most Ebola virus transmission comes from direct contact with blood or bodily fluids of an infected patient during the acute phase of illness. Environmental contamination and fomites do not appear to pose a significant risk when currently recommended infection control guidelines for the viral hemorrhagic fevers are followed.

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 EVD. 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.

1.5-Outbreaks

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

The viruses that cause EVD are often spread through families and friends because they come in close contact with infectious secretions when caring for ill persons and disposing of the body after death (washing the body for example).

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

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.

The current Ebola outbreak is centered on three countries in West Africa: Liberia, Guinea, Sierra Leone, although there is the potential for further spread to neighboring African countries. For up-to-date information on this outbreak go to the Centers for Disease Control and Prevention (CDC) website

<http://www.cdc.gov/vhf/Ebola/outbreaks/guinea/index.html>

1.6-No outbreak outside of the endemic area (Africa)

The Yambuku outbreak (in Zaire now Democratic Republic of the Congo - DRC) of 1976 was the first recognition of the disease. There were 318 cases, 280 (88%) died. EVD was spread by close personal contact and by use of contaminated needles and syringes in hospitals/clinics. Since then there has been 17 outbreaks in Africa with 3,500 cases and no outbreaks occurred outside of the endemic areas. The only occurrences in countries outside the endemic area were laboratory workers exposed in laboratories, and individual cases among travelers.

EVD does not pose a significant risk to the U.S. public. The following measures are implemented to minimize the risk of importation outside of the outbreak area.

2-Clinical Presentation and Clinical Course

Patients with EVD generally have abrupt onset typically 8-10 days after exposure (mean 4-10 days in previous outbreaks, range 2-21 days). Initial signs and symptoms are nonspecific and may include fever, chills, myalgias, and malaise. Fever, anorexia, asthenia/weakness are the most common signs and symptoms. Patients may develop a diffuse erythematous maculopapular rash by day 5 to 7 (usually involving the face, neck, trunk, and arms) that can desquamate.

Due to these nonspecific symptoms particularly early in the course, EVD can often be confused with other more common infectious diseases such as malaria, typhoid fever, meningococemia, and other bacterial infections (e.g., pneumonia).

Patients can progress from the initial non-specific symptoms after about 5 days to develop gastrointestinal symptoms such as severe watery diarrhea, nausea, vomiting and abdominal pain. Other symptoms such as chest pain, shortness of breath, headache or confusion, may also develop. Patients often have conjunctival injection. Hiccups have been reported. Seizures may occur, and cerebral edema has been reported. Bleeding is not universally present but can manifest later in the course as petechiae, ecchymosis/bruising, or oozing from venipuncture sites and mucosal hemorrhage. Frank hemorrhage is less common. Pregnant women may experience spontaneous miscarriages.

Patients with fatal disease usually develop more severe clinical signs early during infection and die typically between days 6 and 16 of complications including multi-organ failure and septic shock. In non-fatal cases, patients may have fever for several days and improve, typically around day 6-11. Patients that survive can have a prolonged convalescence. The World Health Organization has estimated the mortality of the current outbreak of EVD in West Africa to be approximately 55%, but appears to be as high as 75% in Guinea.

3-Diagnosis

Diagnosing Ebola HF in an individual who has been infected for only a few days is difficult, because the early symptoms, such as red eyes and a skin rash, are nonspecific to Ebola virus infection and are seen often in patients with more commonly occurring diseases.

However, if a person has the early symptoms of Ebola HF and there is reason to believe that Ebola HF should be considered, the patient should be isolated and public health professionals notified. Samples from the patient can then be collected and tested to confirm infection.

Laboratory tests used in diagnosis include:

Symptoms begin	<ul style="list-style-type: none"> • Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing • IgM ELISA • Polymerase chain reaction (PCR) • Virus isolation
Later in disease course or after recovery	IgM and IgG antibodies
Retrospectively in deceased patients	<ul style="list-style-type: none"> • Immunohistochemistry testing • PCR • Virus isolation

- Laboratory testing is coordinated by the OPH Public Health Laboratory who will instruct the medical provider what samples to collect and how to send them to the CDC Laboratories.
- Guidelines are at: <http://www.cdc.gov/vhf/Ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-Ebola.html>

3.1-Infection Control for Collecting and Handling Specimens

It is expected that all laboratorians and other healthcare personnel collecting or handling specimens follow established standards compliant with the [OSHA bloodborne pathogens standard](#), which encompasses blood and other potentially infectious materials. This includes wearing appropriate personal protective equipment (PPE) and adhering to engineered safeguards, for all specimens regardless of whether they are identified as being infectious.

Recommendations for specimen collection: full face shield or goggles, masks to cover all of nose and mouth, gloves, fluid resistant or impermeable gowns. Additional PPE may be required in certain situations.

Recommendations for laboratory testing: full face shield or goggles, masks to cover all of nose and mouth, gloves, fluid resistant or impermeable gowns AND use of a certified class II Biosafety cabinet or Plexiglass™ splash guard, as well as manufacturer-installed safety features for instruments.

3.2-Specimen Handling for Routine Laboratory Testing (not for Ebola Diagnosis)

Routine laboratory testing includes traditional chemistry, hematology, and other laboratory testing used to support and treat patients. Precautions as described above offer appropriate protection for healthcare personnel performing laboratory testing on specimens from patients with suspected infection with Ebola virus. These precautions include both manufacturer installed safety features for instruments and the environment as well as PPE specified in the box above.

When used according to the manufacturer’s instructions, Environmental Protection Agency (EPA)-registered disinfectants routinely used to decontaminate the laboratory environment (benchtops and surfaces), and the laboratory instrumentation are sufficient to inactivate enveloped viruses, such as influenza, hepatitis C and Ebola viruses.

3.3-When Specimens Should Be Collected for Ebola Testing

Ebola virus is detected in blood only after onset of symptoms, most notably fever. It may take up to 3 days post-onset of symptoms for the virus to reach detectable levels. Virus is generally detectable by real-time RT-PCR from 3-10 days post-onset of symptoms, but has been detected for several months in certain secretions. Specimens ideally should be taken when a symptomatic patient reports to a healthcare facility

and is suspected of having an EVD exposure; however, if the onset of symptoms is less than 3 days, a subsequent specimen will be required to completely rule-out EVD.

3.4-Preferred Specimens for Ebola Testing

A minimum volume of 4mL whole blood preserved with EDTA, clot activator, sodium polyanethol sulfonate (SPS), or citrate in *plastic* collection tubes can be submitted for EVD testing. Do not submit specimens to the CDC in glass containers. Do not submit specimens preserved in heparin tubes. Specimens should be stored at 4°C or frozen. Specimens other than blood may be submitted upon consult with the CDC by calling the Emergency Operations Center at 770-488-7100.

Standard labeling should be applied for each specimen. The requested test only needs to be identified on the requisition and CDC specimen submission forms.

3.5-Storing Clinical Specimens for Ebola

Specimens should be stored at 4°C or frozen.

3.6-Diagnostic Testing for Ebola Performed at the CDC

Several diagnostic tests are available for detection of EVD. Acute infections will be confirmed using a real-time RT-PCR assay (CDC test directory code CDC -10309 Ebola Identification) in a CLIA-accredited laboratory. Virus isolation may also be attempted. Serologic testing for IgM and IgG antibodies will be completed for certain specimens and to monitor the immune response in confirmed EVD patients (#CDC-10310 Ebola Serology).

Lassa fever is also endemic in certain areas of West Africa and may show symptoms similar to early EVD. Diagnostic tests including but not limited to RT-PCR, antigen detection, and IgM serology may be utilized to rule out Lassa fever in EVD-negative patients.

3.7-Transporting Specimens within the Hospital / Institution

In compliance with 29 CFR 1910.1030, specimens should be placed in a durable, leak-proof secondary container for transport within a facility. To reduce the risk of breakage or leaks, do not use any pneumatic tube system for transporting suspected EVD specimens.

The following steps outline the submission process to the CDC.

- Hospitals should follow their state and/or local health department procedures for notification and consultation for Ebola testing requests and prior to contacting the CDC.
- NO specimens will be accepted without prior consultation. For consultation call the EOC at **770-488-7100**.
- Contact your state and/or local health department and the CDC to determine the proper category for shipment based on clinical history and risk assessment by the CDC. State guidelines may differ and state or local health departments should be consulted prior to shipping.
- Email tracking number to EOCEVENT246@CDC.GOV.
- Do not ship for weekend delivery unless instructed by the CDC.
- Ship to:

Centers for Disease Control and Prevention

ATTN STAT LAB: VSPB, UNIT #70

1600 Clifton Road NE

Atlanta, GA 30333

Phone 770-488-7100

- Include the following information: your name, the patient's name, test(s) requested, date of collection, laboratory or accession number, and the type of specimen being shipped.
- Include the CDC Infectious Disease ([CDC Form 50.34](#)) and [Viral Special Pathogens Branch \[PDF - 2 pages\]](#) specimen submission forms.

- On the **outside** of the box, specify how the specimen should be stored: **refrigerated** or **frozen**.

4-Case Definitions

4.1-Person Under Investigation (PUI)

A person who has both consistent symptoms and risk factors as follows:

- Clinical criteria, which includes fever of greater than 38.6°C or 101.5°F, and additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; AND
- Epidemiologic risk factors within the past 21 days before the onset of symptoms, such as contact with blood or other body fluids or human remains 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 or non-human primates from disease-endemic areas.

4.2-Probable Case

A PUI whose epidemiologic risk factors include high or low risk exposure(s) (see below)

4.3-Confirmed Case

A case with laboratory-confirmed diagnostic evidence of Ebola virus infection

5-Treatment

Treatment would be handled by the attending physician in consultation with CDC specialists.

Standard treatment for Ebola HF is still limited to supportive therapy. This consists of:

- balancing the patient's fluids and electrolytes
- maintaining their oxygen status and blood pressure
- treating them for any complicating infections

Timely treatment of Ebola HF is important, but challenging since the disease is difficult to diagnose clinically in the early stages of infection. Because early symptoms such as headache and fever are nonspecific to Ebola viruses, cases of Ebola HF may be initially misdiagnosed.

However, if a person has the early symptoms of Ebola HF and there is reason to believe that Ebola HF should be considered, the patient should be isolated and public health professionals notified. Supportive therapy can continue with proper protective clothing until samples from the patient are tested to confirm infection.

6-Preventing EBV from Spreading Beyond the Epidemic Area

6.1-Screening at departures

The CDC is assisting with active screening and education efforts on the ground in West Africa to prevent sick travelers from getting on planes. In addition, airports in Liberia, Sierra Leone and Guinea are screening all outbound passengers for Ebola symptoms, including fever, and passengers are required to respond to a healthcare questionnaire.

Individuals that have reached the stage of open bleeding are the most likely source of infection, but at that stage they are so sick that they may not be able to travel.

6.2.Cases among travelers

On the remote possibility that an ill passenger enters the U.S., the CDC has protocols in place to protect against further spread of disease. These include:

- Notification to the CDC of ill passengers on a plane before arrival, investigation of ill travelers, and, if necessary, isolation.
- Guidance to airlines for managing ill passengers and crew and for disinfecting aircraft.
- Health Alert Notice from the CDC reminding U.S. healthcare workers of the importance of taking steps to prevent the spread of this virus, how to test and isolate suspected patients and how they can protect themselves from infection.

6.3-Protection against dissemination from patients coming in the U.S. for treatment

The CDC has very well-established protocols in place to ensure the safe transport and care of patients with infectious diseases back to the United States. These procedures cover the entire process -- from patients leaving their bedside in a foreign country to their transport to an airport and boarding a non-commercial airplane equipped with a special transport isolation unit, to their arrival at a medical facility in the United States that is appropriately equipped and staffed to handle such cases. The CDC's role is to ensure that travel and hospitalization is done to minimize risk of spread of infection and to ensure that the American public is protected. Patients were evacuated in similar ways during SARS.

6.4-Travel recommendations for U.S. travelers to the outbreak areas

CDC elevated their warning to U.S. citizens encouraging them to defer unnecessary travel to Guinea, Liberia, and Sierra Leone over concerns that travelers may not have access to health care facilities and personnel should they need them in country.

Those of you that must travel to an area affected by the Ebola outbreak,
should do the following:

- Practice careful hygiene. Avoid contact with blood and body fluids.
- Do not handle items that may have come in contact with an infected person's blood or body fluids.
- Avoid funeral or burial rituals that require handling the body of someone who has died from Ebola.
- Avoid contact with animals or raw meat.
- Avoid hospitals where Ebola patients are being treated. The U.S. Embassy or consulate is often able to provide advice on facilities.
- Seek medical care immediately if developing fever, headache, muscle pain, diarrhea, vomiting, stomach pain, or unexplained bruising or bleeding.
- Limit contact with other people when you getting medical care. Do not travel anywhere else.

After return, pay attention to your/their health.

- Monitor health for 21 days if you were in an area with an Ebola outbreak, especially if there was contact with blood or body fluids, items that have come in contact with blood or body fluids, animals or raw meat, or hospitals where Ebola patients are being treated or participated in burial rituals.
- Seek medical care immediately if developing fever, headache, muscle pain, diarrhea, vomiting, stomach pain, or unexplained bruising or bleeding.
 - Tell their clinician about recent travel and symptoms before going to the office or emergency room. Advance notice will guide their clinician care and protect other people who may be in the office.

6.5-Guidance on Air Medical Transport for Patients with Ebola Virus Disease

The CDC guidance is intended to assist air medical transport (AMT) service providers in using specialized and/or specially equipped aircraft to transport patients with Ebola virus disease (EVD) while maximizing the

safety of patients and transport personnel. **This guidance does not apply to commercial passenger aircraft.** The recommendations are based on standard infection prevention and control practices, AMT standards, and epidemiologic information from investigations of Ebola virus transmission.

<http://www.cdc.gov/vhf/ebola/hcp/guidance-air-medical-transport-patients.html>

7-Preventing the Spread of Ebola Outside the Epidemic Area

7.1-Patient Evaluation Recommendations

Health care professionals in Louisiana should immediately report by phone to OPH Infectious Disease Epidemiology Section (800-256-2748) any person being evaluated for EVD if the medical evaluation suggests that diagnostic testing may be indicated. If there is a high index of suspicion, the OPH Infectious Disease Epidemiology Section will immediately report any probable cases or persons under investigation (PUI) to CDC’s Emergency Operations Center at 770-488-7100.

Healthcare providers should be alert for and evaluate suspected patients for Ebola virus infection who have both consistent symptoms and risk factors as follows:

- Clinical criteria, which includes fever of greater than 38.6°C or 101.5°F, and additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; AND
- 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:

High risk exposure	<ul style="list-style-type: none"> • <u>Percutaneous or mucous membrane exposure</u> or direct skin contact with body fluids of a person with a confirmed or suspected case of EVD without appropriate personal protective equipment (PPE), • <u>Laboratory processing of body fluids</u> of suspected or confirmed EVD cases <u>without appropriate PPE</u> or standard biosafety precautions, or • <u>Participation in funeral rites or other direct exposure to human remains</u> in the geographic area where the outbreak is occurring without appropriate PPE. 		
High risk exposure	Fever within 21 days of exposure		→ Testing
High risk exposure	NO fever within 21 days of exposure	Other compatible symptom /blood work(*)	→ Testing
High risk exposure	NO fever within 21 days of exposure	NO other compatible symptom /blood work(*)	→ NO Testing, Monitor daily 21 days
Low risk exposure	<ul style="list-style-type: none"> • Spent time in a healthcare facility where EVD patients are being treated (encompassing HCW 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 • Direct unprotected <u>contact with bats or primates</u> from EVD-affected countries 		

	would also be considered to have a low-risk exposure. 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.		
Low risk exposure	Fever within 21 days of exposure	Other compatible symptom /blood work(*)	→ Testing
Low risk exposure	NO fever within 21 days of exposure	NO other compatible symptom /blood work(*)	→ NO Testing, Monitor daily 21 days
Low risk exposure	If fever or other compatible symptom /blood work(*) develop during the 21 day observation		→ Testing

(*) thrombocytopenia <150,000 cells/μL and/or elevated transaminases)

If testing is indicated,

- The OPH Infectious Disease Epidemiology Section should be immediately notified.
- 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.
- Call the CDC (770-488-7100) for consultation and submission information. Specimens received at the CDC without prior consultation will not be tested. Testing may be delayed if tracking information is not provided.
- Check <http://www.cdc.gov/ncezid/dhcpp/vspb/specimens.html> for detailed instructions and a link to the specimen submission form for CDC laboratory testing.

The CDC recommends that healthcare workers contact the state Public Health Laboratory to determine the proper category for shipment based on clinical history and risk assessment.

7.2-Contact investigation

Investigation of any contacts in Louisiana would be handled by epidemiologists from the Infectious Disease Epidemiology Section. The Surveillance and Epidemiological Investigation Plan (Version 2.0 July 2012) from the Infectious Disease Epidemiology Section describe in detail the steps in an outbreak investigation.

Close contact definition

Close contact is defined as

- Being within approximately 3 feet (1 meter) of an EVD patient or within the patient’s room or care area for a prolonged period of time (e.g., health care personnel, household members) while not wearing recommended personal protective equipment (i.e., standard, droplet, and contact precautions; see Infection Prevention and Control Recommendations); or
- Having direct brief contact (e.g., shaking hands) with an EVD case while not wearing recommended personal protective equipment.
- Brief interactions, such as walking by a person or moving through a hospital, do not constitute close contact.

Monitoring close contacts lasts 21 days

Close contacts will be evaluated according to patient evaluation recommendation (section 7.1)

Conditional release

Conditional release means that people are monitored by a public health authority for 21 days after the last known potential Ebola virus exposure to ensure that immediate actions are taken if they develop

symptoms consistent with EVD during this period. People conditionally released should self-monitor for fever twice daily and notify the public health authority if they develop fever or other symptoms.

Controlled movement requires people to notify the public health authority about their intended travel for 21 days after their last known potential Ebola virus exposure. These individuals should not travel by commercial conveyances (e.g. airplane, ship, long-distance bus, or train). Local use of public transportation (e.g. taxi, bus) by asymptomatic individuals should be discussed with the public health authority. If travel is approved, the exposed person must have timely access to appropriate medical care if symptoms develop during travel. Approved long-distance travel should be by chartered flight or private vehicle; if local public transportation is used, the individual must be able to exit quickly.

Quarantine

Quarantine is used to separate and restrict the movement of persons exposed to a communicable disease who don't have symptoms of the disease for the purpose of monitoring.

Self-monitoring

Self-monitoring means that people check their own temperature twice daily and monitor themselves for other symptoms.

7.3-Risk to Health Care Workers outside the endemic area

<http://www.cdc.gov/vhf/Ebola/hcp/infection-prevention-and-control-recommendations.html>

The most significant risk is for health care workers. **Standard, contact, and droplet precautions are recommended for management of hospitalized patients with known or suspected Ebola hemorrhagic fever (Ebola HF), also referred to as Ebola Viral Disease (EVD)** (See Table below).

Note that this guidance outlines only those measures that are specific for Ebola HF; additional infection control measures might be warranted if an Ebola HF patient has other conditions or illnesses for which other measures are indicated (e.g., tuberculosis, multi-drug resistant organisms, etc.).

Though these recommendations focus on the hospital setting, the recommendations for personal protective equipment (PPE) and environmental infection control measures are applicable to any healthcare setting. In this guidance healthcare personnel (HCP) refers all persons, paid and unpaid, working in healthcare settings who have the potential for exposure to patients and/or to infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, or aerosols generated during certain medical procedures. HCP include, but are not limited to, physicians, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual personnel, home healthcare personnel, and persons not directly involved in patient care (e.g., clerical, dietary, house-keeping, laundry, security, maintenance, billing, chaplains, and volunteers), but potentially exposed to infectious agents that can be transmitted to and from HCP and patients. **This guidance is not intended to apply to persons outside of healthcare settings.**

7.4-Infection control precautions to be put into place in a U.S. hospital

If a patient in a U.S. hospital is suspected or known to have Ebola virus disease, healthcare teams should follow standard, contact, and droplet precautions, including the following recommendations:

Isolate the patient: Patients should be isolated in a single patient room (containing a private bathroom) with the door closed.

Wear appropriate PPE: Healthcare providers entering the patients room should wear: gloves, gown (fluid resistant or impermeable), eye protection (goggles or face shield), and a facemask. Additional protective equipment 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.

Restrict visitors: Avoid entry of visitors into the patient's room. Exceptions may be considered on a case by case basis for those who are essential for the patient's wellbeing. A logbook should be kept to document all persons entering the patient's room. See the CDC's [infection control guidance](#) on procedures for monitoring, managing, and training of visitors.

Avoid aerosol-generating procedures: Avoid aerosol-generating procedures. If performing these procedures, PPE should include respiratory protection (N95 or higher filtering facepiece respirator), and the procedure should be performed in an airborne infection isolation room.

Implement environmental infection control measures: Diligent environmental cleaning and disinfection and safe handling of potentially contaminated materials is of paramount importance, as blood, sweat, vomit, feces, urine and other body secretions represent potentially infectious materials should be done following hospital protocols.

7.5-Full body suits are not necessary in U.S. hospitals, but are recommended in Africa

There are important differences between providing care or performing public health tasks in Africa versus in a U.S. hospital.

In field medical settings, additional PPE may be necessary to protect healthcare workers. In some places in Africa, workers may not have the ability to prepare for potential exposures. For example, in some places, care may be provided in clinics with limited resources (e.g., no running water, no climate control, no floors, inadequate medical supplies), and workers could be in those areas for several hours with a number of Ebola infected patients. Additionally, certain job responsibilities and tasks, such as attending to dead bodies, may also require different PPE than what is used when providing care for infected patients in a hospital.

8-Components of Standard, Contact, and Droplet Precautions for EVD Prevention in HCF

8.1-Patient Placement
Single patient room (containing a private bathroom) with the door closed Facilities should maintain a log of all persons entering the patient's room
Consider posting personnel at the patient's door to ensure appropriate and consistent use of PPE by all persons entering the patient room
8.2-Personal Protective Equipment (PPE)
At entry: All persons entering the patient room should wear at least: Gloves, Gown (fluid resistant or impermeable), Eye protection (goggles or face shield), 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, Leg coverings
Upon exit from the patient room or care area, PPE should be carefully removed without contaminating one's eyes, mucous membranes, or clothing with potentially infectious materials, and either discarded, or for re-useable PPE, cleaned and disinfected according to the manufacturer's reprocessing instructions and hospital policies. Instructions for donning and removing PPE have been published Hand hygiene should be performed immediately after removal of PPE.
Environmental services staff should wear recommended personal protective equipment 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 as regulated medical waste.
8.4-Patient Care Equipment

Dedicated medical equipment (preferably disposable, when possible) should be used for the provision of patient care; All non-dedicated, non-disposable medical equipment used for patient care should be cleaned and disinfected according to manufacturer's instructions and hospital policies

8.5-Patient Care Considerations

Limit the use of needles and other sharps as much as possible
Phlebotomy, procedures, and laboratory testing should be limited to the minimum necessary for essential diagnostic evaluation and medical care
All needles and sharps should be handled with extreme care and disposed in puncture-proof, sealed containers

8.6-Aerosol Generating Procedures (AGPs)

Avoid AGPs for Ebola HF patients.
If performing AGPs, use a combination of measures to reduce exposures from aerosol-generating procedures when performed on Ebola HF patients.
Visitors should not be present during aerosol-generating procedures.
Limiting the number of HCP present during the procedure to only those essential for patient-care and support.
Conduct the procedures in a private room and ideally in an Airborne Infection Isolation Room (AIIR) when feasible. Room doors should be kept closed during the procedure except when entering or leaving the room, and entry and exit should be minimized during and shortly after the procedure.
HCP should wear gloves, a gown, disposable shoe covers, and either a face shield that fully covers the front and sides of the face or goggles, and respiratory protection that is at least as protective as a NIOSH certified fit-tested N95 filtering facepiece respirator or higher (e.g., powered air purifying respirator or elastomeric respirator) during aerosol generating procedures.
Conduct environmental surface cleaning following procedures (see section below on environmental infection control).
If re-usable equipment or PPE (e.g. Powered air purifying respirator, elastomeric respirator, etc.) are used, they should be cleaned and disinfected according to manufacturer instructions and hospital policies.
Collection and handling of soiled re-usable respirators must be done by trained individuals using PPE as described above for routine patient care

Although there are limited data available to definitively define a list of AGPs, procedures that are usually included are Bilevel Positive Airway Pressure (BiPAP), bronchoscopy, sputum induction, intubation and extubation, and open suctioning of airways. Because of the potential risk to individuals reprocessing reusable respirators, disposable filtering face piece respirators are preferred.

8.7-Hand Hygiene

HCP should perform hand hygiene frequently, including before and after all patient contact, contact with potentially infectious material, and before putting on and upon removal of PPE, including gloves.
Healthcare facilities should ensure that supplies for performing hand hygiene are available.

Hand hygiene in healthcare settings can be performed by washing with soap and water or using alcohol-based hand rubs. If hands are visibly soiled, use soap and water, not alcohol-based hand rubs.

8.9-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
HCP performing environmental cleaning and disinfection should wear recommended PPE (described above) and consider use of additional barriers (shoe and leg coverings, etc.) 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 and equipment, Textiles and laundry, Food utensils and dishware

Non-Porous surfaces: 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.

Use EPA-registered hospital disinfectants to disinfect hard non-porous surfaces. Follow label instructions for use
Search EPA website of registered products

<p>Porous surfaces: 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 as a regulated medical waste.</p>
<p>Spills of blood or other body substances management: 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 (29 CFR 1910.1030).⁴ CDC guidelines recommend removal of bulk spill matter, cleaning the site, and then disinfecting the site.³ 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.</p>
<p>Disposable materials: These materials should be placed in leak-proof containment and discarded as regulated medical waste. To minimize contamination of the exterior of the waste bag, place this bag in a rigid waste receptacle designed for this use. Incineration as a waste treatment process is effective in eliminating viral infectivity and provides waste minimization. However, check with your state's regulated medical waste program for more guidance and coordinate your waste management activities for the patient's isolation area with your medical waste contractor</p>
<p>Stools and urine in toilets: Sanitary sewers may be used for the safe disposal of patient waste. Additionally, sewage handling processes (e.g., anaerobic digestion, composting, disinfection) in the United States are designed to inactivate infectious agents.</p>
<p>Waste disposal in medical infectious waste: 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.</p>
<p>8.10-Safe Injection practices</p>
<p>Facilities should follow safe injection practices as specified under Standard Precautions.</p>
<p>Any injection equipment or parenteral medication container that enters the patient treatment area should be dedicated to that patient and disposed of at the point of use.</p>
<p>8.11-Duration of Infection Control Precautions</p>
<p>Duration of precautions should be determined on a case-by-case basis, in conjunction with local, state, and federal health authorities.</p>
<p>Factors that should be considered include, but are not limited to: presence of symptoms related to Ebola HF, date symptoms resolved, other conditions that would require specific precautions (e.g., tuberculosis, <i>Clostridium difficile</i>) and available laboratory information</p>
<p>8.12-Monitoring and Management of Potentially Exposed Personnel</p>
<p>Facilities should develop policies for monitoring and management of potentially exposed HCP Facilities should develop sick leave policies for HCP that are non-punitive, flexible and consistent with public health guidance Ensure that all HCP, including staff who are not directly employed by the healthcare facility but provide essential daily services, are aware of the sick leave policies. Persons with percutaneous or mucocutaneous exposures to blood, body fluids, secretions, or excretions from a patient with suspected Ebola HF should Stop working and immediately wash the affected skin surfaces with soap and water. Mucous membranes (e.g., conjunctiva) should be irrigated with copious amounts of water or eyewash solution Immediately contact occupational health/supervisor for assessment and access to postexposure management services for all appropriate pathogens (e.g., Human Immunodeficiency Virus, Hepatitis C, etc.) HCP 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 Ebola HF should Not report to work or should immediately stop working Notify their supervisor Seek prompt medical evaluation and testing Notify local and state health departments Comply with work exclusion until they are deemed no longer infectious to others For asymptomatic HCP who had 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 Ebola HF Should receive medical evaluation and follow-up care including fever monitoring twice daily for 21 days after the last known exposure. Hospitals should consider policies ensuring twice daily contact with exposed personnel to discuss potential symptoms and</p>

document fever checks May continue to work while receiving twice daily fever checks, based upon hospital policy and discussion with local, state, and federal public health authorities.
8.13-Monitoring, Management, and Training of Visitors
Avoid entry of visitors into the patient's room Exceptions may be considered on a case by case basis for those who are essential for the patient's wellbeing. Establish procedures for monitoring managing and training visitors. Visits should be scheduled and controlled to allow for: Screening for Ebola HF (e.g., fever and other symptoms) before entering or upon arrival to the hospital Evaluating risk to the health of the visitor and ability to comply with precautions providing instruction, before entry into the patient care area on hand hygiene, limiting surfaces touched, and use of PPE according to the current facility policy while in the patient's room Visitor movement within the facility should be restricted to the patient care area and an immediately adjacent waiting area.
Visitors who have been in contact with the Ebola HF patient before and during hospitalization are a possible source of EHF for other patients, visitors, and staff.

9-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 DHH/OPH in accord with the CDC.

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°C or 101.5° F, 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, rodents, or non-human primates from disease-endemic areas.

If PSAP call takers have information alerting them to a person with possible Ebola, they should

- 1-Make sure any first responders and EMS personnel are made confidentially aware of the potential for Ebola before the responders arrive on scene.
- 2-Alert the OPH/IDEpi Section at 504-246-2748
- 3-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>

10-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 DHH/OPH in accordance with the CDC, will consider the threat to be elevated (based on information provided by IDEpi and the CDC), the EMS personnel may be directed to modify their practices as described below.

10.1-Patient assessment

Address scene safety when PSAP call takers advise that the patient is suspected of having Ebola,

- EMS personnel should put on 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.

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°C or 101.5°F, 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, rodents, or non-human 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.

10.2-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 the CDC's infection control recommendations (Section 8 of this manual), and can isolate a patient in a private room is capable of safely managing a patient with Ebola.

10.3-Infection Control for EMS Staff

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 Personal protective equipment (PPE)
 - 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> and <http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf> [PDF - 2 pages].
 - Hand hygiene should be performed immediately after removal of 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).
 - In addition to recommended PPE, respiratory protection that is at least as protective as a NIOSH-certified fit-tested N95 filtering face-piece 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.
- In case direct contact with 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.

10.4-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.

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

- 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. Alternatively, a 1:10 dilution of household bleach (final working concentration of 500 parts per million or 0.5% hypochlorite solution) that is prepared fresh daily (i.e., within 12 hours) can be used to treat the spill before covering with absorbent material and wiping up. After the bulk waste is wiped up, the surface should be disinfected as described 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.

10.5-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 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.

11-Safe Handling of Human Remains of Ebola Patients in U. S. Hospitals and Mortuaries

11.1-Transmission

In patients who die of Ebola virus infection, virus can be detected throughout the body. Ebola virus can be transmitted in postmortem care settings by laceration and puncture with contaminated instruments used during postmortem care, through direct handling of human remains without appropriate personal protective equipment, and through splashes of blood or other body fluids (e.g. urine, saliva, feces) to unprotected mucosa (e.g., eyes, nose, or mouth) which occur during postmortem care.

11.2-Minimum handling

Only personnel trained in handling infected human remains, and wearing PPE, should touch, or move, any Ebola-infected remains. Handling of human remains should be kept to a minimum. Autopsies on patients who die of Ebola should be **avoided**. If an autopsy is necessary, the state health department and CDC should be consulted regarding additional precautions.

11.3-Personal protective equipment for postmortem care personnel

- **Personal protective equipment (PPE):** Prior to contact with body, postmortem care personnel must wear PPE consisting of: surgical scrub suit, surgical cap, impervious gown with full sleeve coverage, eye protection (e.g., face shield, goggles), facemask, shoe covers, and double surgical gloves. Additional PPE (leg coverings, apron) might be required in certain situations (e.g., copious amounts of blood, vomit, feces, or other body fluids that can contaminate the environment).
- **Putting on, wearing, removing, and disposing of protective equipment:** PPE should be in place **BEFORE** contact with the body, worn during the process of collection and placement in body bags, and should be removed immediately after and discarded as regulated medical waste. Use caution when removing PPE as to avoid contaminating the wearer. Hand hygiene (washing your hands thoroughly with soap and water or an alcohol based hand rub) should be performed immediately following the removal of PPE. If hands are visibly soiled, use soap and water.

11.4-Postmortem preparation

- **Preparation of the body:** At the site of death, the body should be wrapped in a plastic shroud. Wrapping of the body should be done in a way that prevents contamination of the outside of the shroud. Change your gown or gloves if they become heavily contaminated with blood or body fluids. Leave any intravenous lines or endotracheal tubes that may be present in place. Avoid washing or cleaning the body. After wrapping, the body should be immediately placed in a leak-proof plastic bag not less than 150 µm thick and zippered closed. The bagged body should then be placed in another leak-proof plastic bag not less than 150 µm thick and zippered closed before being transported to the morgue.
- **Surface decontamination:** Prior to transport to the morgue, perform surface decontamination of the corpse-containing body bags by removing visible soil on outer bag surfaces with EPA-registered disinfectants which can kill a wide range of viruses. Follow the product's label instructions. After the the visible soil has been removed, reapply the disinfectant to the entire bag

surface and allow to air dry. Following the removal of the body, the patient room should be cleaned and disinfected. Reusable equipment should be cleaned and disinfected according to standard procedures. For more information on environmental infection control, please refer to “[Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus](http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html)” (<http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html>).

- **Individuals driving or riding in a vehicle carrying human remains:** PPE is not required for individuals driving or riding in a vehicle carrying human remains, provided that drivers or riders will not be handling the remains of a suspected or confirmed case of Ebola, the remains are safely contained and the body bag is disinfected as described above.

11.5-Mortuary Care

- Do not perform embalming. The risks of occupational exposure to Ebola virus while embalming outweighs its advantages; therefore, bodies infected with Ebola virus should not be embalmed.
- Do not open the body bags.
- Do not remove remains from the body bags. Bagged bodies should be placed directly into a hermetically sealed casket.
- Mortuary care personnel should wear PPE listed above (surgical scrub suit, surgical cap, impervious gown with full sleeve coverage, eye protection (e.g., face shield, goggles), facemask, shoe covers, and double surgical gloves) when handling the bagged remains.
- In the event of leakage of fluids from the body bag, thoroughly clean and decontaminate areas of the environment with EPA-registered disinfectants which can kill a broad range of viruses in accordance with label instructions. Reusable equipment should be cleaned and disinfected according to standard procedures.

11.6-Disposition of Remains

- Remains should be cremated or buried promptly in a hermetically sealed casket.
- Once the bagged body is placed in the sealed casket, no additional cleaning is needed unless leakage has occurred.
- No PPE is needed when handling the cremated remains or the hermetically sealed closed casket.

11.7-Transportation of human remains

- Transportation of remains that contain Ebola virus should be minimized to the extent possible.
- All transportation, including local transport, for example, for mortuary care or burial, should be coordinated with relevant local and state authorities in advance.
- Interstate transport should be coordinated with the CDC by calling the Emergency Operations Center at 770-488-7100. The mode of transportation (i.e., airline or ground transport), must be considered carefully, taking into account distance and the most expeditious route. If shipping by air is needed, the remains must be labeled as dangerous goods in accordance with Department of Transportation regulations (49 Code of Federal Regulations 173.196).
- Transportation of remains that contain Ebola virus outside the United States would need to comply with the regulations of the country of destination, and should be coordinated in advance with relevant authorities

12- Students /Faculty Arriving to U.S. Campuses from EBV Outbreak Countries

12.1-Student health centers

The CDC recommendations for student health centers are the same as those for other U.S. health care workers and settings.

- Although not a full list of precautions, student health center clinicians should be sure to follow these steps when caring for someone sick from Ebola
 - Separate patient in a private room with its own bathroom.
 - Use proper infection prevention and control measures; standard, contact, and droplet precautions are recommended if Ebola is suspected.
 - Wear the right PPE including masks, gloves, gowns, facemask and eye protection, when entering the patient care area. Before leaving the patient area, carefully remove PPE and make sure not to contaminate your skin and clothing. Dispose of PPE as biohazard waste.
 - After removing PPE, wash your hands using soap and water (preferred) or an alcohol-based hand sanitizer containing at least 60% alcohol. Use soap and water when hands are visibly dirty.
 - Notify your local or state health department immediately if Ebola is suspected. The health department can provide additional guidance regarding medical evaluation or testing, if indicated.
 - Follow protocols for cleaning and disinfecting reusable medical equipment and proper disposal of needles and other disposable equipment.

12.2-Isolate or quarantine students and faculty coming from countries where the Ebola outbreaks are occurring?

- The CDC is not recommending colleges and universities isolate or quarantine students, faculty, or staff based on travel history alone.
- Colleges and universities should identify students, faculty and staff who have been in countries where Ebola outbreaks are occurring within the past 21 days, and should conduct a risk assessment with each identified person to determine his or her risk (Call the Infectious Disease Epidemiology Section (IDEpi) at 800-256-2748, 24 hours a day for advice).
- All students, faculty and staff who have been in these countries within the past 21 days will be given instructions for health monitoring by IDEpi staff.
- If a student, faculty, or staff member has had a high- or low-risk exposure, state or local public health authorities should be notified, and school officials should consult with public health authorities for guidance about how that person should be monitored. Anyone with a potential exposure should receive a thorough education about immediately reporting symptoms and staying away from other people if symptoms develop.
- In the event that a person who has had a high- or low-risk exposure develops symptoms consistent with Ebola, the person should be medically evaluated while following recommended infection control precautions.

12.3-Keeping people on campus safe from Ebola?

Ensure that student health center staff is aware of exposure risks, signs and symptoms of Ebola and are prepared to follow recommendations.

- Provide Ebola education to all people who have recently arrived from countries where outbreaks are occurring covering the following topics:
 - Self-monitoring for symptoms
 - Reporting procedures for those who develop symptoms
 - Importance of immediately reporting symptoms and staying separated from other people as soon as symptoms develop
- Consider posting information in dorms and other campus buildings with recommendations for people who have recently arrived from countries where Ebola outbreaks are occurring.
 - Infographic: Recently in West Africa?
 - Additional Ebola Outbreak Infographics

12.4-Health information for arriving persons from EVD outbreak countries

Pay attention to your health after you return:

- Monitor your health for 21 days.
 - Take your temperature every morning and evening.
 - Watch for other Ebola symptoms: severe headache, muscle pain, vomiting, diarrhea, stomach pain, or unexplained bleeding or bruising.
 - If your temperature is above 101.5°F (38.6°C) or you have any other Ebola signs or symptoms, **seek medical care immediately**.
 - Call and tell the doctor about your recent travel and your symptoms before you go to the doctor's office or hospital. Advance notice will help the doctor care for you and protect other people who may be in the doctor's office or hospital.
 - Limit your contact with other people when you travel to the doctor; avoid public transportation.
 - Do not travel anywhere except to the doctor's office or hospital.
 - Limit your contact with other people if you are sick. Do not go to work, classes, or other student activities until you have been medically evaluated.
- During the time that you are monitoring your health, if you have no symptoms, you can continue your normal activities, including work and school. If you get symptoms of Ebola, it is important to stay separated from other people and to call your doctor right away.

Geographical distribution 09/01/2014

For an updated map go to:

<http://www.cdc.gov/vhf/ebola/resources/distribution-map-guinea-outbreak.html>



Ebola Outbreaks and Individual Cases

Date	Country	Ebola subtype	Reported number of human cases	Reported number of deaths among cases	Percent mortality	Situation
1976	CD	E	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 outbreak was the first recognition of the disease. ¹
1976	SD	S	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. ²
1976	GB	S	1	0		Laboratory infection by accidental stick of contaminated needle. ³
1977	CD	E	1	1	100	Noted retrospectively in the village of Tandala. ⁴
1979	SD	S	34	22	65	Occurred in Nzara, Maridi. Recurrent outbreak at the same site as the 1976 Sudan epidemic. ⁵
1989	US	R	0	0		Ebola-Reston virus was introduced into quarantine facilities in Virginia and Pennsylvania by monkeys imported from the Philippines. ⁶
1990	US	R	4 (asymptomatic)	0		Ebola-Reston virus 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. ⁷
1989-1990	PH	R	3 (asymptomatic)	0		High mortality among cynomolgus macaques in a primate facility responsible for exporting animals in the USA. ⁸ Three workers in the animal facility developed antibodies but did not get sick. ⁹
1992	IT	R	0	0		Ebola-Reston virus 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. ¹⁰
1994	GA	E	52	31	60	Occured 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. ¹¹
1994	CI	T	1	0		Scientist became ill after conducting an autopsy on a wild chimpanzee in the Tai Forest. The patient was treated in Switzerland. ¹²
1995	CD	E	315	250	81	Occured in Kikwit and surrounding area. Traced to index case-patient who worked in forest adjoining the city. Epidemic spread through families and hospitals. ¹³
1996/01-04	GA	E	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. ¹¹
1996-1997/07-01	GA	E	60	45	74	Occurred in Bououé 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. ¹¹

Date	Country	Ebola subtype	Reported number of human cases	Reported number of deaths among cases	Percent mortality	Situation
1996	ZA	E	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. He was hospitalized, and a nurse who took care of him became infected and died. ¹⁴
1996	US	R	0	0		Ebola-Reston virus was introduced into a quarantine facility in Texas by monkeys imported from the Philippines. No human infections were identified. ¹⁵
1996	PH	R	0	0		Ebola-Reston virus was identified in a monkey export facility in the Philippines. No human infections were identified. ¹⁶
1996	RU	E	1	1	100	Laboratory contamination ¹⁷
2000-2001	UG	S	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 fever case-patients, having contact with case-patients in one's family, and providing medical care to Ebola case-patients without using adequate personal protective measures. ¹⁸
2001-2002/10-01	GA	E	65	53	82	Outbreak occurred over the border of Gabon and the Republic of the Congo. ¹⁹
2001-2002/10-03	CG	E	57	43	75	Outbreak occurred over the border of Gabon and the Republic of the Congo. This was the first time that Ebola hemorrhagic fever was reported in the Republic of the Congo. ¹⁹
2002-2003/10-04	CG	E	143	128	89	Outbreak occurred in the districts of Mbomo and Kéllé in Cuvette Ouest Département. ²⁰
2003/11-12	CG	E	35	29	83	Outbreak occurred in Mbomo and Mbandza villages located in Mbomo district, Cuvette Ouest Département. ²¹
2004	SD	S	17	7	41	Outbreak occurred in Yambio county of southern Sudan. This outbreak was concurrent with an outbreak of measles in the same area, and several suspected EHF cases were later reclassified as measles cases. ²²
2004	RU	E	1	1	100	Laboratory contamination. ²³
2007	CD	E	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. ^{24 25}
2007-2008/12-01	UG	B	149	37	25	Outbreak occurred in Bundibugyo District in western Uganda. First reported occurrence of a new strain. ²⁶
2008 11	PH	R	6 (asymptomatic)	0		First known occurrence of Ebola-Reston in pigs. Strain closely similar to earlier strains. Six workers from the pig farm and slaughterhouse developed antibodies but did not become sick. ^{27 28}
2008 2009	CD	E	32	15	47	Outbreak occurred in the Mweka and luebo health zones of the Province of Kasai Occidental. ²⁹

Date	Country	Ebola subtype	Reported number of human cases	Reported number of deaths among cases	Percent mortality	Situation
/12-02						
2011/05	UG	S	1	1	100	The Ugandan Ministry of Health informed the public that a patient with suspected Ebola Hemorrhagic fever died on May 6, 2011 in the Luwero district, Uganda. The quick diagnosis from a blood sample of Ebola virus was provided by the new CDC Viral Hemorrhagic Fever laboratory installed at the Uganda Viral Research Institute (UVRI). ³⁰
2012/06-10	UG	S	11*	4*	36	Outbreak occurred in the Kibaale District of Uganda. Laboratory tests of blood samples were conducted by the UVRI and the U.S. Centers for Disease Control and Prevention (CDC). ³¹
2012/06-11	CD	B	36*	13*	36	Outbreak occurred in DRC's Province Orientale. Laboratory support was provided through the CDC and the Public Health Agency of Canada (PHAC)'s field laboratory in Isiro, and through the CDC/UVRI lab in Uganda. The outbreak in DRC has no epidemiologic link to the near contemporaneous Ebola outbreak in the Kibaale district of Uganda. ³¹
2013/01	UG	S	6*	3*	50	Outbreak occurred in the Luwero District. The CDC assisted the Ministry of Health in the epidemiologic and diagnostic aspects of the outbreak. Testing of samples by CDC's Viral Special Pathogens Branch occurred at UVRI in Entebbe. ³¹
2014/03	GN, LR, NG	E	1176*	660	56	Ongoing outbreak across Guinea, Liberia, Sierra Leone, and Nigeria. Numbers of patients are constantly evolving due to the on-going investigation. ³²

*Numbers reflect laboratory confirmed cases only.

Countries	CD=Zaire or Democratic Republic of Congo, PH=Philippines, GA=Gabon, CI=Ivory Coast, CG=Republic of Congo; GN=Guinea, IT=Italy, LR=Liberia, NG=Nigeria, RU=Russia, ZA=South Africa, SD=South Sudan, UG=Uganda, US=United States
Ebola virus sub type	E=Ebola, B= Bundibugyo, R=Reston, S=Sudan, T=Tai forest

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