WHA

Combating the spread of the Ebola virus

Research Report

Leiden Model United Nations 2023

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Forum: WHA
Issue: Combating the spread of the Ebola virus

Position: Chair

Introduction

Since the first recorded outbreak of the Ebola virus in 1976, it has caused 15,266 deaths globally. Even those lucky enough to have survived the disease often still suffer from the long term health problems it causes. The disease also impacts society as a whole, in the form of schools closing, no touch policies, and a lack of foreign investment.

Containing an outbreak requires big financial sacrifices from the countries involved, but also from the international community as a whole. Outbreaks are primarily concentrated in Centra and (more recently) West Africa. A lack of basic sanitary resources in these areas is a catalyst for the spread of the deadly virus.

In this research report we will look at the history of the Ebola virus, the positions different countries take on combating it, and possible solutions to the problem.

Definition of Key Terms

Ebola

Ebola is a contagious disease caused by a virus that has been seen to spread through primates (including humans) and domesticated pigs. Symptoms of the disease start in the form of headache, fever and a sore throat, but develop into rash, internal and external bleeding and vomiting. The virus can spread via bodily fluids, or objects that have come into contact with bodily fluids of individuals infected. The incubation period ranges from 2-21 days, but individuals that are infected can only spread the virus after they develop symptoms. Additionally, survivors of the virus can sometimes still spread the virus months after the symptoms have disappeared. Fatality rates during outbreaks vary wildly from 25-90%, depending on the outbreak control and virus strains.

Outbreak

A disease outbreak is the occurrence of disease cases in excess of normal expectancy in a defined community, geographical area or season.

General Overview

Where does Ebola come from?

The first Ebola outbreak took place in 1976 in Central Africa and was actually two independent outbreaks occurring simultaneously, one in Zaire (currently the DRC) and the other in (now South) Sudan. During these outbreaks, it was first assumed that patients had some form of malaria. This unpreparedness gave the virus a chance to spread through contaminated syringes and other medical equipment. The total number of confirmed cases in the Zaire and Sudan outbreaks of 1976 number 318 and 284 respectively. The 1976 outbreaks would remain the biggest outbreaks of Ebola until the year 2000, but pale in comparison to the later outbreaks in 2014 and 2018.

Although Ebola spreads through humans, other primates and pigs, These species are not the source of the virus itself. This source is what scientists call a reservoir. This reservoir is a species in which the virus lays dormant. When this species comes into contact with humans, or other hosts such as primates, the virus can jump species and cause an epidemic. Scientists are not yet certain which species form the reservoir, but they do think fruit bats could be one of them.

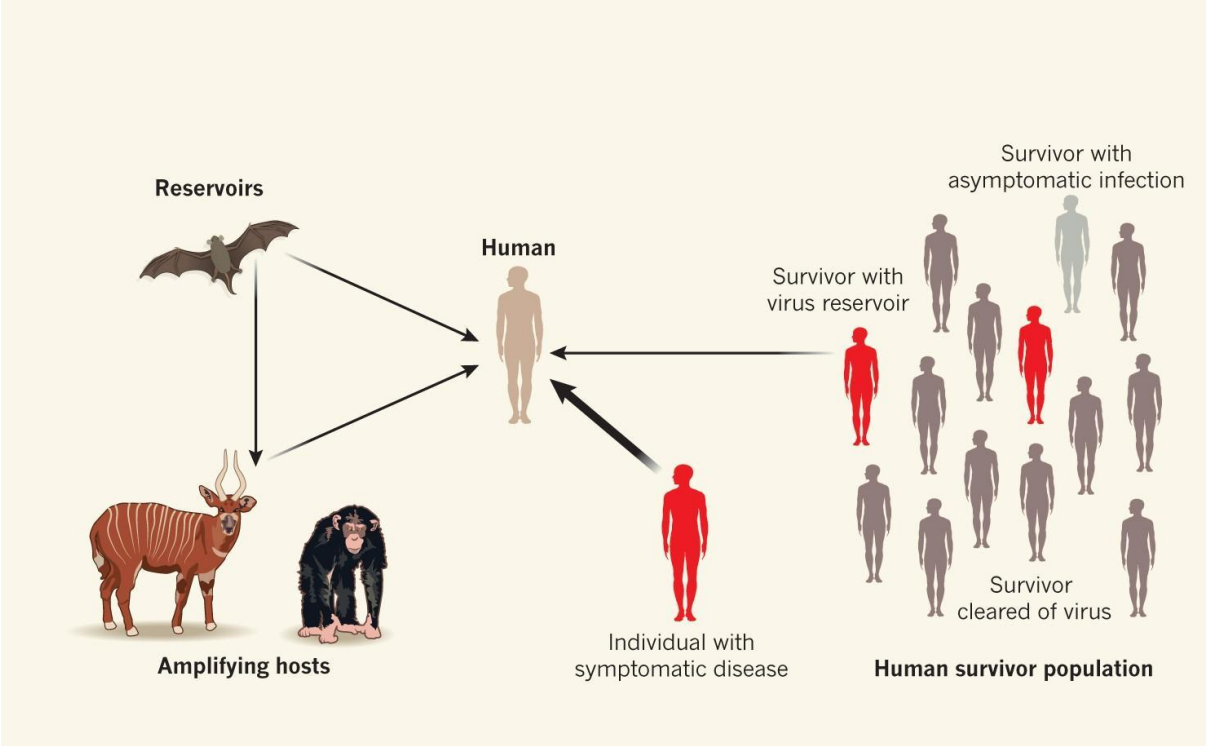

Figure 1: A diagram showing possible sources of an Ebola virus infection. Source: Nature

Ebola Outbreaks

After the 1976 outbreak, two major and several smaller outbreaks took place.

Starting in rural Guinea in March 2014, the Ebola virus spread to neighbouring Liberia and Sierra Leone. Because of lacking health infrastructure, identifying new cases was difficult and the outbreak quickly got out of control. The total number of confirmed cases neared 29,000.

Prior to 2014, nearly all of the Ebola outbreaks had been in central Africa. There had also never been an Ebola outbreak with over 500 cases. These are both reasons that when an

outbreak occurred in the more densely populated areas of west Africa the results were horrific, and the world was in shock.

The WHO declared the 2014 outbreak of Ebola an international public health emergency, and issued a call for help, stating that the WHO did not have the resources to handle the outbreak effectively. As a result of this, countries from all over the world contributed to help fund the much needed medicine, and protective gear being sent into Guinea, Sierra Leone and Liberia. In June 2016 the WHO officially declared the largest Ebola outbreak in history to be over.

Even though the 2014 outbreak was declared over in 2016, there have still been multiple outbreaks since. The most major of which occurred in the Democratic Republic of Congo in 2018 with 3,470 confirmed cases. But there have even been smaller outbreaks in Uganda and the DRC as recently as 2022. So, although the threat of Ebola spreading internationally has been greatly reduced since 2014, it remains ever present. Additionally the impact the virus has on the communities in the DRC and Uganda to this day should not be overlooked.

The different Types of Ebola

Although scientists first believed the simultaneous outbreaks of 1976 were caused by an infected person travelling from Zaire to Sudan, it was later discovered that this could not be the case, as the outbreaks had been caused by two different strands of the Ebola virus, the Zaire Ebola virus and the Sudan Ebola virus. Since then, three other Ebola viruses have been found: the Tai Forest Ebola virus, the Reston Ebola virus and the Bundibugyo Ebola virus. Of all the known Ebola strands, Zaire is the most common and the most fatal, with mortality rates of up to 90%. The Sudan Ebola virus follows suit, with a mortality rate of around 50%. Of the last three, only the Bundibugy strand is known to be fatal to humans, with a fatality rate of 20-35%.

Ebola Vaccinations

Even though the first Ebola outbreak was in 1976, scientists were not in a rush to develop a vaccine. The prevailing opinion among health officials at the time was that developing a vaccine for Ebola was not necessary, because Ebola had such a high mortality rate that an outbreak would quickly burn itself out. When the virus spread to urban areas in West Africa during the 2014 outbreak, they were proven wrong. Development of a vaccine was sped up, resulting in the first Ebola vaccine, known as Ervebo, to be granted conditional marketing authorisation by the EMA (European Medicines Agency) in November 2019. Since then, the WHO and a number of different countries have also approved the vaccine.

In May 2020 a second vaccine, known as the Johnson and Johnson vaccine, was granted conditional marketing authorisation by the EMA. This vaccine uses two doses to build up immunity over multiple weeks. In that aspect it is different from the Ervebo vaccine, which only needs one dose, and builds up immunity more quickly. This difference gives the vaccines different roles in an outbreak management strategy.

Major Parties Involved

United Nations Security Council

The Security Council is one of the 6 main organs of the United Nations. It consists of 15 members, of which 5 are permanent, and 10 non permanent members. The primary responsibility of the Council is to safeguard international peace and security.

In September 2014 the Security Council unanimously adopted a resolution on the Ebola virus outbreak that was developing in West Africa at that moment. The resolution called on member states to send aid in combating the spread of the virus. It also put measures in place to prevent further isolation of the affected countries, as this could be devastating to virus control efforts as well as the economies of the affected countries. It is important to note that this was only the second time that the Security Council had passed a resolution on a disease.

World Health Organisation (WHO)

Founded in 1948, the World Health Organisation, a specialised agency of the United Nations, has gained responsibilities throughout the years that greatly expand on its original purpose of "promoting the attainment of the highest possible level of health by all peoples". These gained responsibilities vary from epidemic control, to drug standardisation. The WHO has played a key role in combating all Ebola outbreaks since 1976. It did this through various methods, ranging from coordinating aid packages between different member states and raising awareness of the Ebola disease in affected areas.

The United States of America (USA)

The USA has been a global leader when it comes to sending aid to countries affected by the Ebola Virus. This aid comes in many different forms such as deploying training centres to instruct health workers and sending logistical resources. During the 2014-2016 outbreak alone, the USA states to have contributed $2.369 billion in aid to Liberia, Sierra Leone and Guinea, with most of the aid being sent to Liberia.

The United Kingdom (UK)

The United Kingdom is the country that has sent the second highest amount of aid to countries affected by the Ebola Virus, behind the USA. During the 2014-2016 outbreak the UK dedicated more than £230 million to combating the spread of the Ebola Virus.

The Democratic Republic of the Congo (DRC)

The Democratic Republic of the Congo is a relatively large country located in Central Africa. It was here that the first Ebola outbreak took place. The DRC was then known as Zaire, hence the name of the virus strain. Throughout the years, the DRC has been the country with the highest amount of recorded Ebola outbreaks. It is also the country that most recently had an Ebola outbreak of over 1,000 cases. Ebola has negatively impacted health infrastructure throughout the country (but mostly in the East), which impedes the combating of other viruses such as malaria.

Timeline of Events

Please note that this is not a list of all Ebola outbreaks, only of those that had a large impact or are relevant in some other manner.

August-November1976	The first Ebola outbreak takes place in the DRC and Sudan with a combined total of 602 cases
January - June 1995	The first large Eola outbreak since 1976 takes place in the DRC. The outbreak was quickly brought under control with proper hygiene in hospitals. This kept the total number of cases at 315.
August 2000 - January 2001	An outbreak of 425 confirmed cases in Uganda marks the first time an Ebola outbreak with over 100 cases took place in a country other than Sudan or the DRC.
August - November 2007	An outbreak of 264 confirmed cases takes place in the DRC. Radio messaging was used to inform the population of the dangers of the Ebola Virus, which kept the number of cases relatively low.
March 2014 - June 2016	Starting in the rural areas of Northeastern Guinee, this outbreak quickly spread to neighbouring countries, Sierra Leone and Liberia. Two and a half years later, the number of cases totalled 28,600, and the number of deaths had risen to 11,325. This outbreak quickly developed into the largest Ebola outbreak in history.
8th of August 2014	The WHO declared the outbreak in West Africa a Public Health Emergency of international Concern (PHEIC), and called for an international response to prevent the risk of further spreading.
August 2018 - June 2020	This outbreak in eastern parts of the DRC and Western Uganda totaled 3,470 confirmed cases and 2,287 deaths, making it the second largest Ebola outbreak in history, and the most recent outbreak with over a thousand cases. The international response was broad, with many different countries sending aid to combat the virus, just like in 2014.
September - 2022 - January 2023	The most recent Ebola outbreak took place in Uganda, totalling 164 cases and 55 deaths. Although it was a relatively small outbreak, it shows us that Ebola remains a threat to this day.

Possible Solutions

Vaccine Development and Distribution

Vaccines are perhaps the most important solution, as vaccinations offer a long- term solution to the problem. Much work has already been done in this field, like the development of two different vaccines for Ebola, with more to come. But there also remain important steps to be taken, like making the vaccines readily available for everyone, in order to create group immunity. Until then, we will have to rely on ring vaccination as a guideline of how to use the limited amount of vaccines in the manner in which they will be most effective. Ring vaccination is the practice of vaccinating people that have been in contact with a confirmed case, forming a so-called “ring” around the patient, to limit further spreading.

Improving (Healthcare) Infrastructure

The countries suffering from Ebola are nearly all developing countries, with relative weak healthcare infrastructures. Improving this infrastructure through foreign aid and domestic policy would give these countries something to fall back on in the case of an outbreak. This also limits the amount of secondary deaths an outbreak can cause, by disrupting the treatment of other illnesses.

Outbreaks usually start in rural, hard to reach areas, because of the nature of the disease and its reservoir species. This often causes problems for health workers trying to form a quick response to a new outbreak. Improving general infrastructure such as roads and railways would therefore also help combat the virus.

Public Health Education

The importance of public health education should also not be overlooked. Information campaigns have already been of great use during past Ebola outbreaks. Warning people in affected areas of the dangers of the virus, and giving reliable information about its spread allows for a more effective outbreak control effort. Educating local healthcare workers would also increase alertness for new outbreaks, and would therefore enable a quicker response.

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