Infectious Disease Epidemiology Section
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Louisiana Dept. of Health & Hospitals
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Ebola Hemorrhagic Fever
Ebola Virus Disease (EVD)

12/01/2014

"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. This manual is updated weekly. For the most recent information access the CDC website.

The word Ebola is sometimes used as a synonym for Ebola Virus Disease.

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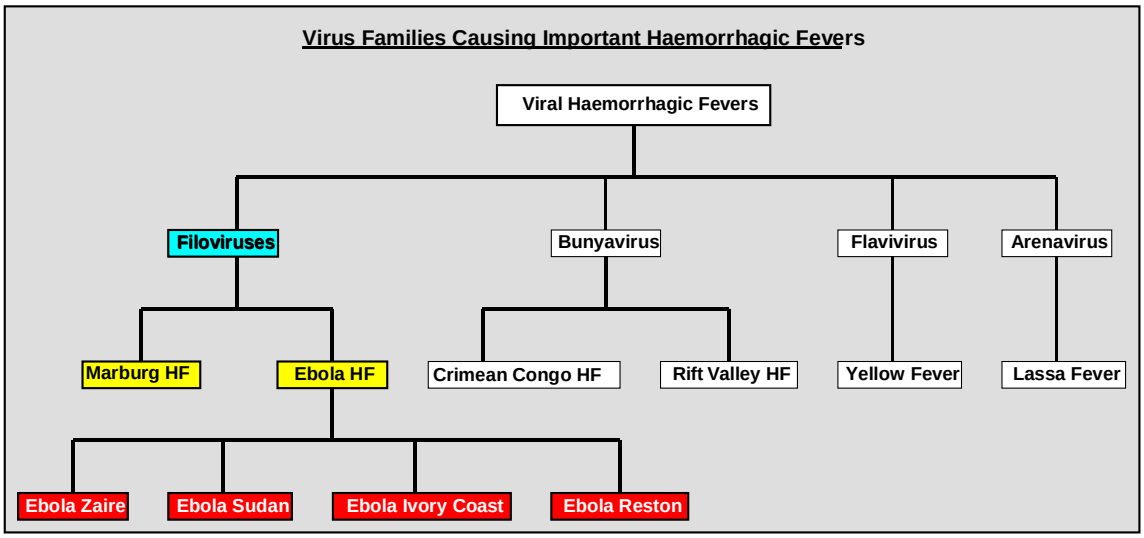
1-Epidemiology

1.1-The virus

Ebola is one of the most virulent viral diseases known, causing death in 50%-90% of all clinically ill cases (mortality rate depends on the strain). Four different strains of Ebola have been identified:

Africa: Ebola-Zaire (EBO-Z) – (Includes Ebola-Gabon)
Ebola-Sudan (EBO-S)
Ebola-Ivory Coast (EBO-CI) (= Ebola-Taï)
Philippines: Ebola-Reston (EBO-R)



Source: Ebola & Marburg Outbreak Control Manual. Médecins Sans Frontières (MSF).

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.

The Ebola virus has a lipo-protein (fatty) envelope that is relatively fragile and vulnerable to chlorine disinfection, heat, and direct sunshine (UV light). Soaps and detergent can also be effective in destroying the virus; they dissolve the fatty envelope, which results in its death.

For simplicity and security, disinfection with chlorine solutions of 0.05% & 0.5% is the primary technique often recommended.

At present, fruit bats seem to be the natural reservoirs. Infected bats can survive, and there is evidence of asymptomatic infection, which suggests that they may play a role, either as the natural reservoir or as an important transition species. Non-human primates have been implicated in outbreaks of Ebola. Monkeys and apes die quickly when infected with Ebola; therefore, it is unlikely that they are the natural reservoir.

1.2-Incubation period is important

Symptoms may appear anywhere from two to 21 days after exposure to the Ebola virus although eight to ten days is most common. An individual having been possibly 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.

1.3-Transmission, source of the virus

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.

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 risk of EVD transmission from direct skin contact with an EVD patient is lower than the risk from exposure to blood or body fluids and may be more likely in severe illness (when the Ebola virus RNA levels are highest). It is not known if **transmission from direct skin contact** is mediated by Ebola virus primarily on the skin, where it has been documented by histopathology and RT-PCR of a skin swab, or by micro-contamination of the skin with blood or other body fluids.

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.

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, semen, urine or stools) may contain small amounts of blood and would be a source for transmission**. (Ebola virus-RNA has been found in semen up to three months after clinical recovery).

During an Ebola outbreak in 1995 in Kikwit, Democratic Republic of the Congo, 28 (16%) of the 173 household contacts of 27 primary Ebola cases developed EVD All 28 secondary cases involved direct physical contact with a known EVD patient; overall, 28 of 95 family members who had direct contact with a primary case became infected, whereas none of 78 family members who did not report direct contact became infected (Dowell SF, Mukunu R, Ksiazek TG, Khan AS, Rollin PE, Peters CJ.

Transmission of Ebola hemorrhagic fever: a study of risk factors in family members, Kikwit, Democratic Republic of the Congo, 1995. Commission de Lutte contre les Epidemies a Kikwit. *The Journal of Infectious Diseases*. Feb 1999;179 Suppl 1:S87-91. Other studies have reported similar findings, in that all, or the large majority of secondary transmissions involved direct physical contact with known EVD patients

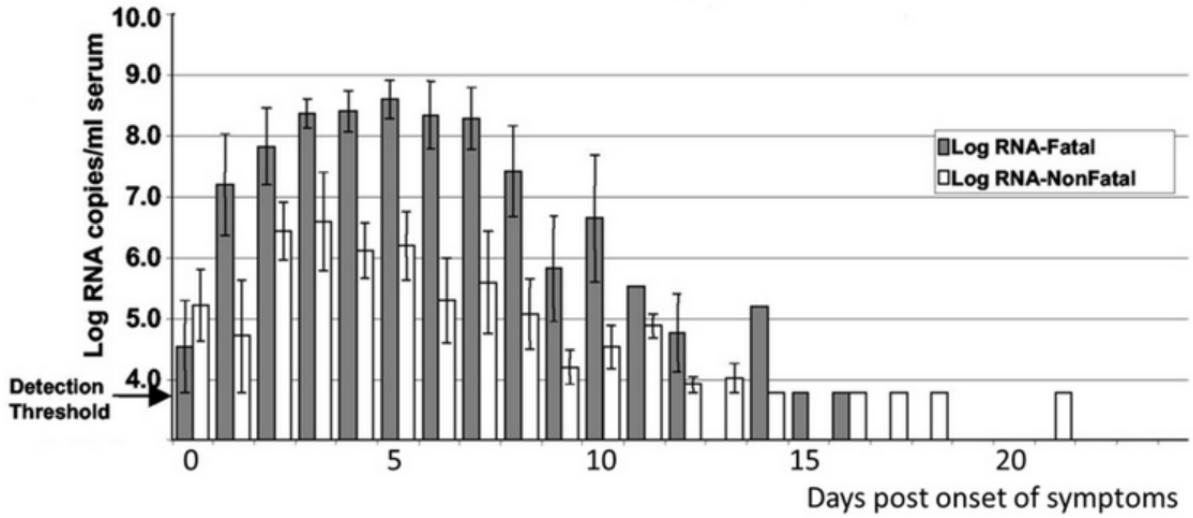
ABC to fight Ebola: Avoid Body Contact

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.

1.4-Viral load

Ebola virus is usually detectable in patients' blood at the time of fever and symptom onset, although Ebola virus RNA levels at the time of fever and symptom onset are typically low (near the detection threshold limits), and in some patients may not be reliably detectable during the first three days of illness.

The virus nucleic acid (RNA) detection limit is about 5,000 viral particles per mL of blood. In a study of 45 patients (27 fatal and 18 survivors), the average viral load the first day after onset was about 100,000 viral particles/mL. **By the first week it increased to 100,000,000 (100 million) /mL of blood** among the fatal cases; only to 1,000,000 (1 million) /mL among the survivors (Towner JS, Rollin PE, Bausch DG, et al. Rapid diagnosis of Ebola hemorrhagic fever by reverse transcription-PCR in an outbreak setting and assessment of patient viral load as a predictor of outcome. *Journal of Virology.* Apr. 2004; 78(8):4330-4341).



In a study that focused on the **convalescent phase of illness**, Ebola virus was detected from vaginal, rectal, conjunctival swabs and seminal fluid of one or more EVD patients by RT-PCR, but not in urine or saliva. In another study involving 28 convalescent EVD patients, all specimens other than semen that were obtained between 12 and 157 days after symptom onset were negative by viral culture and by a viral antigen assay including 85 specimens of tears, 84 of sweat, 79 of feces, 95 of urine, 86 of saliva, and 44 of vaginal secretions. The eight convalescent specimens of semen were also negative by viral culture and by a viral antigen assay, but Ebola virus was detected by RT-PCR in six of these eight semen specimens

Across combined studies (each study did not examine the exact same fluid types at the same time points), Ebola virus RNA has been detected up to 101 days after symptom onset in semen, 33 days from vaginal swabs, 29 days from rectal, 23 days from urine, 22 days from conjunctival swabs, 21 days in blood, 15 days in breast milk, eight days in saliva, and six days on skin

1.5-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.

Indirect exposure to blood and body fluids (via fomites) has also been implicated in EVD transmission, but is not common. In the 2000 - 2001 Ebola outbreak in Gulu, Uganda, one EVD patient had no direct exposure to another known EVD patient; this patient slept with a blanket that had been used by another patient who died of EVD. Another study evaluated 31 environmental specimens from an Ebola isolation ward that were not visibly bloody. By RT-PCR, all specimens were negative suggesting that fomites in a clinical setting (where cleaning and decontamination would be frequent) are unlikely to be capable of EVD transmission.

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.

1.6-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 is not wearing appropriate protective equipment, (e.g. 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/2014-west-africa/distribution-map.html.

1.7-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.

1.8-Fear and perceptions

The popular perception of the disease coupled with fear, rumor, and a lack of information can result in communities losing confidence in the health system and services, and can make outbreak control activities very difficult. If the communities have reached a point where they do not have trust in the health services and the information and messages being disseminated, it can be very difficult to regain their trust. This is why the early implementation of health promotion and social mobilization activities is particularly important, and every opportunity should be taken to provide rational, accurate explanations about the diseases and the risks. Community perceptions should also be taken into account when planning and designing activities in the intervention.

EVD does not pose a significant risk to the U.S. public. However, fear and perception are real problems that must be dealt with.

2-Clinical Presentation and Clinical Course

2.1-Pathogenesis

The virus can replicate in a large variety of human cells. Macrophages and dendritic cells are generally the first cell types to be infected, and the infection affects their functioning, inhibiting the presentation of antigens to lymphocytes, and interfering with the secretion of immune regulating factors. This causes an immune suppression. As the disease progresses parenchymal cells, like hepatocytes and adrenal cortical cells, are infected, and finally epithelial cells and fibroblasts. The infection can affect almost every organ in the body, and cause widespread cell death. Bleeding, when it occurs, is caused by disseminated intravascular coagulation (DIC), probably due to the activation of macrophages and the release of pro-inflammatory cytokines. There may be apoptosis of lymphocytes late in the disease course, causing further immuno-suppression.

The case fatality rates for Ebola infections have generally been reported as being between 50%-90% in an African setting, depending on the strain of virus. Certain strains of Ebola Zaire have been shown to cause more severe infections than other strains. The chances of survival of individual patients are linked

to the effectiveness of their immune response. Mild cases occur due to an effective immune response with little immuno-suppression. Recovery occurs after 10 to14 days of illness and is associated with the appearance of effective antibodies.

Although this variability of survival and of immune response between patients has been used to argue that survival may depend little on medical care, there is evidence that good supportive medical care improves outcome.

It should be noted that in the final stages of the severe illness, the presence of fever may not be a reliable sign, and many patients with severe disease may be apyrexial. Therefore the presence of fever cannot be used alone to guide diagnosis or discharge

2.2-Symptoms

Patients with EVD generally have abrupt onset typically eight to ten 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 five to day seven (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, meningococcemia, and other bacterial infections (e.g., pneumonia).

Initial symptoms	**Followed by**
Sudden onset of high fever	
General weakness	Vomiting (bloody)
Muscle pain	Diarrhea
Headache	Rash
Sore throat	Chest pain
Hiccups	Reduction of kidney and liver functions (results of the severity of the disease and reflects the presence of multi-organ failure
	Internal and external bleeding
	The patient then often goes into shock and eventually dies

Patients can progress from the initial non-specific symptoms after about five 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 six 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 six to day 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

3.1-Tests

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	Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing IgM ELISA **RT-PCR (Reverse transcript Polymerase chain reaction): detection of genetic material (RNA).** Immunohistochemistry: detection of viral antigen (skin snip). Virus isolation (culture)
Later in disease course or after recovery	IgM and IgG antibodies
Retrospectively in deceased patients	Immunohistochemistry testing PCR Virus isolation

Note: Field-based real-time testing is now possible with techniques and portable equipment developed by the Health Canada - National Microbiology Laboratory. With this method test results can be produced in four hours; this is invaluable for the management of suspect cases in an outbreak situation. This test is not used in the United States.

- 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 Centers of Disease Control and Prevention (CDC) Laboratories.
- Guidelines are at:

http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html

3.2-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.

3.3-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.

3.4-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 three days post-onset of symptoms for the virus to reach detectable levels. Virus is generally detectable by real-time RT-PCR from three to ten 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 possibly having an EVD exposure; however, if the onset of symptoms is less than three days, a subsequent specimen will be required to completely rule-out EVD.

3.5-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.

3.6-Storing Clinical Specimens for Ebola

Specimens should be stored at 4°C or frozen.

3.7-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.

3.8-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 specimens for EVD testing.

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**.

Laboratories in your facility should have already received the below information from our laboratory. Based on questions we are receiving we thought it would be helpful to share the following with Infection Prevention as well.

As a follow up to the laboratory guidance that was sent out on Friday, I wanted to make sure that everyone was aware that if you do have a specimen that is approved to be sent to the CDC for Ebola testing, it would have to be shipped as Category A. You might want to check to make sure you have an insulated Category A mailer on hand. If you don't have one, they can be purchased through several venders such as Fisher, VWR, Saf T Pak, etc. Although FedEx does accept Category A specimens, we just found out that they will not transport a specimen for EVD testing. If you do have a specimen that needs to be shipped, you would have to use a different courier. I spoke with World Courier (http://www.worldcourier.com/, 1-800-221-6600), and they will ship high-risk Category A specimens such as Ebola. You would first have to call the 800 number to set up an account before they would ship the specimen.

Also when shipping a Category A specimen, the person packaging and shipping needs to be certified. If no one in your laboratory has been trained in the last two years, you need to make sure that someone gets ***certification*** training that includes the required components: General Awareness, Function Specific, Safety/Emergency Response and Security Awareness. Several vendors offer online training at varying costs. NLTN also offers an online Packaging and Shipping course for free. http://www.cdc.gov/labtraining/course_listing/packing_shipping.html.

Kerri Gerage, Laboratory Emergency Response Coordinator, Louisiana Office of Public Health Laboratory

4-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.

5-Preventing EBV from Spreading Beyond the Epidemic Area

5.1-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.

5-2-Screening at arrival in the U.S.

All passengers departing from the aforementioned West African countries and arriving at one of the five designated international U.S. airport ports of entry, JFK (New York City), Newark Liberty (New Jersey), Atlanta Hartsfield Jackson (Georgia), Dulles (Virginia), and O'Hare (Chicago, IL), are subject to active entry screening by federal agents/officials. It is estimated that this process will result in approximately 150 being screened daily which is about 94% of all passengers whose journey originated in one of the three West African countries currently experiencing the Ebola Outbreak.

The active screening will consist of a cursory visual examination, temperature being taken with a thermal scanner, and the administration of a Traveler Health Declaration Form, which be completed by the federal agent through an interview process.

Those travelers who do not exhibit or report any symptoms, have no measured fever, and have been determined to have an "uncertain exposure risk" (does not know if they were exposed or does not acknowledge any exposure) will be allowed to continue on their journey, subject to active follow-up and monitoring by public health authorities for a 21-day period since their last possible exposure. Note: this category of traveler is changed from "No Exposure Risk" to "Uncertain Exposure Risk. The below procedure reflects the current U.S. Government policy on how this will be conducted:

5.2.1-Procedure to Conduct Acting Traveler Health Monitoring and Follow-up:

- Key information from the Traveler Health Declaration Form will be entered into a database and shared on a daily basis via Epi-X, with the relevant states having jurisdiction over the travelers' declared ultimate US destination. Traveler information to be provided includes name, address of ultimate destination and multiple means of communication (land line number(s), mobile phone number(s), and email address.

· The daily Epi-X reports will be sent to the relevant state, pre-designated as part of the traveler manifest exchange process already in place and used for other infectious disease incidents. (We understand that the states have already verified the accuracy of these designated points of contact.)

· Before the traveler leaves the federal processing area of the airport, he/she will be provided with a "CARE" ("Check and Report Ebola") kit which will include a fact sheet and instructions to self-monitor for signs and symptoms, a temperature and symptoms log, a thermometer, and a contact sheet with the 24/7 phone numbers of the state health departments with instructions to contact the appropriate state health department if they have any questions, concerns, or to report becoming symptomatic.

· Once the state/local health department is notified through Epi-X of a traveler's plans to arrive in their jurisdiction**, the public health agency is expected to immediately initiate daily active monitoring and follow-up for the balance of the 21 day observation period.** This would include making contact with the traveler, on a daily basis, either by phone, e-mail or in-person, to query the on their health status.

5.2.2-Travel restriction

Should the traveler intend to travel during this 21-day observation period, the traveler cannot do so without the express permission of the state/local public health authority. There are three criteria to be considered in restricting further travel:

- Commercial conveyances cannot be used
- The public health authority still must have the ability to make daily contact with the traveler to verify health status
- Suitable healthcare services must be readily available in the area where the traveler plans to visit.

Travel approved should be done on a case-by-case basis and, based on the circumstances of each specific case, an interstate "hand off" may be required as determined by the permitting state or local jurisdiction.

Various documents that constitute the Traveler health kit or C.A.R.E. kit that is handed out to travelers arriving at the five ports of entry for active screening from Sierra Leone, Liberia or Guinea are:

a. Welcome Letter
b. Health Advisory
c. Symptom cardlog_EbolaCAREkit
d. Thermometer Instructions
e. Wallet Card
f. CBP tear sheet

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

The 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 while in those countries.

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 are 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.

5.4-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

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

6.1-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.

6.2-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.

6.3-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

6.4-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.

7-Public health approach to prevent the spread of Ebola in the U.S.

The main approach is interview cases, classify them by risk category and take preventive action necessary to prevent transmission to the population

7.1--Case Definitions

7.1.1--Person of Interest (POI - OPH terminology)

A person that may have some history of exposure not yet investigated or confirmed. All the POIs are entered in a POI tracking database in the Infectious Disease Epidemiology Section.

7.1.2-Person Under Investigation (PUI - CDC terminology)

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

- A person who has both consistent signs or symptoms and risk factors as follows: Elevated body temperature or subjective fever or symptoms, including severe headache, fatigue, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; **AND**
- An epidemiologic risk factor within the 21 days before the onset of symptoms

7.1.3-Confirmed Case (CDC terminology)

A PUI with laboratory-confirmed diagnostic evidence of Ebola virus infection.

7.1.4-Close contact

Close contact is defined as

- Being within approximately three 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.

7.1.5-Areas of EVD active transmission

An area /country where new confirmed cases are identified. **An area of active transmission is taken off the list 42 days after the onset of the last confirmed cased**. The reason for the 42 days is to allow sufficient time for a secondary case originating from contact with a case that was missed by the case detection system.

The 42 day rule applies to a country or a large area. It is NOT an incubation period. It should not be used when tracking a small group of contact such as household contacts.

7.2-Person Exposure Evaluation

Health care professionals in Louisiana should immediately report by phone to the OPH Infectious Disease Epidemiology Section (IDEpi), (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 IDEpi 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 patients possibly infected by 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 possibly infected by the Ebola virus;
  - 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.

According to the CDC, testing of patients with possible EVD should be guided by the **risk level of exposure**, as described in the following table:

NOTE: This classification is presented here for information only. The Louisiana Administration does not use this classification to establish a risk-based approach.

Exposure
High risk: direct contact of infected body fluids through: 1-Needle stick, or splashes to eyes, nose, or mouth 2-Getting body fluids directly on skin 3-Handling body fluids, such as in a laboratory, without wearing personal protective equipment (PPE) or following recommended safety precautions 4-Touching a dead body without correctly wearing PPE in a country with widespread Ebola transmission (In countries with widespread Ebola transmission, it is not always known what a person died of. Therefore touching any dead body in one of these countries is considered a high risk exposure.) 5-Living with and caring for a person showing symptoms of EVD
Some risk: In countries with widespread transmission or urban areas with uncertain control 1-Direct contact while using appropriate PPE with a person with Ebola while the person was symptomatic or with the person's body fluids 2-Direct patient care in other healthcare settings 3-Close contact in households, healthcare facilities, or community settings with a person with Ebola while the person was symptomatic (Close contact is defined as being for a prolonged period of time while not wearing appropriate PPE within approximately 3 feet (1 meter) of a person with Ebola while the person was symptomatic
Low risk (but not zero) **In country with widespread Ebola transmission previous 21 days and having no known exposure** 1- In same room for a brief period of time (without direct contact) with a person showing symptoms of Ebola 2- Brief skin contact with a person showing symptoms of Ebola, not very contagious **In countries without widespread Ebola transmission**: 1-Direct contact with symptomatic EVD while wearing PPE 2-Travel on an airplane with a person showing symptoms of Ebola
No risk 1-Contact with asymptomatic person AFTER that person was in contact with a person with Ebola 2-Contact with a person with Ebola BEFORE the person was showing symptoms 3-Travel to a country with Ebola outbreak MORE than 21 days ago 4-In a country with no widespread Ebola transmission (USA), and having no other exposures to Ebola

7.3-Decision to test or monitor according to CDC Guidelines.

NOTE: This decision tree is presented here for information only. The Louisiana Administration does not use this decision tree to set the control measures.

The decision to test is based on the presence of symptoms and the exposure risk (protocol shown following), and scientific consideration.

7.3.1-EVD Medical evaluation for all high, some, and low risk categories

These people MUST have a medical examination to make sure they don't have EVD. They will remain isolated in a hospital until doctors and public health officials are certain that Ebola is not a concern. (Symptoms of Ebola: Fever, severe headache, fatigue, muscle pain, vomiting, diarrhea, stomach pain, unexplained)

7.3.2-Medical evaluation for other diseases for no risk category

These people might need to have a medical examination for other diseases (not Ebola).

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.

7.4- Follow up actions

Following are the definitions of actions that are recommended in the new guidance based on risk levels and symptoms. Public health actions, such as isolation of symptomatic people, active monitoring or direct active monitoring of people without symptoms, and travel restrictions when needed, help protect the public by preventing the spread of disease.

7.4.1- The Louisiana Sanitary Code Title 51, Public health, Part II: The control of Diseases / Isolation /Quarantine

Definitions from the Code:

- *Isolation*—the separation for the period of communicability of infected persons from other persons, in such places and under such conditions as will prevent the direct or indirect conveyance of the infectious agent from infected persons to persons who are susceptible or who may spread the agent to others.
- *Quarantine*—the limitation of freedom of movement of such well persons or domestic animals as have been exposed to a communicable disease for a period of time equal to the longest usual incubation period of the disease, in such manner as to prevent effective contact with those not so exposed.

NOTE from the Sanitary Code: In connection with the control of communicable diseases, the term *quarantine* is frequently used interchangeably with the term *isolation* as defined above in this Paragraph.

At times, the two terms may be used together, as in an *isolation/quarantine order* pursuant to R.S. 40:4(A)(13), and further pursuant to §§117-121 in the body of this Part in this code pertaining to the Control of Diseases.

In summary:

Isolation	applies to	infected (with disease)	people during the	**communicability**	period
Quarantine	applies to	exposed	People during the	**incubation**	period

Confinement is used in other states and is identical to quarantine.

Paragraph 117 (§117 Disease Control Measures Including Isolation/Quarantine) specifies the authority of the State Health Officer. The State Health Officer may:

- Order that any person suspected of being a case, a carrier or merely exposed to a communicable disease be medically examined and submit appropriate specimens,
- Order that any such person be placed in isolation or under quarantine as long as his or her status remains undetermined,
- Declare the house, building, apartment, room, or place where the case occurs, a place of quarantine, and to require that only persons so authorized by the state health officer shall leave or enter said quarantined place during the period of quarantine.
  - Proclaim and institute a quarantine of the locality in which the said disease prevails and shall formulate and publish rules and regulations to carry out such quarantine effectively;

7.4.2-Active monitoring: reporting to PH

Active monitoring means that public health officials are responsible for checking at least once or twice a day to see if people have a fever or other symptoms of Ebola. People being monitored must take their temperature twice daily, watch themselves for symptoms, report as directed to public health officials, and immediately tell public health officials if they have a fever or other symptoms. Active monitoring must take place until 21 days after the last possible exposure and can occur on a voluntary basis or be required by public health order.

7.4.3-Direct active monitoring: Observing by PH

Direct active monitoring means that public health officials conduct active monitoring by directly observing the person being monitored. This means that a public health official directly observes the individual at least once a day to review symptoms and check temperature; a second follow-up per day can be done by telephone instead of being directly observed. Direct active monitoring should include discussion of plans to work, travel, take public transportation, or go to busy public places to determine whether these activities are allowed.

7.4.4. Travel restrictions /Controlled movements

This 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.

7.4.5-Quarantine used in Louisiana Sanitary Code or confinement (later term used in some states)

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.

Quarantine requires that the person must stay at home and avoid contact with the general public. In the case of Ebola that is transmitted by close contact but is not transmitted airborne over long distances the person can be allowed to get outside of the home, use personal transportation (car, bicycle, jogging for example) as long as they do not come in personal contact with others. Getting food from a drive through window should pose no risk.

There is a large body of scientific literature confirming that asymptomatic individuals are not infectious (cannot transmit the infection to another person). Therefore there is no scientific rational for putting an asymptomatic individual under quarantine. However this practice is done under the guise of "abundance of caution". The unfortunate consequence is that this approach undermines the message that Ebola can only be transmitted by persons with symptoms and seriously encroaches on the credibility of health officials.

There is no reason to quarantine family members that are living in the same household as asymptomatic quarantined individuals. These same family members, for example, would be useful in providing support to those who may be forbidden to go to grocery stores.

7.4.6-Louisiana approach mandated by the DHH Administration

The approach used in Louisiana is to use regardless of the risk category

- **Active direct monitoring and**
- **Voluntary quarantine**

7.5- 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 IDEpi Section describe in detail the steps in an outbreak investigation.

Monitoring close contacts lasts 21 days

Close contacts will be evaluated according to patient evaluation recommendation

7.6-Summary table of PH actions to be taken according to risk

LEVEL	**PUBLIC HEALTH ACTION**		
Monitoring	**Restricted Public Activities**	**Restricted Travel**	
HIGH risk	Yes- Direct Active Monitoring	Yes	Yes
SOME risk	Yes- Direct Active Monitoring	Case-by-case assessment	Case-by-case assessment
LOW risk	Yes- Active Monitoring for some; Direct Active Monitoring for others	No	No
NO risk	No	No	No
The approach used in Louisiana is to use regardless of the risk category • **Active direct monitoring and** • **Voluntary quarantine**			

7.7-Monitoring and determining the exposure risk of returning health care workers to the U.S.

Returning health care workers are heroes worthy of dignity and respect. Their efforts, along with our civilian and military personnel in the region, is what ultimately will enable us to eliminate the threat of additional domestic Ebola cases.

The high number of cases of Ebola among health care workers providing direct care to Ebola patients in countries with widespread transmission suggests that there are multiple potential sources of exposure to

Ebola virus in these countries, including unrecognized problems with PPE, inadequate decontamination procedures, and exposure in patient triage areas. Due to this higher risk, these health care workers are classified in the **some risk category**, and additional precautions are recommended for them when they arrive in the United States.

7.8-Monitoring and determining exposure risk of health care workers in U.S. hospitals

7.8.1-No history of HCP infection: Low risk /Direct active monitoring.

Even when U.S. health care workers who care for Ebola patients follow all the recommended PPE guidelines, they are still considered to be in the **low risk level**, because they might not realize they have been exposed. Therefore, all health care workers must have **direct active monitoring**.

7.8.1-Hostory of HAI: High risk / Direct active monitoring

If a U.S. health care worker becomes sick with Ebola and it is not clear how the health care worker became exposed, then the other health care workers in that hospital who also took care of the Ebola patient are now considered exposed (high risk). This is because it would no longer be certain that all these health care workers had correctly followed the recommendations.

If this happens, public health officials must review the hospital's infection control practices, fix any problems identified, and retrain all the health care workers.

8-Prevention of HCP infection

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 possibly infected by Ebola**

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**.

8.1-Think Ebola and Care Carefully

The CDC reminds health care workers to "Think Ebola" and to "Care Carefully."

- Health care workers should take a detailed travel and exposure history with patients who exhibit fever, severe headache, muscle pain, weakness, diarrhea, vomiting, stomach pain, and unexplained hemorrhage.

- If the patient is under investigation for Ebola, health care workers should activate the hospital preparedness plan for Ebola, isolate the patient in a separate room with a private bathroom, and ensure standardized protocols are in place for PPE use and disposal.
- **Health care workers should not have physical contact with the patient without putting on appropriate PPE**

8.2- Recommended administrative controls for HCF

These controls include the following:

At an administrative level, the facility's infection prevention management system, in collaboration with the facility's occupational health department, should -

- Establish and implement **triage protocols** to effectively identify patients who may have Ebola and institute the precautions detailed in this document.
- Designate individuals as **site managers** responsible for overseeing the implementation of precautions for healthcare workers and patient safety. A site manager's sole responsibility is to ensure the safe and effective delivery of Ebola treatment. These individuals are responsible for all aspects of Ebola infection control including supply monitoring and evaluation with direct observation of care before, during, and after staff enter an isolation and treatment area.
- At least one site manager should be on-site at all times in the location where the Ebola patient is being cared for.
- Identify **critical patient care functions** and essential healthcare workers for care of Ebola patients, for collection of laboratory specimens, and for management of the environment and waste ahead of time.

8.3-Rigorous and repeated training

Focusing only on PPE gives a false sense of security of safe care and worker safety. Training is a critical aspect of ensuring infection control. Facilities need to ensure all healthcare providers practice numerous times to make sure they understand how to appropriately use the equipment, especially in the step-by-step putting on and taking off of PPE.

- Ensure healthcare workers have been trained in all recommended protocols for safe care of Ebola patients before they enter the patient care area.
- Train healthcare workers on all PPE recommended in the facility's protocols. Healthcare workers should practice donning and doffing procedures and must demonstrate during the training process competency through testing and assessment before caring for Ebola patients.
- Use trained observers to monitor for correct PPE use and adherence to protocols for donning and doffing PPE, and guide healthcare workers at each point of use using a checklist for every donning and doffing procedure.
- Document training of observers and healthcare workers for proficiency and competency in donning and doffing PPE, and in performing all necessary care-related duties while wearing PPE.

8.4-Patient placement; Isolate the patient; Restrict visitors

- Patients should be isolated in a single patient room (containing a private bathroom) with the door closed. Limit personnel in the isolation room. Maintain a log of all persons entering the patient's room
- 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.

8.5-Infection control precautions (Personal protective Equipment –PPE)

8.5.1-Guiding principles

If a patient in a U.S. hospital is possibly infected or known to have Ebola virus disease, healthcare teams should **follow standard, contact, and droplet precautions**.

In healthcare settings, Ebola is **spread through direct contact** (e.g., through broken skin or through mucous membranes of the eyes, nose, or mouth) with blood or body fluids of a person who is sick with Ebola or with objects (e.g., needles, syringes) that have been contaminated with the virus. The main goal of barrier precaution is: **No skin exposure when PPE is worn.**

The CDC's Guidance for U.S. Healthcare Settings is similar to MSF's (Doctors Without Borders) Guidance. Both CDC's and MSF's guidance documents focus on:

1. Protecting skin and mucous membranes from all exposures to blood and body fluids during patient care
2. Meticulous, systematic strategy for putting on and taking off PPE to avoid contamination and to ensure correct usage of PPE
3. Use of oversight and observers to ensure processes are followed.

8.5.2-List of PPE to be worn by HCP entering the patient's room:

- Gloves, double
- Single-use fluid resistant or impermeable gown that extends to at least mid-calf ***or*** coverall without integrated hood.
- Eye protection: Goggles are no longer recommended as they may not provide complete skin coverage in comparison to a single-use, disposable full-face shield. Additionally, goggles are not disposable, may fog after extended use, and healthcare workers may be tempted to manipulate them with contaminated gloved hands. Again what is needed is a single-use, full-face shield that is disposable
- Surgical hoods to ensure complete coverage of the head and neck
- Respirators, including either N95 respirators or powered air purifying respirator (PAPR).
- An apron that is waterproof and covers the torso to the level of the mid-calf (and that covers the top of the boots or boot covers) should be used if Ebola patients have vomiting or diarrhea
- Boot covers that are waterproof and go to at least mid-calf or leg covers

Notes on PPE:

-PAPR **or** N95 Respirator. If a NIOSH-certified PAPR and a NIOSH-certified fit-tested disposable N95 respirator is used in facility protocols, ensure compliance with all elements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134, including fit testing, medical evaluation, and training of the healthcare worker.

-PAPR: A PAPR with a full face shield, helmet, or headpiece. Any reusable helmet or headpiece must be covered with a single-use (disposable) hood that extends to the shoulders and fully covers the neck and is compatible with the selected PAPR. The facility should follow manufacturer's instructions for decontamination of all reusable components and, based upon those instructions, develop facility protocols that include the designation of responsible personnel who assure that the equipment is appropriately reprocessed and that batteries are fully charged before reuse.

A PAPR with a self-contained filter and blower unit integrated inside the helmet is preferred.

A PAPR with external belt-mounted blower unit requires adjustment of the sequence for donning and doffing, as described below.

-N95 Respirator: Single-use (disposable) N95 respirator in combination with single-use (disposable) surgical hood extending to shoulders and single-use (disposable) full face shield. If N95 respirators are used instead of PAPRs, careful observation is required to ensure healthcare workers are not inadvertently touching their faces under the face shield during patient care.

- Gown:

- Single-use (disposable) fluid-resistant or impermeable gown that extends to at least mid-calf or coverall without integrated hood. Coveralls with or without integrated socks are acceptable. Consideration should be given to selecting gowns or coveralls with thumb hooks to secure sleeves over inner glove. If gowns or coveralls with thumb hooks are not available, personnel may consider taping the sleeve of the gown or coverall over the inner glove to prevent potential skin exposure from separation between sleeve and inner glove during activity. However, if taping is used, care must be taken to remove tape gently. Experience in some facilities suggests that taping may increase risk by making the doffing process more difficult and cumbersome.
- Single-use (disposable) nitrile examination gloves with extended cuffs. Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.
- Single-use (disposable), fluid-resistant or impermeable boot covers that extend to at least mid-calf or single-use (disposable) shoe covers. Boot and shoe covers should allow for ease of movement and not present a slip hazard to the worker.
- Single-use (disposable) fluid-resistant or impermeable shoe covers are acceptable only if they will be used in combination with a coverall with integrated socks.
- Single-use (disposable), fluid-resistant or impermeable apron that covers the torso to the level of the mid-calf should be used if Ebola patients have vomiting or diarrhea. An apron provides additional protection against exposure of the front of the body to body fluids or excrement. If a PAPR will be worn, consider selecting an apron that ties behind the neck to facilitate easier removal during the doffing procedure.

8.5.3-Disinfection of PPE prior to taking off:

The CDC recommends disinfecting visibly contaminated PPE using an EPA-registered disinfectant wipe prior to taking off equipment. Additionally, the CDC recommends disinfection of gloved hands using either an EPA-registered disinfectant wipe or alcohol-based hand rub between steps of taking off PPE. Due to differences in the U.S. healthcare system and West African healthcare settings, MSF's guidance recommends spraying as a method for PPE disinfection rather than disinfectant wipes

8.5.4-Procedures to don/take off PPE

Implement PPE designated areas for putting on and taking off PPE.

The PPE Removal Area is an area in proximity to the patient's room (e.g., anteroom or adjacent vacant patient room that is separate from the clean area) where healthcare workers leaving the patient's room can doff and discard their PPE. Alternatively, some steps of the PPE removal process may be performed in a clearly designated area of the patient's room near the door, provided these steps can be seen and supervised by a trained observer (e.g., through a window such that the healthcare worker doffing PPE can still hear the instructions of the trained observer). Do not use this clearly designated area within the patient room for any other purpose. Stock gloves in a clean section of the PPE removal area accessible to the healthcare worker while doffing.

In the PPE removal area, provide supplies for disinfection of PPE and for performing hand hygiene and space to remove PPE, including a place for sitting that can be easily cleaned and disinfected, where the healthcare workers can remove boot covers. Provide leak-proof infectious waste containers for discarding used PPE. Perform frequent environmental cleaning and disinfection of the PPE removal area, including upon completion of doffing procedure by healthcare workers.

If a facility must use the hallway outside the patient room as the PPE removal area, construct physical barriers to close the hallway to through traffic and thereby create an anteroom. In so doing, the facility should make sure that this hallway space complies with fire-codes. Restrict access to this hallway to

essential personnel who are properly trained on recommended infection prevention practices for the care of Ebola patients.

Facilities should consider making showers available for use by healthcare workers after doffing of PPE.

- Facilities should ensure that space and layout allows for clear separation between clean and potentially contaminated areas
- Trained observer to monitor PPE use and safe removal: the CDC is recommending a trained monitor actively observe and supervise each worker putting PPE on and taking it off. This is to ensure each worker follows the step by step processes, especially to disinfect visibly contaminated PPE. The trained monitor can spot any missteps in real-time and immediately address
- Step-by-step PPE removal instructions that include:
    - Disinfecting visibly contaminated PPE using an EPA-registered disinfectant wipe prior to taking off equipment
    - Disinfection of gloved hands using either an EPA-registered disinfectant wipe or alcohol-based hand rub between steps of taking off PPE.

8.5.5-Precautions during patient care

PPE must remain in place and be worn correctly for the duration of exposure to potentially contaminated areas. PPE should not be adjusted during patient care. Healthcare workers should perform frequent disinfection of gloved hands using an ABHR, particularly after handling body fluids. If during patient care a partial or total breach in PPE (e.g., gloves separate from sleeves leaving exposed skin, a tear develops in an outer glove, a needlestick) occurs, the healthcare worker must move immediately to the doffing area to assess the exposure. Implement the facility exposure plan, if indicated by assessment.

Double gloving provides an extra layer of safety during direct patient care and during the PPE removal process. Beyond this, more layers of PPE may make it more difficult to perform patient care duties and put healthcare workers at greater risk for percutaneous injury (e.g., needlesticks), self-contamination during care or doffing, or other exposures to Ebola. If healthcare facilities decide to add additional PPE or modify this PPE guidance, they must consider the risk/benefit of any modification, and train healthcare workers on correct donning and doffing in the modified procedures.

8.6-Avoid aerosol-generating procedures:

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.

- 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 respiratory 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

8.7-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.

8.8-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

8.9-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.

8.10-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.

8.10.1-Environmental services staff

They 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 is 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.

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.

8.10.2-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

8.10.3-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.

8.10.4-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). CDC guidelines recommend 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.

8.10.5-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

8.10.6-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.

8.10.7-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.

8.11-Safe Injection practices

Facilities should follow safe injection practices as specified under Standard Precautions. 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.

8.12-Duration of Infection Control Precautions

Duration of precautions should be determined on a case-by-case basis, in conjunction with local, state, and federal health authorities.

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, *Clostridium difficile*), and available laboratory information

8.13-Monitoring and Management of Potentially Exposed Personnel

8.13.1-Leave policies

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.

8.13.2-Persons with percutaneous or mucocutaneous exposures to blood, body fluids, secretions, or excretions

- 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.)

8.13.3-Symptomatic HCP

HCPs 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

8.13.4-Asymptomatic HCP who had an unprotected exposure

HCP 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 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.

8.14-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.

8.15-Hospital Preparedness Assessment

8.15.1-Upon arrival to clinical setting/triage

- Does patient have fever (subjective or ≥101.5°F)?
- Does patient have compatible EVD symptoms such as headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain or hemorrhage?
- Has the patient traveled to an Ebola-affected area in the 21 days before illness onset?

8.15.2-Upon initial assessment if patient is admitted

- Isolate patient in single room with a private bathroom and with the door to hallway closed
- Implement standard, contact, & droplet precautions (if symptomatic)
- Notify the hospital Infection Control Program
- Report to the health department at 800-256-2748
- Conduct a risk assessment to categorize the patient risk level as
  - High-risk exposure
    - Percutaneous (e.g., needle stick) or mucous membrane exposure to blood or body fluids from an EVD patient
    - Direct skin contact with skin, blood or body fluids from an EVD patient
    - Processing blood or body fluids from an EVD patient without appropriate PPE
    - Direct contact with a dead body in an Ebola-affected area without appropriate PPE
  - Low-risk exposures
    - Household members of an EVD patient or others who had brief direct contact (e.g., shaking hands) with an EVD patient without appropriate PPE
    - Healthcare personnel in facilities with EVD patients who have been in care areas of EVD patients without recommended PPE
- Before entering patient room, wear gown (fluid resistant or impermeable), facemask, eye protection (goggles or face shield), gloves
- If likely to be exposed to blood or body fluids, additional PPE may include double gloving, disposable shoe covers, leg coverings
- Upon exiting patient room: PPE should be carefully removed without contaminating one's eyes, mucous membranes, or clothing with potentially infectious materials
- Discard disposable PPE

- Re-useable PPE should be cleaned and disinfected per the manufacturer's reprocessing instructions
- Hand hygiene should be performed immediately after removal of PPE

8.15.3-Patient management

- Maintain log of all persons entering patient's room
- Use private room
- Use dedicated disposable medical equipment (if possible)
- Use of personal protective equipment (PPE)
- Use a buddy system to ensure that PPE is put on and removed safely
- Wear PPE (detailed in center box) during environmental cleaning and use an EPA-registered hospital disinfectant with a label claim for non-enveloped viruses
- Provide aggressive supportive care including aggressive IV fluid resuscitation if warranted
- Assess for electrolyte abnormalities and replete
- Evaluate for evidence of bleeding and assess hematologic and coagulation parameters
- Symptomatic management of fever, nausea, vomiting, diarrhea, and abdominal pain
- Consult health department regarding other treatment options
- **This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.**

8.15.4-Aerosol-generating procedures

- Avoid aerosol-generating procedures if possible
- Limit number of personnel present
- Conduct in an airborne infection isolation room
- Don PPE as described above except use a NIOSH certified fit-tested N95 filtering face-piece respirator for respiratory protection or alternative (e.g., PAPR) instead of a facemask

8.15.5-Sharps

- Limit the use of needles and other sharps
- Limit phlebotomy and laboratory testing to those procedures essential for diagnostics and medical care
- Carefully dispose of all needles and sharps in puncture proof sealed containers

8.15.6-Testing:

- Consult with health department about diagnostic EVD RT-PCR testing.
- Consider, test for, and treat (when appropriate) other possible infectious causes of symptoms (e.g., malaria, bacterial infections).

9-Laboratory: Specimen Collection, Transport, Testing and Submission for Patients with possibly infected with Ebola Virus Disease

Potentially infectious diagnostic specimens are routinely handled and tested in U.S. laboratories in a safe manner, by closely following the standard safety precautions below. All laboratorians and other healthcare personnel collecting or handling specimens must follow established standards compliant with the OSHA bloodborne pathogens standard, which includes blood and other potentially infectious materials. These standards include wearing appropriate personal protective equipment (PPE) and following all safety rules for all specimens regardless of whether they are identified as being infectious.

Recommendations for risk assessment to staff: Risk assessments should be conducted by each laboratory director, biosafety officer, or other responsible personnel to determine the potential for sprays, splashes, or aerosols generated from laboratory procedures. They should adjust, as needed, PPE requirements, practices, and safety equipment controls to protect the laboratorian's skin, eyes, and mucous membranes.

Recommendations for specimen collection by staff: Any person collecting specimens from a patient with a case of possible EVD should wear gloves, water-resistant gowns, full face shield or goggles, and masks to cover all of nose and mouth. Additional PPE may be required in certain situations.

Recommendations for laboratory testing by staff: Any person testing specimens from a patient with possible EVD should wear gloves, water-resistant gowns, full face shield or goggles, and masks to cover all of nose and mouth, and as an added precaution use a certified class II Biosafety cabinet or plexiglass splash guard with PPE to protect skin and mucous membranes. All manufacturer-installed safety features for laboratory instruments should be used.

9.1-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 possible infection with Ebola virus. These precautions include both manufacturer installed safety features for instruments and the laboratory environment as well as PPE specified above.

9.2-Environmental Cleaning and Disinfection

See the Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus (http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html) for recommendations regarding the cleaning and disinfection of patient care area surfaces including the management of blood and body fluid spills. These recommendations also apply to cleaning and disinfecting in a laboratory where specimens are being processed from persons under investigation, or with probable or confirmed Ebola virus infections.

In the case of a spill in the laboratory, the basic principles for blood or body substance spill management are outlined in the United States OSHA Blood Borne Pathogens Standards. There are no disinfection 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 an added precaution, use a disinfectant with a higher potency than what is normally required for an enveloped virus to disinfect potentially Ebola-contaminated surfaces. 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.

9.3-Management of Laboratory Waste

Waste generated during laboratory testing 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 container designed for this use. If available, steam sterilization (autoclave) or incineration as a waste treatment process can inactivate the virus and reduces waste volume. For equipment that drains directly into the sewer system, the United States sanitary sewer system handling processes (e.g., anaerobic digestion, composting, disinfection) are designed to safely inactivate infectious agents.

9.4-CDC Division of Select Agents and Toxins (DSAT) Considerations

If these guidelines for the collection, transport, and testing of specimens from possible or confirmed Ebola patients are followed, waste generated during the handling and testing of such specimens and which

is properly disposed would not be subject to Federal select agent regulations (See the exclusion provision 42 CFR § 73.3(d)(1)). However, this exclusion would not apply to any facility or laboratory that intentionally collected or otherwise extracted the Ebola virus from waste generated during the delivery of patient care.

9.5-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 possible EVD specimens.

9.6-Packaging and Shipping Clinical Specimens to the CDC

Specimens collected for EVD testing should be packaged and shipped without attempting to open collection tubes or aliquot specimens.

Hospitals are **REQUIRED** to contact the Office of Public Health Infectious Disease Epidemiology Section On-Call number at 1-800-256-2748 if a possible EVD presents. If it is determined in consult with ID Epi that the specimen meets the requirements for Ebola testing, the CDC must be contacted for consultation before a specimen can be submitted.

After OPH IDEpi's consultation with the CDC, if testing is still warranted, the following steps should be used by your facility in submitting samples to the CDC:

- Email tracking number to **EOCEVENT246@CDC.GOV**.
- Do not ship for weekend delivery unless instructed by 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** specimen submission forms.
- On the **outside** of the box, specify how the specimen should be stored: **refrigerated**.

Specimens for shipment should be packaged following the basic triple packaging system which consists of a primary container (a sealable specimen bag) wrapped with absorbent material, secondary container (watertight, leak-proof), and an outer shipping package. All applicable requirements of the U.S. Hazardous Materials Regulations (HMR) issued by the U.S. Department of Transportation (U.S. DOT) can be found on the DOT website. For questions on (packaging) transportation regulations, contact the U.S. DOT HazMat Information Center at 1-800-467-4922.

Insulated Infectious Disease shippers are available for purchase through commercial vendors such as Fisher Scientific, VWR, Saf T Pak, etc.

9.7-Occupational Health

Potential exposures to blood, body fluids and other infectious materials must be reported immediately according to your institution's policies and procedures.

9.8-When to Contact the CDC /OPH

The CDC highly recommends contacting your state and/or local health department *before* contacting CDC. The CDC is available for consultation 24/7 at 770-488-7100.

The CDC will continue to evaluate new information as it becomes available and will update this guidance as needed.

If there are any questions, please do not hesitate to contact the OPH Laboratory: Kerri Gerage (225-219-5234, kerri.gerage@la.gov), Danielle Haydel (225-219-5263, danielle.haydel@la.gov), Lab 24 hr cell at 504-458-9537 or OPH Infectious Disease Epidemiology: On-Call phone at 1-800-256-2748, Julie Hand (504-568-8298, julie.hand@la.gov), Jenna Iberg Johnson (504-568-8312, jenna.ibergjohnson@la.gov).

10-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 think a caller is reporting symptoms of Ebola, they should screen callers for risk factors within the past three weeks before onset of symptoms. Risk factors include:

- Contact with blood or body fluids of a patient known to have or is possibly infected with 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

10.1-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.

10.1.1-Patient assessment

Address scene safety when PSAP call takers advise that the patient may have EVD:

- EMS personnel should put on PPE appropriate for possible 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 three weeks before the onset of symptoms, including:
    - Contact with blood or body fluids of a patient known to have or be possibly infected with 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 possible cases of Ebola.
- If there are no risk factors, proceed with normal EMS care.

10.1.2-EMS Transfer of Patient Care to a Healthcare Facility

EMS personnel should notify the receiving healthcare facility when transporting a possible 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.

10.1.3-Infection Control for EMS Staff

EMS personnel can safely manage a patient with possibly infected 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 possible 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/hcp/procedures-for-ppe.html.
- 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 possible 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 possible EVD 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.

10.1.4-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 possibly infected 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.

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

EMS personnel should be aware of the follow-up and/or reporting measures they should take after caring for a possibly infected or confirmed Ebola patient.

EMS personnel with exposure to blood, bodily fluids, secretions, or excretions from a patient with possibly infected 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 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).
- **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

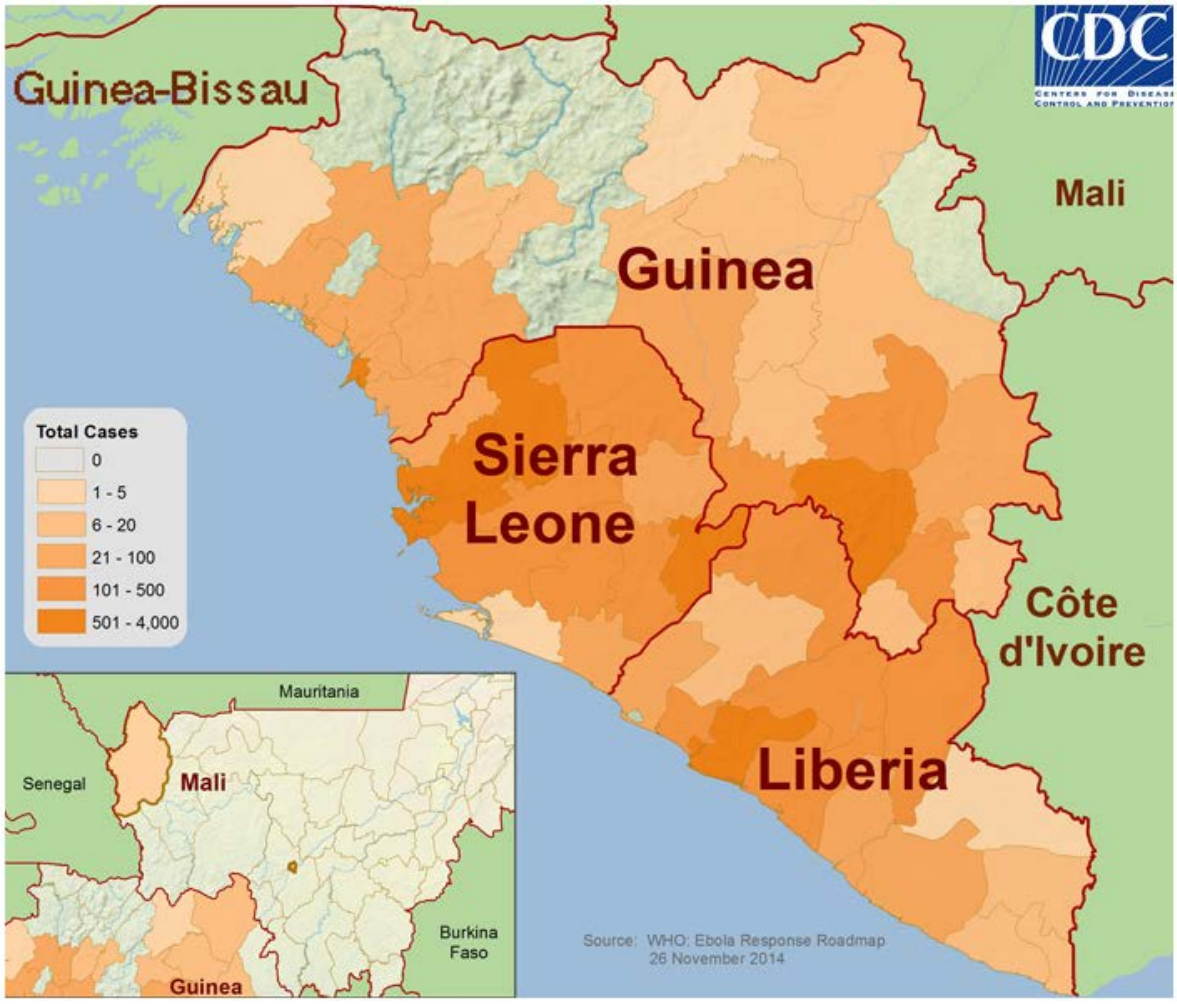
- Remains should be cremated or buried promptly in a hermetically sealed casket.
- Once the bagged body is placed in the sealed casket, no additional cleaning is needed unless leakage has occurred.
- No PPE is needed when handling the cremated remains or the hermetically sealed closed casket.

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

Geographical distribution 11/26/2014

For an updated map go to:
http://www.cdc.gov/vhf/ebola/resources/distribution-map-guinea-outbreak.html



Update on the situation in Nigeria

On July 25, 2014, the Nigerian Ministry of Health confirmed that a man in Lagos, Nigeria, who had traveled from Liberia, died from Ebola. The man had been in a Lagos hospital since arriving at the Lagos airport. A small number of Ebola cases linked to this patient were reported in Lagos and Port Harcourt. There were a total of 20 cases, 19 of which were lab-confirmed, and eight of the cases died. All cases have either died or recovered; contacts of those cases have completed their 21-day monitoring period and are no longer at risk for Ebola. The last case in Nigeria was reported on September 5, 2014. The CDC has moved the travel notice for Nigeria from Level 2 Alert to Level 1 Watch because of "decreased risk of Ebola in Nigeria," the travel notice will be removed after 42 days from the last case which would be October 17, 2014.

While the CDC still has Nigeria listed on its countries affected page, they have indicated it will be removed from the list after 42 days of the last case, which would be October 17, 2014. The CDC has stated on phone calls that travel to Nigeria is not a risk. Enhanced entry screening is taking place at five major U.S. airports for returning travelers from Liberia, Sierra Leone and Guinea. Nigeria is not one of the listed countries.

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 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. [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 occured 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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