

A Report on the *Zaire ebolavirus* (Ebola)

Prepared for -----

ENG 107 Technical Writing Class

Submitted on April 30, 2015

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ACKNOWLEDGMENTS

I would like to express my thanks to the people who have helped me throughout this report. Firstly, I am most thankful to Professor ----- for providing me with the guidance to write an effective and comprehensive report. I would also like to thank her for giving me the proper formatting required. Next, I would like to thank Dr. -----for helping me compile the necessary and proper resources for this report. Furthermore, I would like to thank --- ----- for helping me edit and proof read my report wherever necessary before the final submission. Lastly, I would also make a point of thanking my parents for supporting me through the writing process of this report. (actually pol)

EXECUTIVE SUMMARY

In 2014, there was an outbreak of Ebola in Africa. This outbreak spread more rapidly and more aggressively than any recent infectious diseases. This caused a world-wide focus on the issue. At the time, it seemed that it would not stop spreading and the disease would spread to other nations uninhibited. There were many reasons why Ebola was allowed to spread so wildly in Africa. One reason the outbreak happened is due to the diet of the Africans and their cooking practices. Further yet, a more prevalent reason for the Ebola outbreak is that the African infrastructure in medicine was below sub-par; with proper teaching and implementing of medical practice the Ebola outbreak began to be beaten back. Lastly, a big reason for the Ebola outbreak was the lack of cultural awareness of the disease and superstitious beliefs. With the proper care and education of the African people, the world was able to stop the aggressive spread of Ebola. Many doctors risked their lives to make sure that Ebola was stopped as soon as possible.

INTRODUCTION

On March 14, 2014, "A new disease that we do not know the name was reported in the prefecture of Macenta located 800 KM from Conakry, killing 8 people dead and several others contaminated learned Africaguinee.com. Symptoms "manifested by anal and nasal bleeding." Seems to resemble Lassa Fever.", Ebola, was discovered (Ebola Map). That day marked the beginning of a disease that would shake all of West Africa and force the world to intervene. Ebola's scientific name is *Ziare ebolavirus*. An infection from a virus from the family *Filoviridae* and genus *Ebolavirus* causes Ebola. During hundreds of days, across multiple countries, the Ebola virus infected 26,325 people and killed 10,905 (Center for Disease Control and Prevention (CDC)).

The transmission of the Ebola virus is primarily caused by animals that can host the Ebola virus. Natural carriers of the virus are fruit bats from the *Pteropodidae* family and bush meat, monkeys, gorillas, chimpanzees, forest antelope, rodents, and porcupines found dead or ill in the jungle. Once a human interacts with the infected host the virus spreads through any form of fluid contact, direct or indirect. This means that anything that was wet from an Ebola carrier is now a highly contagious contagion. Dead bodies can carry the Ebola virus; this makes disposal of victims very difficult (World Health Organization (WHO)).

The symptoms of Ebola are fever, unexplained hemorrhaging, severe headache, abdominal pain, muscle pain, vomiting, weakness, diarrhea, and fatigue. These symptoms can appear anywhere from 2 to 21 days from exposure, but on average, the symptoms show up from at 8 to 10 days after infection. There is no current cure for Ebola. However, Ebola can be overcome based upon how well the medical care and overall immune system strength a person has. The new-found immunity to Ebola after survival can last for at least 10 years (CDC). It is

difficult to identify Ebola from other common infectious diseases. Symptom cause confirmation can be ascertained by the following methods: antibody-capture enzyme-linked immunosorbent assay (ELISA), antigen-capture detection tests, serum neutralization test, reverse transcriptase, polymerase chain reaction (RT-PCR) assay, electron microscopy, and virus isolation by cell culture. The testing samples are an “extreme biohazard risk” and should be handled under “maximum biological containment” (WHO).

Figure 1:

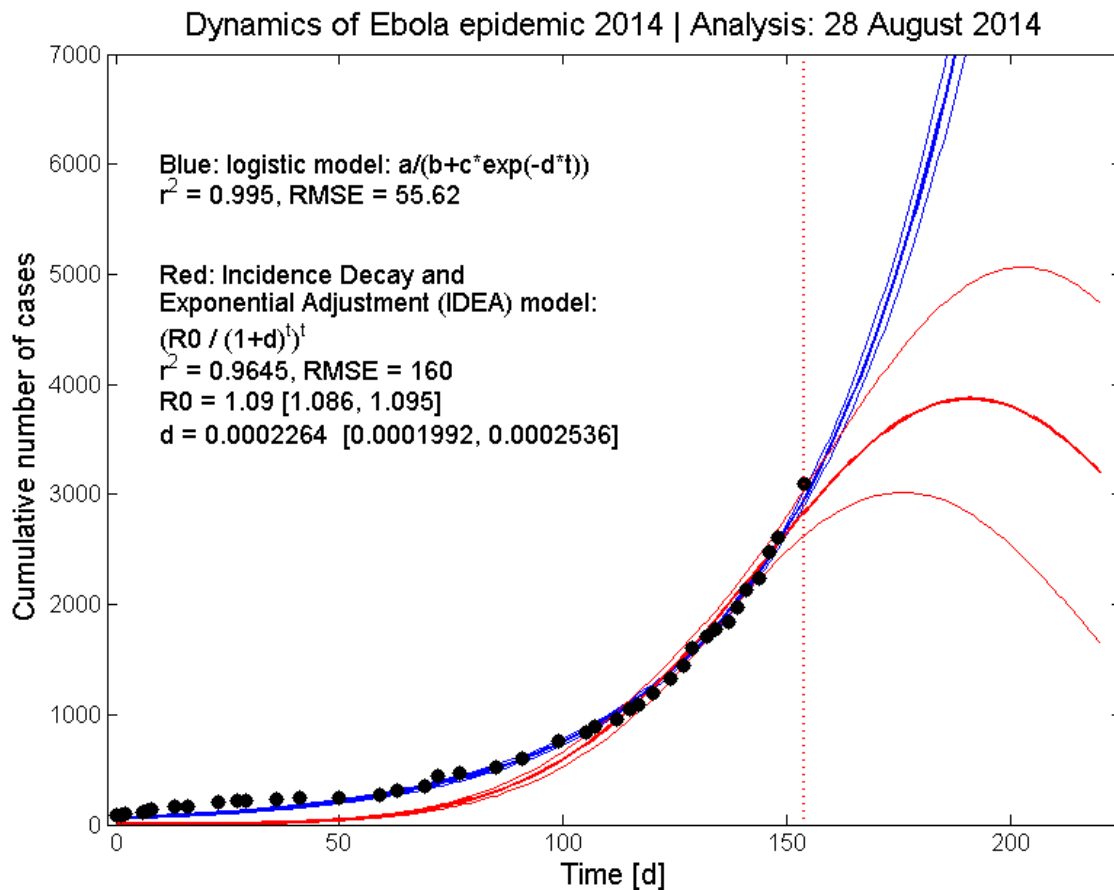


Figure 2:

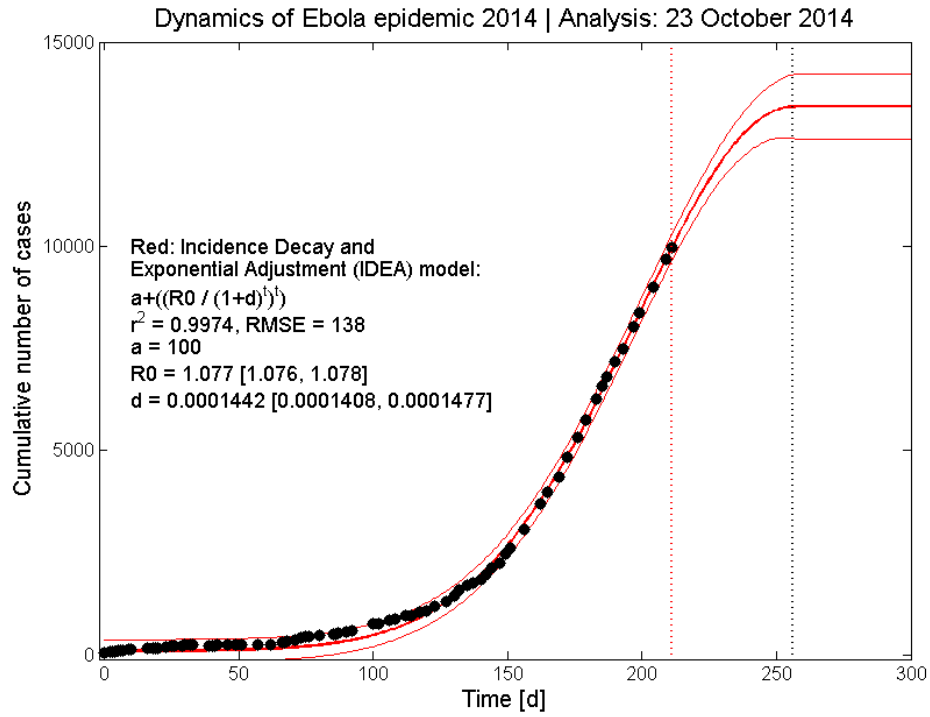
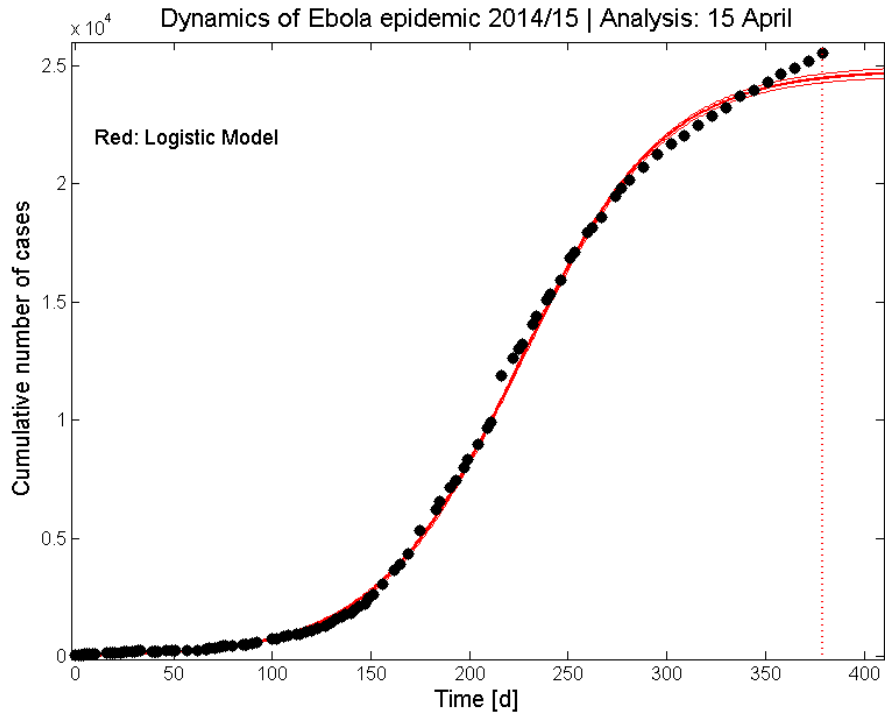


Figure 3:



Figures 1, 2, and 3 illustrate the spread of Ebola over the course of hundreds of days. Figure 1 is an early statistical data model of Ebola infection cases per day scale. Using logistical models and IDEA models Dr. Felix Scholkmann extrapolates and plots the data to provide a visual representation of the infectious disease's growth. The first figure shows that the virus is predicted to spread exponentially if there is no containment progress compared to the linear modeling in the first 2 months of infections. Figure 2 is a remodeled graph after containment measures were implemented. Notice the plateau in the projections. This demonstrates that the infection rate has reached zero. Figure 3 lastly shows that now the virus is finally dying out with proper containment measures. Enough data has been provided to properly graph the growth of Ebola.

All of these figures show the severity of the Ebola outbreak in West Africa. If there were no containment measures implemented figure 1's blue model would be true until everyone started to die or become immune, millions could have died, an extreme severity case. The next model illustrates that the implementation of containment will save millions of lives, a medium severity case. Lastly, figure 3 confirms the projections with real world data, a low severity case. Ebola is quickly dying out due to modern medical care techniques; however, this outbreak would never have happened if Africa had followed modern trends with regards to lifestyle. Therefore, the purpose of this report is to help illustrate and explore the reasons why the extremely deadly outbreak of Ebola happened in West Africa and what is done to prevent and subdue such outbreaks.

BODY

Infectious diseases are a plague upon all of humanity. With that said, I am very invested in this topic because of the reasons why the outbreak occurred. Each reason could have been prevented easily if an effort had been made by both locals and other countries. Through research of the contributing factors to the outbreak of Ebola virus, I found multiple times that the blatant disregard for hygiene, cultural differences, and medical inferiority were the main contributors to it. This led me to a trove of scientific and cultural research.

Reason #1: Food Consumption Practices

I saw a very disturbing video on YouTube called “Rat Meat and Ebola.” It features a man roasting a rat over a trashcan fire. This man is in Ghana and is ignoring the national warning to not eat bush meat. While he is cooking this rat he seems to be happily chanting “Ebola” while slapping the rat as if it is just a game. This blatant disregard for cuisine hygiene is one of the most horrifying and shocking examples of the nonsensical attitude towards Ebola at the time of the outbreak. This clear problem most definitely contributed to the explosive growth of Ebola.

Additionally, another video on YouTube, by Vice, and called “Monkey Meat and the Ebola Outbreak in Liberia,” shows the substandard practices of cuisine hygiene that has attributed to the Ebola crisis. In the middle of the video, about at the 9 minute mark, it shows the conditions of meat sale in an Ebola risk area. The locals are proudly eating meat that can be contaminated and are very stubborn in their diet beliefs. The video then transitions to showing the butchering of fresh bush meat. The wife cuts herself while preparing the raw meat. She then proceeds to continue cutting the meat. This very obvious form of transition is apparent to even the youngest children in western society; however, the people of Africa show no regard to the

mixing of human and animal blood. What makes this practice even worse is that everyone in Liberia, where the video takes place, believes that Ebola is just a governmental scheme to shaft the people. These two videos just show a fraction of the millions of people who hold the same beliefs. These conditions are more than perfect for an infectious disease to spread madly. Even as bad as the conditions presented by these videos were, there are more reasons to why Ebola blew up in West Africa.

Reason #2: Medical Inferiority

The state of the medical infrastructure of West Africa is in shambles compared to any western country. The YouTube video by Vice called “Monkey Meat and the Ebola Outbreak in Liberia” illustrates this throughout the entire first half of the video. The hospital for Ebola testing is a facility from the 1980’s and the containment suits have to be re-used multiple times. The video also points out that the Liberian government is horribly corrupt and ineffective. This can be related to all West African countries. This lack of organization helped the outbreak immensely.

Paul Farmer, a physician, visited Liberia after the Vice video. Ironically, Liberia became an Ebola hotspot after the Vice reporter left. That outcome furthers the strength of the first reason I proposed to the spread of Ebola. Farmer wrote about the medical infrastructure:

Both nurses and doctors are scarce in the regions most heavily affected by Ebola. Even before the current crisis killed many of Liberia’s health professionals, there were fewer than fifty doctors working in the public health system in a country of more than four million people, most of whom live far from the capital. That’s one physician per 100,000 population, compared to 240 per 100,000 in the United

States or 670 in Cuba. Properly equipped hospitals are even scarcer than staff, and this is true across the regions most affected by Ebola. Also scarce is personal protective equipment (PPE): gowns, gloves, masks, face shields etc. In Liberia there isn't the staff, the stuff or the space to stop infections transmitted through bodily fluids, including blood, urine, breast milk, sweat, semen, vomit and diarrhoea. Ebola virus is shed during clinical illness and after death: it remains viable and infectious long after its hosts have breathed their last. Preparing the dead for burial has turned hundreds of mourners into Ebola victims.(Farmer)

This quote from Farmer quite clearly states the poor situation for West African medical strength. Moreover, Farmer points out that the medical infrastructural damage caused by the Ebola outbreak will be coupled with the AIDS, tuberculosis, and malaria strain on the West African government to “gravely affect” trade and commerce. This path of events causes a domino effect to take place further forcing the medical system of West Africa to crumble. This then provides a perfect environment for Ebola infections to increase. Then, this failure by the government further bolsters the local's mistrust of the government. This, in turn, causes another ideal situation for Ebola to spread.

Reason #3: Culture and Superstitions

The culture in West Africa is immensely different from Western culture. The Vice video from YouTube shows this best. It shows how Africans keep wild disease carrying animals as pets. It also shows the lack of medical awareness. This lack of medical awareness is pointed out by the man who keeps a monkey. He does not seem to understand that a monkey can carry a deadly virus to humans while being perfectly healthy itself. Additionally, the first Ebola victim,

patient zero, was a young boy who was playing with wild animals, something you would never see in a western country. In his article, Stableford writes, “According to ... colony of insectivorous free-tailed bats.” This behavior is not encouraged in western society. The active action of playing with wild animals and hunting them without proper precautions can easily spread disease. Nevertheless, in West Africa, it is commonplace to play with wild animals or keep them as pets. This is a cultural detriment to the West African society.

Another aspect of West African beliefs that attributed to the Ebola outbreak was superstition. An article written by Ludovica Iaccino details the effects of this superstition. A meme was made to instill fear and panic into the West African locals by a popular image board (Iaccino). I quote, “The meme did find its way onto the Nairaland (Nigerian forum), where one user wrote a post claiming that Europe and America 'hate Africans and worship an Ebola demoness who they call 'Ebola-Chan'. They perform magical rituals in order to spread the disease and kill people. They target the area they want to infect next using blood sacrifices” (Iaccino). Also, Iaccino wrote, “Aid workers struggling against the virus in West Africa had already previously reported the challenge of misinformation and mistrust among communities, with some believing the disease to be the work of 'sorcerers'.” This shows how superstitious the people are. A group of trolls (online provocateurs) effectively helped the spread of Ebola by convincing the locals that it was a product of black magic and caused panic. Panic is the worst possible outcome to any emergency.

CONCLUSION

Through the course of my research into the Ebola crisis of 2014, I have discovered that there were many reasons as to why the infectious disease exploded so aggressively in West Africa. It is completely true that the difference in culture, between Westerners and Africans, is the underlying cause of the outbreak. Food culture is horribly unhygienic as compared to Western practices in West Africa. A horrible medical system and poor government helped the disease to spread even further. Finally, the superstitious and cultural differences between African society and Western society added to the infection rate of Ebola. Accounting for these three reasons, West Africa is the perfect environment for an infectious disease to thrive. What is more, even when considering that Ebola is a fluid-borne virus it still spread at astounding rates.

RECCOMENDATIONS

President Obama took the helm of fighting the Ebola crisis in West Africa. According to the *New York Post* President Obama sent 3,000 military troops into afflicted regions to help the local government fight Ebola. The article states that the initiatives put forth by the administration entails:

- Train as many as 500 health care workers a week.
- Erect 17 health care facilities in the region with 100 beds each.
- Set up a joint command headquartered in Monrovia, Liberia, to coordinate between US and international relief efforts.

— Provide home health care kits to hundreds of thousands of households, including 50,000 that the US Agency for International Development will deliver to Liberia this week.

— Carry out a home- and community-based campaign to train local populations on how to handle exposed patients.

In addition to this effective and organized plan to stop Ebola, the CDC outlines the proper preventative steps to keep oneself free from Ebola. Practicing careful hygiene in the form of washing hands with disinfectant, alcohol, or soap and water is essential to preventing Ebola infections. Another preventative measure is to not handle any items that have come in contact with an infected person's bodily fluids such as vomit, saliva, urine, feces, blood, breast milk, semen, sweat, and vaginal fluids. Another good way to prevent Ebola outbreaks is to avoid any bats or non-human primates, dead or living (CDC).

Lastly, a major way to combat Ebola infections is to dispose of the dead properly. An article by Joe DeCapua proves this effectively. DeCapua writes that, "In Monrovia, Anita Dullard is the spokesperson ... last July to April of this year safely buried more than 3,500 bodies." This goes to show that proper burial of victims is imperative. Amazingly, due to the safety measures implemented in West Africa, from burial to preventative measures, the WHO is set to declare that Liberia will be Ebola free if no new cases are reported on May 9th (DeCapua).

I believe that in addition to the implementation of these features a basic education of the West African locals is needed. The people's food consumption practices paired with their culture and superstitions are directly related to a lack of general education. The local's medical infrastructure is directly related to a lack of advanced education. If West Africans were educated

to the level of modern Western high-school students in hygiene and social behaviors, I believe that infectious disease outbreaks would plummet. The simple actions of eating carefully and washing off outside contaminants are imperative to any modern society. Also, educating more doctors to help guide the population of Africa to a cleaner and brighter future is needed. With a strong education system, I believe that the youths of Africa can rise up to lead their nations into new prosperity, if not to just ensure that no more infectious disease crises are born from the squalor of an impoverished society.

BIBLIOGRAPHY

DeCapua, Joe. "Liberia Burials Key in Ebola Fight." VOA. Voice of America, 30 Apr. 2015.

Web. 30 Apr. 2015. <<http://www.voanews.com/content/ebola-burials-liberia-30apr15/2743281.html>>.

"Ebola Hemorrhagic Fever." *Centers for Disease Control and Prevention*. Centers for Disease Control and Prevention, 30 Apr. 2015. Web. 30 Apr. 2015.

<<http://www.cdc.gov/vhf/ebola>>.

"Ebola Virus Disease." WHO. World Health Organization, n.d. Web. 30 Apr. 2015.

<<http://www.who.int/mediacentre/factsheets/fs103/en/>>.

Farmer, Paul. "LRB · Paul Farmer · Diary: Ebola." London Review of Books. N.p., 23 Oct. 2014.

Web. 30 Apr. 2015. <<http://www.lrb.co.uk/v36/n20/paul-farmer/diary>>.

Iaccino, Ludovica. "Nigeria: Is Ebola Meme Being Used to Spread Fears Virus 'Was Created by White People'?" International Business Times RSS. International Business Times, 18

Sept. 2014. Web. 30 Apr. 2015. <<http://www.ibtimes.co.uk/nigeria-ebola-meme-being-used-spread-fears-virus-was-created-by-white-people-1466095>>.

Monkey Meat and the Ebola Outbreak in Liberia. YouTube. Google, 26 June 2014. Web. 30 Apr.

2015. <<https://www.youtube.com/watch?v=XasTcDsDfMg>>.

"Modeling Ebola in West Africa: Cumulative Cases by Date of Reporting." *Ebola Map*. N.p., n.d.

Web. 30 Apr. 2015. <<http://www.healthmap.org/ebola/#timeline>>.

Press, Associated. "US Will Send 3,000 Troops to Help Fight Ebola in West Africa." New York Post. New York Post, 16 Sept. 2014. Web. 30 Apr. 2015.

<<http://nypost.com/2014/09/16/us-will-send-3000-troops-to-help-fight-ebola-in-west-africa/>>.

Rat Meat and Ebola. Prod. Yaw A. Agyemang. *YouTube*. Google, 4 Sept. 2014. Web. 30 Apr. 2015. <<https://www.youtube.com/watch?v=MV-9MbX1ams>>.

Scholkmann, Felix. "Analyzing the Dynamics of the Ebola Outbreak 2014/2015." *Analyzing the Dynamics of the Ebola Outbreak 2014/2015*. Weebly, Aug. 2014. Web. 30 Apr. 2015. <<http://ebolaanalysis2014.weebly.com/>>.

Stableford, Dylan. "Ebola's 'patient Zero' Got Virus from Playing in a Bat Tree, Scientists Say." *Yahoo! News*. Yahoo!, 30 Dec. 2014. Web. 30 Apr. 2015. <<http://news.yahoo.com/ebola-boy-index-patient-zero-bat-tree-182151708.html>>.