Ebola

Ebola, previously known as Ebola hemorrhagic fever, is a severe, often fatal disease in humans and nonhuman primates (such as monkeys, gorillas, and chimpanzees).

Ebola is a rare and deadly disease caused by infection with a virus of the family *Filoviridae*, genus *Ebolavirus*. There are five identified *Ebolavirus* species, four of which have caused disease in humans: *Zaire ebolavirus*; *Sudan ebolavirus*; *Taï Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*; and *Bundibugyo ebolavirus*. The fifth, *Reston ebolavirus*, has caused disease in nonhuman primates but not in humans.

Ebola is found in several African countries. The first Ebola species was discovered in 1976 near the Ebola River in what is now the Democratic Republic of the Congo. Since then, outbreaks have appeared sporadically in Africa.

The natural reservoir host of Ebola remains unknown. However, on the basis of available evidence and the nature of similar viruses, researchers believe that the virus is animal-borne with bats being the most likely reservoir. Four of the five subtypes occur in an animal host native to Africa.

Transmission

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

When an infection does occur in humans, there are several ways the virus can be spread to others. These include:

- direct contact with the blood or body fluids (including but not limited to feces, saliva, urine, vomit and semen) of a person who is sick with Ebola
- contact with objects (like needles and syringes) that have been contaminated with the blood or body fluids of an infected person or with infected animals

The virus in the blood and body fluids can enter another person's body through broken skin or unprotected mucous membranes in, for example, the eyes, nose, or mouth. The viruses that cause Ebola are often spread among families and friends, because they come in close contact with blood or body fluids when caring for ill persons.

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

Dedicated medical equipment (preferably disposable, when possible) should be used by healthcare personnel providing care for someone sick with Ebola. 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 instrument sterilization, virus transmission can continue and amplify an outbreak.

Signs and Symptoms

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

Signs and Symptoms of Ebola typically include:

- Fever (greater than 38.6°C or 101.5°F)
- Severe headache
- Muscle pain
- Vomiting
- Diarrhea
- Stomach pain
- Unexplained bleeding or bruising

Symptoms may appear anywhere from 2 to 21 days after exposure to Ebola but the average is 8 to 10 days.

Recovery from Ebola depends on the patient's immune response. People who recover from Ebola infection develop antibodies that last for at least 10 years.

Risk of Exposure

Ebola is found in several African countries. Since 1976, Ebola outbreaks have occurred in the following countries:

- Democratic Republic of the Congo (DRC)
- Gabon
- South Sudan
- Ivory Coast
- Uganda
- Republic of the Congo (ROC)
- South Africa (imported)
- Guinea
- Liberia
- Sierra Leone
- Senegal
- Nigeria

Because the natural reservoir host of Ebola, and the manner in which transmission of the virus to humans remain unknown, risk assessment in endemic areas is difficult.

During outbreaks of Ebola, those at highest risk include healthcare workers and the family and friends of a person infected with Ebola. Healthcare workers in Africa should consult the Infection Control for Viral Hemorrhagic Fevers In the African Health Care Setting to learn how to prevent and control infections in these settings. Medical professionals in the United States should consult the Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals.

Diagnosis

Diagnosing Ebola in a person who has been infected for only a few days is difficult because the early symptoms, such as fever, are not specific to Ebola infection and are seen often in patients with more commonly occurring diseases, such as malaria and typhoid fever.

However, if a person has symptoms of Ebola and had contact with blood or body fluids of a person sick with Ebola, contact with objects that have been contaminated with blood or body fluids of a person sick with Ebola or contact with infected animals, 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

Timeline of Infection	Diagnostic tests available
Within a few days after symptoms begin	- Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing - IgM ELISA - Polymerase chain reaction (PCR) - Virus isolation
Later in disease course or after recovery	- IgM and IgG antibodies
Retrospectively in deceased patients	- Immunohistochemistry testing - PCR - Virus isolation

Treatment

Currently there are no specific vaccines or medicines (such as antiviral drug) that have been proven to be effective against Ebola.

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

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

Timely treatment of Ebola 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 not specific to *Ebolaviruses*, cases of Ebola may be initially misdiagnosed.

However, if a person has symptoms of Ebola and had contact with blood or body fluids of a person sick with Ebola, contact with objects that have been contaminated with blood or body fluids of a person sick with Ebola, or contact with an infected animal, 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.

Experimental treatment has been tested and proven effective in some animals but has not yet been evaluated in humans.

Prevention

When cases of the disease do appear, there is increased risk of transmission within healthcare settings. Therefore, healthcare workers must be able to recognize a case of Ebola and be ready to use appropriate infection control measures. The aim of these techniques is to avoid contact with the blood or body fluids of an infected patient.

Appropriate procedures include:

- isolation of patients with Ebola from contact with unprotected persons
- wearing of protective clothing (including masks, gloves, impermeable gowns, and goggles or face shields) by persons caring for Ebola patients
- the use of other infection-control measures (such as complete equipment sterilization and routine use of disinfectant)
- Avoid touching the bodies of patients who have died from Ebola

Healthcare workers should also have the capability to request diagnostic tests or prepare samples for shipping and testing elsewhere.

CDC, in conjunction with the World Health Organization, has developed a set of guidelines to help prevent and control the spread of Ebola. Entitled Infection Control for Viral Hemorrhagic Fevers In the African Health Care Setting, the manual describes how to:

- recognize cases of viral hemorrhagic fever
- prevent further transmission in health care setting by using locally available materials and minimal financial resources