

TerranearPMC Safety Share

Week of August 4, 2014 – Ebola

Fear over Ebola is growing as international leaders and health organizations struggle to try to stop the deadly epidemic in West Africa. According statements from the World Health Organization (WHO) the Ebola outbreak is moving faster than the efforts to control it. This is the first Ebola outbreak in West Africa and involves the most deadly strain in the Ebola virus family: Zaire ebolavirus.

The first reported case of the deadly virus came in 1976 and it is named after the Ebola River in the Democratic Republic of Congo which was where it was discovered. At the time, the area where the disease was spotted was officially recognized as Zaire. The virus has since spread throughout the region. Non-human primates, like gorillas and chimpanzees, have been cited by WHO as possible infection sources for humans, but experts have realized that they are not the source of the problem. The apes have been deemed “accidental hosts,” meaning that they catch the disease and then pass it along but are not the initial “reservoir” source (initial starting point) that produces the virus. Fruit bats are the No. 1 suspect, but it is not clear how Ebola jumps from animals to people. Bush meat is one possibility (meat from wild animals such as fruit bats, rodents, porcupines, gorillas, chimpanzees, and forest antelopes); and once an outbreak occurs, it spreads from person to person.

There are five identified subspecies of *Ebolavirus*. Four of the five have caused disease in humans: Ebola virus (*Zaire ebolavirus*); Sudan virus (*Sudan ebolavirus*); Tai Forest virus (*Tai Forest ebolavirus*); and Bundibugyo virus (*Bundibugyo ebolavirus*). The fifth, Reston virus (*Reston ebolavirus*), has caused disease in nonhuman primates, but not in humans. Experts at the CDC believe that the four strains that affect humans spread largely due to exposure to the blood or bodily secretions of an infected individual, but how the first infected individual caught the disease remains a mystery.

WHO defines a disease outbreak as an instance when there are more cases of the illness reported than what would be considered normal for a defined geographical area or community. An outbreak can last a couple of days or a couple of months. Ebola outbreaks are not a new thing, nor do they only occur in Africa. In 1976 there was an outbreak in England when an accidental stick of a laboratory needle caused an infection. The same year 151 people died in South Sudan when the disease spread though a hospital. In 1995, 250 people died when a forest worker contracted the disease and it spread thought the hospital that he was taken to. In 2001 a similar incident caused 224 people to contract and die from Ebola in Uganda. There have been over 30 documented incidents of various forms of the Ebola strain breaking into the human population since 1976.

The most common form of Ebola, *Zaire ebolavirus*, is derived from *Zaire* (the country in which the Ebola virus was first discovered) while the suffix, *ebolavirus*, denotes an ebolavirus species. Because Ebola is a virus, antibiotics are not effective. A virus is a small infectious agent that replicates only inside the living cells of other organisms. Viruses can infect all types of life forms, from animals and plants to bacteria.

Virus particles (known as virions) consist of two or three parts: i) the genetic material made from either DNA or RNA, long molecules that carry genetic information; ii) a protein coat that protects



TerranearPMC Safety Share

these genes; and in some cases iii) an envelope of lipids that surrounds the protein coat when they are outside a cell. The shapes of viruses range from simple helical forms to more complex structures. The average virus is about one one-hundredth the size of the average bacterium. Most viruses are too small to be seen directly with an optical microscope.

When a human becomes infected with Ebola, there are several ways in which the virus can be transmitted to others. One pathway involves direct contact with body fluids such as blood or secretions of an infected person. Another mode of transmission is an exposure to objects (such as needles) that have been contaminated with infected secretions. Inhalation has NOT been identified as a method of transmission.

Ebola kills anywhere from 50 to 90 percent of those infected, depending on the strain and on where the outbreak is. Doctors say patients die from the effects of high fever, and extreme loss of fluids through vomiting and diarrhea, but early treatment can often save lives. If patients are treated soon enough, saline solution can help stabilize them while their body fights the infection. In the current outbreak, the mortality rate's been about 60 percent. The reasons why some people survive Ebola while others do not is still not fully understood. Health care professionals have recognized that treatment methods and the sophistication of the health care facility provide significant influences. It has also been noted that patients who die usually have not developed a significant immune response to the virus at the time of death.

Symptoms of Ebola typically include fever, headache, joint and muscle aches, weakness, diarrhea, vomiting, stomach pain and lack of appetite. In addition, some patients may experience a rash, red eyes, hiccups, cough, sore throat, chest pain, difficulty breathing and swallowing, along with bleeding inside and outside of the body. Symptoms may appear anywhere from 2 to 21 days after exposure to ebolavirus though 8-10 days is most common.

During outbreaks of Ebola the disease can spread quickly within health care settings (such as a clinic or hospital) where doctors and nurses are susceptible to bodily fluids such as vomit and diarrhea. Family members of deceased Ebola patients are also at risk due to local traditions of washing bodies to prepare for burial, where, unfortunately, Ebola is one disease that remains infectious even after a person has died, so precautions during funerals and burials are still necessary. Therefore it is important that proper PPE, such as gloves and disposable gowns and masks are worn properly while handling potentially infected persons. 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.

While the recent outbreak has caused two US health care workers to become infected (recently sent to Emory University for treatment), the reason for these workers contracting Ebola is still not clear; however, there is a possibility that PPE practices may not have been strictly applied.

.Gravitation cannot be held responsible for two people falling in love

Albert Einstein

