



Biosurveillance Update – August 20, 2014

Ebola

As many of our health providers may be aware, there is an Ebola epidemic in West Africa that seems to be the largest outbreak of its kind in its known history. The CHCANYS Emergency Management Team and the Primary Care Emergency Preparedness Network (PCEPN) have been working closely with our partners to stay informed about the disease, pushing out information as needed and reviewing our biological agent plans to ensure that they are up to date in the event that they are needed. The Centers for Disease Control (CDC), the New York City Department of Health and Mental Hygiene (DOHMH) and the New York State Department of Health (NYSDOH) have been keeping our ESF-8 Health and Medical partners informed and have pushed out several guidance documents on the identification and diagnosis of patients potentially infected with Ebola, should they present in New York.

Formally known as Ebola Hemorrhagic Fever, Ebola Virus Disease (EVD) first appeared in the human population in 1976 in two simultaneous outbreaks located in Nzara, Sudan and Yambuku, Democratic Republic of Congo (formally Zaire). Yambuku is a small village that is situated close to the Ebola River, from which the disease takes its name. Ebola is a zoonotic disease that appears to have jumped from animals to humans through contact with infectious animal products and/or fluids. It is spread from human to human through contact with bodily fluids. Various outbreaks have occurred since the virus was first discovered. Typically, these outbreaks have been confined to the above mentioned nations and have been very limited regionally.

Genus Ebolavirus is a member of the *Filoviridae* family (filovirus), along with genus Marburgvirus and genus Cuevavirus¹. As the family name indicates, Ebola is a thread-like virus that carries a helical singular linear negative-sense ssRNA that is wrapped by a protein coat which is studded with glycoproteins. Ebola is comprised of five (5) distinct species:

1. Bundibugyo ebolavirus (BDBV)
2. Zaire ebolavirus (EBOV)
3. Reston ebolavirus (RESTV)
4. Sudan ebolavirus (SUDV)
5. Tai Forest ebolavirus (TAFV)

Typically, BDBV, EBOV, and SUDV have been associated with outbreaks in Africa. RESTV and TAFV have been identified in Asia; however, neither illness nor death from these species has been reported to date in the human population². While prior EVD outbreaks have occurred in central and lower west Africa near the tropical rain forests, the present outbreak has been centered in the far west African nations of Guinea, Sierra Leone, and Liberia. Its natural reservoir seems to be the common fruit bat. All three nations have little experience with EVD as it has never been detected there before. Additionally, these nations have been plagued by political unrest and war, making their medical infrastructure less robust than in western nations.

¹ Ebola Virus Disease. <http://www.who.int/mediacentre/factsheets/fs103/en/>. Accessed 8/14/2014.

² Ebola. Baylor College of Medicine. <https://www.bcm.edu/departments/molecular-virology-and-microbiology/ebola> Accessed on August 15, 2014.

Ebola is a highly virulent pathogen, historically sporting an 80-90% mortality rate. While the mortality rate associated with the current outbreak is lower (about 50-60%), the number of patients identified is far greater than in any outbreak seen before. As of the writing of this article, over 1,700 cases have been identified, and approximately 950 deaths reported.

Patients infected with EVD initially present with flu-like symptoms which typically include fever, general weakness, and myalgia. As the disease progresses, patients develop coagulation abnormalities and internal bleeding caused by damage to the blood vessels, exaggerated (non-protective) inflammatory responses, and viremia. Once the virus infects the vascular endothelial cells, vascular integrity is compromised, causing bleeding into the spaces. Typically, EVD patients die from diffuse bleeding terminating in hypovolemic shock and severe hypotension³.

In a joint decision with the Centers for Disease Control (CDC), a healthcare relief group recently brought two healthcare workers diagnosed with EVD to Emory University Medical Center in Atlanta for treatment. Both were exposed to and contracted EVD in the healthcare environment while working in Liberia. Aside from these two patients, there have been no reported cases of Ebola in the United States. However, due to the duration of the incubation phase, it is possible for a patient with Ebola to become sick in the air while traveling to the United States or upon arrival. Therefore, health facilities (specifically those located in air travel hub cities) should prepare for possible presentation and review their plans for the management of these patients.

Recently, a suspected patient with suspicious symptoms was examined in a primary care setting in New York City. The attending physician notified the designated hospital, and the patient was transferred to the emergency department for testing. The tests were negative. To date, this has been the only case warranting testing for Ebola in the United States.

The CDC, working closely with the State and NYC Departments of Health, have published several alerts and guidance documents regarding this disease during the past few weeks. These guidance documents state that clinicians should do the following if confronted with a potential presentation:

1. *Collect a travel history.*
2. *Immediately isolate any patient, using strict standard, contact and droplet precautions.* It is preferable that the patient be isolated in a negative pressure room; however, in the primary care setting, placing the patient in a room with the door closed is acceptable. Both the patient and the persons in contact with him/her should wear standard droplet precaution personal protective equipment, including a gown, gloves, shoe covers, eye protection, and an N-95 mask.⁴ Isolation should be considered for any patient with a travel history to the affected areas within 21 days of illness and either: (a) a fever of greater than or equal to 101.5 degrees F; or (b) other possible symptoms of EVD, such as severe illness with thrombocytopenia and elevated transaminases.
3. *Ask patients meeting these criteria about their potential exposures within the 21 days preceding illness onset.* The questions to ask are as follows:
 - a. Has the patient had any contact with a person with known or suspected EVD?
 - b. Has the patient worked or spent time in a healthcare facility where EVD patients were being treated?
 - c. Has the patient worked in a laboratory where specimens from EVD patients were being analyzed or processed?

³ N.Sullivan, Z. Yang, and G. Nabel. Ebola Virus Pathogenesis: Implications for Vaccines and Therapies. *Journal of Virology*. Sept. 2003, p 9733-9737.

⁴ During the transport of the EVD infected clinicians to Emory, some may have seen on media channels the patient and the medic get out of the ambulance in a Tyvek suit with a PAPR. This choice of PPE was likely due the realities of transporting someone in an ambulance rather than the need to protect against infection. This level of PPE is currently not recommended for the office or hospital setting.

- d. Has the patient participated in any funeral rites or have other exposure to human remains in the EVD outbreak areas?
4. *If the patient meets any of the above criteria, call the health department at 1-866-692-3641 to report the case to public health.*

In the primary care setting, immediately ask any patient with a fever about travel history and isolate any patient who traveled to the aforementioned areas before continuing the interview. In their differential diagnoses, clinicians should include other potential causes of fevers that include, but are not limited to malaria, rickettsia infection, gastroenteritis, typhoid fever, and influenza. Ebola is not transmitted in the air. It is susceptible to common disinfectants and drying, although the virus can live ex-corporally for several days if kept in a moist environment.

For more information on the current outbreak, please visit the [CDC website](#). Click below additional resources:

- [Recent Ebola-related alerts issued by the NYC Department of Health and Mental Hygiene \(NYCDOHMH\)](#)
- [Ebola resource list compiled by the CDC](#)
- [Ebola Evaluation Algorithm](#)
- [NYS/NYC Laboratory Guidelines for Handling Specimens from Cases or Suspected Cases of Ebola Virus Disease](#)
- [Patient Signage](#)

For any further questions regarding the outbreak, please contact Mario Gonzalez at mgonzalez@chcanys.org.

Eastern Equine Encephalitis

A patient in Onondaga County has tested positive for the virus that causes eastern equine encephalitis (EEE). The adult was hospitalized and is now in stable condition and recovering. The virus is carried and transmitted through infected mosquitos; there is a 33% mortality rate for those who develop the disease. Most reported cases have occurred in the Atlantic and Gulf Coast region of the United States. Severe EEE is rare, and only a few cases are reported to public health each year. Most patients who carry the disease do not develop symptoms. When it does develop, the disease causes inflammation of the brain and is characterized by a sudden onset of symptoms that include headache, fever, and vomiting. Symptoms usually begin 4-10 days after a bite from an infected mosquito. As the illness progresses, the patient may develop an altered mental status, confusion, seizures, and coma. There is no specific cure for EEE; treatment mainly consists of addressing the symptoms. For more information about EEE, please visit the [CDC website](#).