EPI Monthly Report

Florida Department of Health in Miami-Dade County

WWW.DADEHEALTH.ORG

Ebola Virus Disease

Isabel Griffin, MPH, Kristin Campbell, MPH

Inside the Issue

Epidemiology, Disease Control & Immunization Services

8600 NW 17th Street

Suite 200

Miami, Florida 33126

Tel: (305) 470-5660

Fax: (305) 470-5533

Since March of 2014, **Ebola virus disease (EVD)** has been spreading throughout western Africa in the countries of Sierra Leon, Nigeria, Liberia, and Guinea. This virus is just one of five viral hemorrhagic subspecies. The other four include the Sudan virus (Sudan ebolavirus); Tai Forest virus (Tai Forest ebolavirus, formerly Cote d'loviore ebolavirus); Bundibugyo virus (Bundibugyo ebolavirus); and Reston virus (Reston ebolavirus). The last two cause disease in non-human primates, but not in humans (1).

Transmission

The natural reservoir of the virus, and the manner in which transmission of the virus to humans occurs, remains unknown. Researchers suspect that fruit bats of the *Pteropodidae* family are the most likely natural host (2). The transmission cycle begins when a human or primate comes into contact with an infected animal, initial human infection results from contact with these animals, and then human-to-human transmission is achieved through close contact with an infected individual (refer to Figure 1) (3). Researchers do know that four of the five subtypes occur in an animal host native to Africa (2).

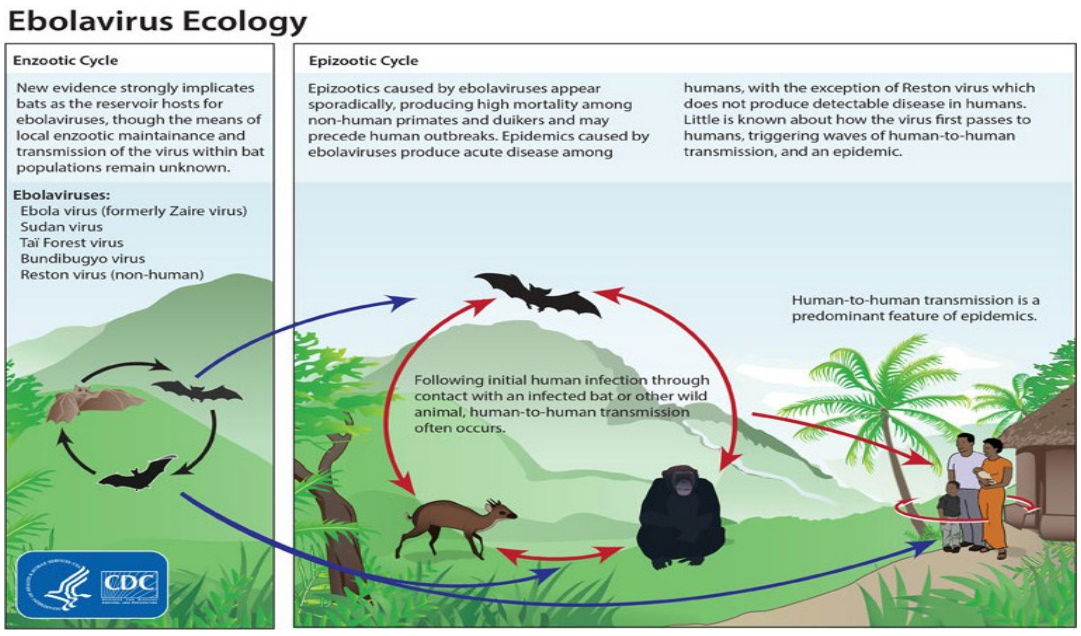
Pathogenesis of the Virus

According to the CDC, the virus enters the patient through mucous membranes, migrating from the initial infection site to the lymph nodes and subsequently to the liver, spleen, and adrenal gland (4). Although not infected by the virus, lymphocytic apoptosis results in decreased white blood cell counts. Liver toxicity leads to coagulopathy. The virus also appears to trigger the release of pro-inflammatory cytokines with subsequent vascular leak and impairment of clotting resulting in multi-organ failure and shock. The incubation period may be related to the infection route (i.e., 6 days for injection versus 10 days for contact).

Signs and Symptoms

Symptoms of EVD typically include severe acute viral illness, with sudden onset of fever,

Figure 1:



malaise, myalgia and headache, followed by pharyngitis, vomiting, diarrhea and maculopapular rash. In severe and fatal forms, the hemorrhagic is diathesis accompanied by hepatic damage, renal failure, central nervous system involvement and terminal shock with multi-organ dysfunction (5). Patients with fatal disease usually develop more severe clinical signs early during infection and die typically between 6 and 16 days of complications including multi-organ failure and septic shock. In non-fatal cases, patients may have a fever for several days and improve, typically around day 6 to 11 (6).

Laboratory Findings

Laboratory findings usually show lymphopenia, severe thrombocytopenia and transaminase elevation (AST greater than ALT), sometimes with hyperamylasemia, elevated creatinine and blood urea nitrogen levels during final renal failure phase, which indicates abnormal liver function (5).

Specimen Collection, Testing and Diagnosis

During the first couple of days after symptoms begin, CDC recommends diagnostic testing to include IgM ELISA, PCR, and virus isolation (7). Later in the course of the disease or after recovery, IgM and IgG antibodies indicating current and recent infection, respectively, can be used for diagnostics. Retrospectively in deceased patients, testing can include PCR, virus isolation and immunohistochemistry testing. Specimens should be 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 CDC in glass containers. Do not submit specimens preserved in heparin tubes. Specimens should be stored at 4°C or frozen.

Testing is recommended for all high risk persons who have an onset of fever within 21 days and a high risk exposure, such as mucous membrane exposure or contact with body fluids of a person with EVD without appropriate PPE, lab processing of body fluids of EVD cases without appropriate PPE, or participation in funeral rites or other direct exposure to human remains without appropriate PPE in the geographic locations where the outbreak is occurring. Testing is recommended for all low risk persons with development of fever with other symptoms and have unknown or abnormal blood work findings (see *Laboratory Findings*) and have spent time in an Ebola healthcare facility, have had contact with household members of an EVD patient without high-risk exposure, or had direct unprotected contact with bats or primates from EVD-affected countries.

Risk Factors

In past outbreaks, the majority of cases occurred among healthcare workers treating Ebola patients. Ebola has an extremely high attack rate within households as household members typically care for symptomatic patients prior to being brought to hospitals. Transmission during funerals is common as a result of local burial practices and excretion of infectious bodily fluids post-mortem.

Treatment

There is no specific antiviral or licensed vaccine available, only supportive therapy. Patients are given supportive care through intravenous fluids, blood pressure management, and maintenance of oxygen status and treatment of secondary infections. An experimental treatment called ZMapp, created by Mapp Biopharmaceuticals in San Diego, California, has been given to several Ebola patients; however, it has not officially been tested in humans for safety and effectiveness (8). The drug is intended for treatment, not prevention of Ebola.

Prevention

The most effective way to stop the current outbreak is to continue surveillance efforts to find new Ebola cases, isolate and care for those patients, and trace contacts to stop the deadly chain of transmission. Educating communities about safe burial practices, recognizing the signs and symptoms of Ebola, and strict adherence to infection control guidelines within hospitals treating Ebola patients. For patients in the United States, the CDC recommends placing patients in a single patient room (containing a private bathroom) with the door closed. Healthcare workers should wear gloves, gowns, shoe covers, eye protection and a face mask. Aerosol-generating procedures should be avoided. If performing these procedures, PPE should include respiratory protection (N95 mask or higher) and the procedure should be performed in an

airborne isolation room. CDC also recommends diligent environmental infection control through cleaning and disinfection of contaminated items and safe disposal of contaminated materials, such as blood, sweat, emesis, feces and other infectious bodily secretions.

The Current Outbreak in Western Africa

There have been a total of 2,615 confirmed and suspect cases and 1,427 deaths in Guinea, Liberia, Nigeria and Sierra Leone, as of August 20, 2014 (2). The World Health Organization has estimated the mortality of the current outbreak to be approximately 55%, but it appears to be as high as 75% in Guinea (2). According to the Director of the CDC Dr. Thomas Frieden, this outbreak is different from previous outbreaks in four major ways (9). Outbreaks in the past were sporadic and confined to rural areas, whereas this outbreak is occurring in heavily populated communities, moving across the borders of adjacent countries, creating a tri-country epicenter. This outbreak is larger than all other Ebola outbreaks combined. This is the first outbreak in Western Africa, a region that lacks expertise and resources to manage a disease such as Ebola. This was also the first time we are treating Ebola patients on United States soil. Two Ebola patients, who became infected while doing humanitarian aid work in Liberia, have been treated at Emory University Hospital where both patients received the experimental drug ZMapp. As of today, both patients have recovered and been released from the hospital.

What to do if you suspect Ebola

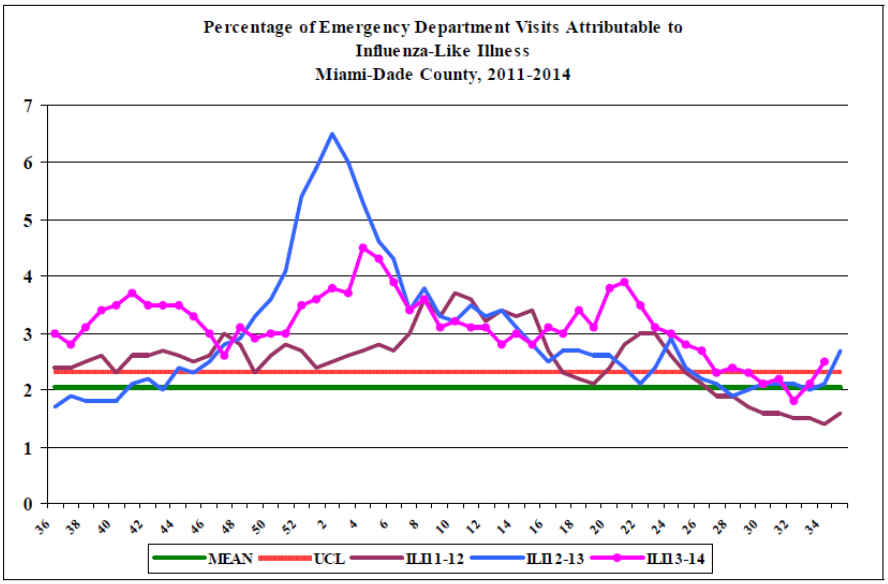
If you suspect a patient may have Ebola, obtain patient demographics, clinical symptoms (specifically the presence of fever 101.5°F), travel history (including countries and dates of travel), purpose of travel and occupation. Those volunteering in healthcare settings with Ebola patients are at a much higher risk of exposure. Refer to CDC guidance regarding management of Ebola in healthcare settings in the United States and infection control.

Immediately report all suspect cases of Ebola to the Florida Department of Health in Miami-Dade County, Epidemiology, Disease Control and Immunization Services Department (24/7) at 305-470-5660. The Florida Department of Health will notify the Centers for Disease Control.

References

1. Centers for Disease Control and Prevention. About Ebola Hemorrhagic Fever. August 5, 2014. Retrieved from http://www.cdc.gov/vhf/ebola/about.html
2. World Health Organization. Ebola Virus Disease. April 2014. Retrieved from http://www.who.int/mediacentre/factsheets/fs103/en/
3. Centers for Disease Control and Prevention□National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)□ Division of High-Consequence Pathogens and Pathology (DHCPP)□Viral Special Pathogens Branch (VSPB). Ebolavirus Ecology. August 2014. Retrieved from http://www.cdc.gov/vhf/ebola/resources/virus-ecology.html
4. Centers for Disease Control and Prevention. Ebola Virus Disease Information for Clinicians in U.S. Healthcare Settings. August 10, 2014. Retrieved from http://www.cdc.gov/vhf/ebola/hcp/clinician-information-us-healthcare-settings.html
5. Heymann, D. Control of Communicable Diseases Manual, 19th Edition. American Public Health Association. 2008.
6. Centers for Disease Control and Prevention. Ebola Hemorrhagic Fever Fact Sheet. 2014. Retrieved from http://www.cdc.gov/vhf/ebola/resources/pdfs/Ebola-FactSheet.pdf
7. Centers for Disease Control and Prevention. Interim Guidance for Specimen Collection, Transport, Testing, and Submission for Patients with Suspected Infection with EVD. August 21, 2014. Retrieved from http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html
8. Centers for Disease Control and Prevention. Questions and Answers on Experimental Testing and Vaccines for Ebola. August 8, 2014. Retrieved from http://www.cdc.gov/vhf/ebola/outbreaks/guinea/qa-experimental-treatments.html
9. C-SPAN. Ebola Virus. August 7, 2014. Retrieved from http://www.c-span.org/video/?320862-1/hearing-ebola-outbreak-africa

Influenza-Like-Illness, All Age



During this period, there were 23,033 ED visits; among them 564 (2.5%) were ILI. At the same week of last year, 2.1% of ED visits were ILI.

PARTICIPATE IN INFLUENZA SENTINEL PROVIDER SURVEILLANCE

Florida Department of Health in Miami-Dade County NEEDS Influenza Sentinel Providers!

Sentinel providers are key to the success of the Florida Department of Health's Influenza Surveillance System. Data reported by sentinel providers gives a picture of the influenza virus and ILI activity in the U.S. and Florida which can be used to guide prevention and control activities, vaccine strain selection, and patient care.

- Providers of any specialty, in any type of practice, are eligible to be sentinel providers.
- Most providers report that it takes **less than 30 minutes a week** to compile and report data on the total number of patients seen and the number of patients seen with influenza-like illness.
- Sentinel providers can submit specimens from a subset of patients to the state laboratory for virus isolation **free of charge**.

For more information, please contact

Lakisha Thomas at 305-470-5660.

TO REPORT ANY DISEASE AND FOR INFORMATION CALL:
Epidemiology, Disease Control & Immunization Services

Childhood Lead Poisoning Prevention Program 305-470-6877
Hepatitis 305-470-5536
Immunizations or outbreaks 305-470-5660
HIV/AIDS Program 305-470-6999

STD Program 305-575-5430
Tuberculosis Program 305-575-5415

Immunization Service 305-470-5660

To make an appointment.....786-845-0550

About the Epi Monthly Report

The Epi Monthly Report is a publication of the Florida Department of Health in Miami-Dade County: Epidemiology, Disease Control & Immunization Services. The publication serves a primary audience of physicians, nurses, and public health professionals. Articles published in the Epi Monthly Report may focus on quantitative research and analysis, program updates, field investigations, or provider education. For more information or to submit an article, contact Isabel Griffin at (305) 470-5660.

Miami-Dade County Monthly Report
Select Reportable Disease/Conditions
July 2014

Diseases/Conditions	2014 Current Month	2014 Year to Date	2013 Year to Date	2012 Year to Date
HIV/AIDS				
AIDS*	40	381	463	317
HIV	126	817	889	616
STD				
Infectious Syphilis*	38	207	204	195
Chlamydia*	825	5646	5962	5422
Gonorrhea*	189	1182	1407	1410
TB				
Tuberculosis**	18	80	71	45
Epidemiology, Disease Control & Immunization Services				
Epidemiology				
Campylobacteriosis	53	232	206	190
Chikungunya Fever	16	16	0	0
Ciguatera Poisoning	9	9	9	3
Cryptosporidiosis	3	15	13	13
Cyclosporiasis	1	1	2	1
Dengue Fever	6	14	16	9
Escherichia coli, Shiga Toxin-Producing	1	7	4	4
E. coli, Non-O157	0	0	0	0
Encephalitis, West Nile Virus	0	0	0	0
Giardiasis, Acute	22	132	152	117
Influenza Novel Strain	0	0	0	0
Influenza, Pediatric Death	0	1	1	2
Legionellosis	0	8	17	8
Leptospirosis	0	0	0	0
Listeriosis	0	2	1	1
Lyme disease	0	2	1	2
Malaria	0	3	5	5
Meningitis (except aseptic)	0	13	23	14
Meningococcal Disease	0	6	11	11
Salmonella serotype Typhy (Typhoid Fever)	0	1	1	2
Salmonellosis	87	330	305	254
Shigellosis	54	586	26	29
Streptococcus pneumoniae, Drug Resistant	0	35	61	46
Vibriosis	2	4	9	1
West Nile Fever	0	0	0	0
Immunization Preventable Diseases				
Measles	0	0	0	0
Mumps	0	0	0	1
Pertussis	3	19	31	37
Rubella	0	0	0	0
Tetanus	0	0	0	0
Varicella	5	29	47	31
Hepatitis				
Hepatitis A	6	21	15	19
Hepatitis B (Acute)	1	7	10	12
Lead				
Lead Poisoning	5	35	57	49

*Data is provisional at the county level and is subject to edit checks by state and federal agencies.

** Data on tuberculosis are provisional at the county level.