



**WHO AFRO TRANSFORMATION AGENDA AT WORK: A TEST CASE IN THE  
INVESTIGATION OF A SUSPECTED CASE OF EBOLA VIRUS DISEASE THAT  
TURNED OUT NEGATIVE.**

**Murebwa Chirambo Rufaro\*, Muzala Kapina, Elizabeth Chizema, Mazaba-Liwewe Mazyanga; Ndumba Idah, Musumali Mbaulo, Mweemba Nora, Asaph Choonga, Harison Ng'uni, Herbert Mbewe, Ngonda Saasa, Katendi Changula, Qiu Yongjin, Kajihara Masahiro, Akina Mori, Yasuko Orba, Edgar Simulundu, Ladslav Moonga, Kashihara Sakae, Ayato Takada, Aaron S. Mweene and Mufunda Jacob**

\*Corresponding Author: Murebwa Chirambo Rufaro

Article Received on 07/05/2016

Article Revised on 28/05/2016

Article Accepted on 19/06/2016

**ABSTRACT**

**Background:** Ebola virus disease (EVD) was first reported in the African region in DRC and Sudan in 1976. In the recent past (2014), an outbreak was reported in Guinea, which mostly affected West African countries, but with the greatest impact on Liberia and Sierra Leone, where many cases and deaths have been recorded. The lessons learnt from this outbreak in terms of the rate at which cases were confirmed and the response among other issues led the incoming World Health Organization (WHO) Regional Director for Africa to come up with the concept of Transformation Agenda, which basically focusses on the need to change the way WHO does its business. **Objective:** To document the investigation of a suspected EVD case within the principles of the Transformation Agenda. **Methodology:** A recently EVD trained health worker suspected a 30 year old man of Ebola, who presented at the health center with epistaxis, hematemesis and fever. There was no history of having traveled to DRC or any EVD affected countries and no contact with suspected or confirmed EVD case. The patient was immediately quarantined, together with immediate family members and the district, province and national levels notified accordingly. Meetings were convened for a rapid and transparent response and a Rapid Response team was dispatched to the health center which is 154km from Solwezi and 2km from the DRC border. He was commenced on IV fluids and magnesium trisilicate. A blood sample was collected and taken to the University of Zambia Veterinary laboratory in Lusaka. Daily feedbacks were sent to WCO and MoH headquarters. **Results:** The patient's plasma was tested for Ebola, Marburg and Filovirus genes using Polymerase Chain Reaction (PCR) techniques (Protocol for Ebola Diagnosis at UNZA-VET, YEAR). The samples were handled in a BSL-3 containment laboratory. The results were Negative - No amplification of Ebola, Marburg or Filovirus genes. **Conclusion:** It took less than 3 days to isolate the case, collect the sample and confirm the diagnosis from the initial notification of the case. This was possible because of the implementation of the tenets of the transformation agenda (accountability, responsiveness, transparency, tolerance to non-compliance), including the team work between WHO, MoH and the Veterinary Laboratory and readily available resources to respond.

**KEYWORDS:** magnesium trisilicate, Filovirus genes, Solwezi.

**BACKGROUND**

Ebola virus disease (EVD) was first reported in Africa in the Democratic Republic of Congo (DRC) and Sudan in 1976 (Feldmann & Geisbert, 2011). Reports of EVD outbreaks affecting nonhuman primates have been reported in Asia and US while in the sub-Saharan African region the virus has been reported to affect humans (Kouadio, *et al*, 2014). Many factors have been linked to human infections such as cultural beliefs in handling the deceased and unsafe burial practices (Kouadio, *et al*, 2014).

Recently, a major Ebola outbreak erupted in Africa affecting mostly countries in the western part of the continent including Sierra Leone, Liberia and Guinea. The outbreak was first reported in Guinea in 2014 and

subsequently spread to neighboring countries, Sierra Leone and Liberia (Baize *et al*, 2014). The 2014 Ebola epidemic is the largest in history, affecting multiple countries in West Africa. As of 18<sup>th</sup> September, 2015, a total of 28,287 (suspected, probable and confirmed) cases, out of which 15,234 were laboratory confirmed. There were 11,309 deaths recorded. There were a small number of cases reported in Nigeria and Mali and a single case reported in Senegal; however, these cases were contained, with no further spread in these countries. Two imported cases, including one death, and two locally acquired cases in healthcare workers were reported in the United States (Baize *et al*, 2014). A recent study has estimated 22 million people distributed in areas of Central and West Africa to be at risk of Ebola (Hartman *et al*, 2008). It has been a year since the first

case associated with the current Ebola virus outbreak in West Africa was identified.

There are several risk factors which have been recorded as having contributed to the magnitude of the EVD in West Africa such as: the Zaire type being the most virulent of all the five types of Ebola virus affecting humans; EVD had never been reported in West Africa and this led to unpreparedness; low income countries with weak health infrastructure; population movement within country and abroad aiding virus spread; and delay in Governments confirming cases leading to delayed response (Kouadio, *et al.*, 2014).

A country with active surveillance and response system is required to effectively recognize and respond to disease timely. It is painfully clear that the world's initial handling of this dangerous outbreak was far from optimal, though some progress is being recorded in the battle (WHO, 2015; Baize *et al.*, 2014).

In line with this view among others, the incoming World Health Organization (WHO) Regional Director for Africa recently institutionalized the Transformation Agenda within the WHO reform context in the African region in order to bring about change in the way WHO does its business. Pro-results values, innovation, accountability and responsiveness are some of the tenets. In line with this pronouncement, Zambia WHO Country Office redeployed the 4 National Professional Officers / Surveillance (NPOS) in a representative manner matching the geographic orientation of the country thus positioning them where the need was most. A purpose developed purchase order was established to make funds readily available to speedily address suspected disease events and links to the national laboratories for quick confirmation of diseases.

During this major epidemic, Zambia enhanced its surveillance for EVD and all suspected cases were completely investigated with laboratory testing. Unpublished reports indicate up to 16 cases investigated from 2014 to date (MOH, 2014). A comprehensive team including clinicians, laboratory scientists, surveillance officers and national epidemiologist was constituted at national level. All suspected cases were communicated to the national epidemiologist in the Directorate of Public Health, Surveillance and Research in the Ministry of Health (MoH). The clinician in-charge on the team would then follow up on the investigation and the virology laboratory at the University Teaching Hospital in Zambia would facilitate transportation of samples to the University of Zambia School of Veterinary Medicine biosafety level-3 (BSL-3) containment laboratory for testing. The turnaround time for this process was approximately 5 to 7 days.

A suspected case of EVD affecting a 30 year old male was reported at Mangala Rural Health Center (RHC) in Solwezi District of Northwestern Province on 14

September 2015. He complained of a 2 week history of general body malaise, fever and headache and was treated for malaria, but came back the following day with hematemesis and epistaxis. Mangala RHC is 154 kilometers from Solwezi town, the provincial capital of North-Western province, and is 2 kilometers from DRC border. North-Western province which borders with Angola on the western side and DRC on the northern side has a population of 706,462 (Census, 2010). It is the most sparsely populated province in the country.

This manuscript documents the investigation process and results of a suspected EVD case within the principles of the Transformation Agenda of the WHO.

**Methodology:** A recently EVD trained health worker at Mangala RHC on suspicion of EVD in a patient that presented at the center, quarantined the patient and his immediate family at a shelter 1 kilometer away from the health center. He immediately notified the District Medical office who notified the provincial medical office and national epidemiologist of the case in line with the Ministry of Health national guidelines.

#### **Case investigation and surveillance**

The national epidemiologist notified the virology laboratory at the University Teaching Hospital and the Zambia WHO country office of the case and intention for laboratory investigation. The veterinary laboratory were also notified and prepared for urgent processing of the sample.

The WHO Zambia country office immediately went on alert and prompted its outbreak investigation team to give technical support to the Ministry of Health on the investigation. The NPO-Surveillance Officer responsible for North-western province joined the provincial team, including the Provincial Surveillance Officer in response measures, together with the affected district on 16<sup>th</sup> September. Meetings were held with the Provincial and District Medical Officers who had an initial meeting to establish a coherent response and communication channels. The Solwezi Rapid Response Team was dispatched with the Personal Protective Equipment (PPE), disinfectants and granular chlorine. They were in the area for 5 days. They also did contact tracing and no one was identified with similar symptoms. The team at the province and district were received daily updates and were monitoring the events at the treatment center, as well as providing technical support as required. Daily feedbacks were sent to WCO and the Ministry of Health accordingly. The suspect had been quarantined and a blood sample collected as per guidelines using PPE and using triple packaging. The Provincial Medical Office provided a vehicle to transport the Biomedical scientist with the samples to the designated laboratory. Contingency funds provided by WHO were used to carter for the personal costs for the Biomedical scientist.

### Case management

The patient was commenced on IV fluids and magnesium trisilicate and by the following day, there was no more bleeding and fever. On receipt of the negative results, the patient was removed from the quarantine center and taken to the health facility. His contacts were also released and the school which is situated 500meters from the health center which was closed was re-opened. Supplies were adequate at the health center for adequate management of the case, including PPEs. The patient continued to improve; IV fluids were discontinued and normal feeding resumed. He was then commenced on ferrous sulfate and folic acid because of the probable low hemoglobin levels due to epistaxis and hematemesis he had at the onset of the disease. Having continued to improve with no new complaints, the patient was finally discharged on 22<sup>nd</sup> September, 2015.

### Laboratory testing

The blood samples were centrifuged at 3,000 rpm for 5 minutes and the patient's plasma was harvested. Total RNA was extracted from the plasma and subjected to one-step reverse transcription polymerase chain reaction (RT-PCR) to test for Ebola and Marburg infection using polymerase chain reaction techniques as previously describe (Ogawa *et al.*,2011). The amplification of Ebola and Marburg virus genome was examined by electrophoresis with 1.0% agarose gel and subsequently amplicons were purified. The second round polymerase chain reaction was carried out with purified amplicons and the identical primer sets used for the first RT-PCR. The samples were handled in a BSL-3 containment laboratory at the University of Zambia, School of Veterinary Medicine. The primer sets used in this test are as shown in Table 1.

**Table 1: Primers used in this study**

Primer name	Primer sequence	Target gene	Reference
FiloNP-Fm	TGGCTTACYACAGGYCACATGAAAGT	Marburg virus NP	Ogawa et al., 2011
FiloNP-Rm	GTGTGTGATTTTCAGTTTTTYTGGAGGTGGAA		
FiloNP-Fe	TGGCAATCAGTDGGACACATGATGGT	Ebola virus NP	Ogawa et al., 2011
FiloNP-Re	GAAGCTGATTTTCRTTCTTYTTCTGATGGAA		
FILO-A	ATCGGAATTTTTCTTTCTCATT	Filovirus L	Sanchez et al., 1999
FILO-B	ATGTGGTGGGTTATAATAACTACTGACATG		

### RESULTS

The patient's demographic information is shown in table below.

**Table 2: Patient's demographic information**

Age	30 years
Sex	Male
History of travel to DRC	No
Contact with suspected or confirmed case	No
Laboratory result	Negative - No amplification of Ebola, Marburg or Filovirus genes.

### DISCUSSION

The main finding in this case study was that the laboratory test for EVD came out negative. Therefore, the suspicions of EVD were nullified. The transformation agenda demands that we change the way we do business emphasizing effective, timely and efficient response. It was shown that the investigation process was completed within 3 days of notification as compared to 7 days or so in the previously 16 investigated cases when WHO was not directly involved in the response. The participation of WCO Zambia in collaboration with the MoH in the investigation of the suspected EVD contributed to an efficient and timely response. This timely and efficient response effected by the team is a testimony of the impact of the implementation of the TA in Zambia.

WHO in the African Region has embarked on a Transformation Agenda with theme "change in the way we do business". As a response to this call, the Zambia WHO country office has made marked reforms in its

operations to enhance Pro-results values, innovation, accountability and responsiveness. Two of these reforms are firstly the deployment of the 4 NPO / Surveillance Officers in a representative manner matching the geographic orientation of the country, thus positioning them where they are needed most and secondly, development of a purpose purchase order which was established to make funds readily available to speedily respond to suspected disease events and links to the national laboratories for quick confirmation of diseases.

Through the application of these tenets of the Transformation Agenda, the investigation process of the suspected EVD case was done in a transparent manner, with each level and individuals given clear roles and responsibilities. By so doing all the delays witnessed in previous response activities were done away with, resulting in prompt action and quick results. Effective and positive leadership was also demonstrated.

## CONCLUSION

From the initial alert of the case, it took less than 3 days to isolate the case, collect the sample and conduct the diagnosis which was negative. This was possible because of the positioning of the NPO Surveillance Officer in the provinces, readily available resources to respond and team work with MoH and the laboratory to conduct the screening test for EVD.

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