# Ebola Transmission, Symptoms, Infection Control, Treatment and Prevention – Quick Tips



Ebola is a viral disease often referred to as Ebola Hemorrhagic Fever. Ebola was first diagnosed in 1976 during two simultaneous outbreaks in Africa. The outbreak of 2014 is the largest outbreak in history affecting multiple countries of West Africa with the potential to spread globally. There are currently five species of Ebola that have been identified. Each Ebola species is associated with a specific mortality rate. According to the U.S. Navy's Emerging Infections Department the mortality rate during the 2014 Ebola outbreak in Africa has been between 50 to 75%. Some species, such as the Zaire Ebola virus have been up to 90% fatal. The natural host to the Ebola virus is unknown but antibody testing has shown that fruit bats in Africa may be a reservoir for the disease.

**Transmission and Risk**

Ebola is spread by direct contact with the virus through broken skin or via mucous membranes (eyes, mouth, and nose). The virus can be found in bodily fluids such as blood, stool, urine, saliva, vomit, mucus, sweat, tears, breast milk and semen. Ebola also can be transmitted from items an infected person has come into contact with such as soiled clothing, bed linens or needles. The people most at risk for contracting Ebola are people who work directly with a patient while he/she is exhibiting symptoms. These include healthcare workers, family members or even mourners and workers who come into contact with the bodies as part of burial rituals. Once exposure to the virus occurs, individuals can become symptomatic within 2-21 days but the average time is between 8-10 days. Once symptoms appear individuals are contagious and able to spread the virus. Anyone who feels they have been exposed to Ebola should monitor his or her symptoms for 21 days and seek medical care immediately if symptoms emerge.

**Symptoms**

Early common symptoms for Ebola include symptoms similar to many other viral infections. They include fever (greater than 101.5°F), fatigue, muscle pain, abdominal pain, headache and sore throat. As the illness progresses, patients can have nausea, vomiting, diarrhea, impaired organ function as well as blood count changes. Some patients experience rashes, bruising, internal and/or

external bleeding from skin, eyes, or gums, which was why Ebola was originally named a hemorrhagic fever. Ebola patients may die from diffuse bleeding and shock.

Anyone showing the symptoms of Ebola after being in direct contact with someone known to have the disease or having been in an area known to have Ebola should seek medical care immediately and limit exposure to the public. Once the healthcare facility has been informed of the risk of Ebola infection they can perform a blood test to confirm Ebola infection and help minimize the risk to the public with infection control measures.

**Infection Control**

The Centers for Disease Control and Prevention (CDC) has consolidated a list of Guidelines and Informational sheets to help protect healthcare workers from exposure to Ebola. New guidelines released on October 20, 2014 provide detailed instructions regarding training, demonstration of competency, oversight, and supervision including trained observers during donning and doffing steps. According to the CDC, healthcare workers coming into contact with Ebola or Ebola patients should wear personal protective equipment (PPE) to ensure no skin is exposed. That PPE must be donned correctly and not modified while in the patient care area. The CDC recommended list of PPE includes:

- PAPR (Powered Air Purifying Respirator) OR N95 single-use disposable respirator in combination with single-use disposable surgical hood extending to shoulders and single-use disposable full face shield.
- 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.
- Single-use disposable nitrile exam gloves with extended cuffs. Two pairs of gloves should be worn and at minimum outer gloves should have extended cuffs.
- Single-use disposable fluid-resistant or impermeable boot covers that extend to mid-calf; Single-use disposable fluid-resistant or impermeable shoe covers are acceptable if used in combination with a coverall with integrated socks.
- Single-use disposable fluid-resistant or impermeable apron that covers torso to mid-calf should be used if Ebola patients have vomiting or diarrhea.

**With the updated guidance, 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 and may fog after extended use leading workers to be tempted to adjust them with contaminated gloved hands.

Hand Hygiene is a critical tool to help prevent the spread of infection. The World Health Organization (WHO) has created a simple infographic for hand hygiene. Hands should be washed before donning and wearing PPE, before performing any clean or aseptic procedures on a patient, after any exposure risk or exposure to a patient’s blood or body fluids, after touching potentially contaminated surfaces in the patient’s surroundings and after working with a patient with Ebola and removing contaminated PPE. Hands should be washed with hand soap and water and dried on single-use towels. Alcohol-based hand sanitizers/alcohol-based hand rubs (ABHR) can be used in place of hand washing

unless the hands are visibly soiled and then soap and water should be utilized.

Other ways to help control infection include the proper disposal of all sharps, such as needles, in sharps disposal containers and regular and rigorous environmental cleaning including the decontamination of surfaces and equipment using an U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim of potency at least equivalent to that for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus). For more information the CDC has published a document on Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus.

**Treatment and Prevention**

There are currently no specific vaccines or medicines proven to be effective against Ebola. Best practices for treatment involve treating the symptoms. That includes providing intravenous fluids and balancing electrolytes, maintaining oxygen status and blood pressure and treating any subsequent infections if they occur. Some experimental treatments developed for Ebola have been tested in animals but have not yet been tested in randomized trials in humans. Recovery from Ebola is dependent on the immune response of the patient. However, survivors of Ebola typically develop antibodies that can last 10 years or more to protect them from subsequent infections.

The best ways to prevent an Ebola infection include:

- Avoid contact with blood and body fluids
- Do not handle items that have come in contact with an infected person’s blood or body fluids
- Follow proper hand hygiene guidelines
- Avoid funeral or burial rites that require handling the body of someone who died of Ebola
- Avoid sex without protection with any man who has been infected with Ebola for three months. Ebola virus has been found in semen for up to three months after recovery.

**Commonly Asked Questions**

1. **How do I protect myself from breathing in Ebola?**
2. Ebola is not an airborne virus. You can only contract the disease by contact with fluids or contaminated items. A standard surgical mask or a disposable respirator can be worn to help prevent fluids from splashing into the mouth when working with a patient or to prevent aerosolized particles from entering the mouth from sneezing or coughing.
3. **Can I get a vaccine to prevent Ebola?**
4. There is no approved vaccine or medications for Ebola at this time, however, some experimental treatments have been tested on animals and further tests are needed to prove efficacy and safety.
5. **Can I come into contact with Ebola naturally in the United States even if I don’t have contact with an infected person?**
6. No. The natural reservoirs for the Ebola virus are thought to be bats in Africa. That virus affects human and non-human primates (such as monkeys, gorillas and chimpanzees) after exposure. No animals in North America are known hosts for Ebola.

**References and Sources for More Information**

World Health Organization (WHO) FAQ on Ebola
WHO Ebola Topic Page
WHO Steps for donning and removing PPE
OSHA Ebola Topic Page
OSHA Fact Sheet: Protecting Workers during a Pandemic
CDC Ebola Factsheet
CDC Facts about Ebola in the US Infographic
CDC Guidelines for Patient Management in US Hospitals
CDC Ebola Guidance for Airlines
CDC Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing)
CDC Fact Sheet on Tightened Guidance for U.S. Healthcare Workers on Personal Protective Equipment for Ebola
DuPont Technical Bulletin for Protective Clothing for Ebola Virus Disease
3M FAQ on Personal Protective Equipment (PPE) for Ebola virus disease

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