Ebola: The Cost of Poor Global Humanitarian Governance in Health

Preliminary Investigation Results

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EXECUTIVE SUMMARY

Improving the response for any significant epidemiological risk means designing and implementing mechanisms and systems that make it possible to contain the disease rapidly so that an epidemic does not reach proportions that are either uncontrollable or very expensive to control.

The objective of this paper is to try to give some order of comparison between what should have happened and what really happened in the management of the 2014-2015 West Africa Ebola Hemorrhagic Fever (EHF) outbreak.

The lessons learnt from previous Ebola Hemorrhagic Fever outbreaks and the West Africa EHF crisis show the importance of a series of critical steps in the epidemiological management of the outbreak:

- **Alert**: This implies that there is at least a minimum of health infrastructures covering the area with a basic health information system able to trigger the alert and to rapidly activate confirmation mechanisms;
- **Circumscribe and manage the area of concern**: This involves identifying people, tracing cases, conducting safe burials, isolating victims and controlling movements with a specific focus on helping health institutions to limit their potential as contamination hubs;
- **Treat** (caring for people and caring for responders): As there is no treatment available yet, this means supporting the capacity of cases to combat the disease and limiting the occurrence of additional diseases that could further weaken the patients;
- **Prevent**: (communicating with public health messages, preventing the disease from spreading to other countries, and implementing preparedness measures);
- **Ensure a minimum of systemic stability**: (food/nutrition, essential services, recovery, psychosocial, support to the normal health systems to prevent their decline as a result of the Ebola epidemic);
- **Coordinate**: Coordinating the response and its different components, including multi-purpose logistics;
- **Prepare**: In particular, this involves supporting national health authorities in epidemiological surveillance, alert systems and the development of a rapid intervention capacity;
- **Rehabilitate the health system and help it to recover a positive reputation**: It is often significantly disenfranchised and weakened at the end of the outbreak.

Decisiveness and timeliness of the response are critical. This implies not only appropriate surveillance and alert capacity, but also political courage and leadership and well-targeted and rapid resource allocation.

In West Africa, with WHO not reactive and the governments of the region not fully mobilized, the national and international health and humanitarian systems did not react after the early alert, apart from MSF and the Red Cross and Red Crescent family. The crisis got out of control, affecting the capital cities of the three Mano River Basin countries, crossing borders with neighboring countries, and cases began to be detected outside of the region. This situation triggered a major international reaction, which, unfortunately, was three months late.

An important factor to keep in mind is that the Ebola Treatment Centres (ETCs), which received a great deal of coverage in the media, are just the peak of the iceberg. The logistical chain involved in verifying information, collecting and transporting patients and the role of culturally-adapted health messaging are critically important, but this has been underestimated to a large extent.
Comparing the cost of an early and decisive response (using costing information from MSF and IFRC) with the massive amount of resources that was actually mobilized once the international community realized the danger of the situation is depressing as the late response resulted in:

- a level of mortality that should have been avoided
- costs that were 100 times higher than they should have been
- countries being significantly weakened, and particularly their health systems;
- And cases continuing to appear more than one year after the first case was confirmed.

The tropical and equatorial parts of West and Central Africa where Ebola hosts are to be found are being affected by rapid agro-ecological, economic and demographic changes. This increases the risk of a new epidemic. Weak health systems, with insufficient surveillance mechanisms and early warning/early action capacities, are not only a feature of the Mano river basin (Guinea, Liberia and Sierra Leone) but of at least 17 countries in West and Central Africa, the second largest source of zoonoses in the world and the main source of selvatic zoonoses, including HIV.

Strengthening surveillance and enhancing the preparedness level of health systems in the whole of West and Central Africa is vital for the security of the whole world. Investing in health systems and in the capacity to manage health emergencies should be a strategic priority at national and international levels.
1. INTRODUCTION

1.1. Objective of this document

The international response to the 2014-2015 Ebola Hemorrhagic Fever (EHF) outbreak has been the subject of a lot of discussions and debates, as well as of a growing body of reviews and evaluations. Several key issues have emerged. These include:

- The aid system’s level of preparedness to respond to this type of challenge,
- The timeliness, size and effectiveness of the response,
- The importance of national leadership and international decisiveness in the rapid deployment of a response capacity and the mobilization of appropriate measures;
- The importance of a holistic response (health, social communication, political mobilization, the regulation of movement, proper management of the deceased, etc.);
- The impact of the outbreak on local economies, societies, health systems, African solidarity, etc.,
- The overall cost of the response, in a context where aid resources are under pressure.

At a time when aid resources are overstretched due to a large number of protracted crises and regular, significant, rapid-onset disasters, it is essential to achieve the highest level of efficiency. An inadequately managed crisis that goes partly out of control will always result in extremely high costs to contain an epidemic.

The objective of this paper is to analyse how better management of the EHF outbreak could have significantly reduced the impact on the population and the national health system and also helped to save a great deal of resources for the aid community.

1.2. Methodology

To carry out this analysis, existing literature on EHF was reviewed, including from previous outbreaks in Uganda and DRC, and taking stock of what is being produced on the current West Africa crisis (see references in the annexes). Interviews with specialists from MSF, IFRC, AFD, and DG ECHO were carried out and specialized institutions where contacted (CDC, IRD).

On this basis, a “picture” of the situation was established and critical points in the response were identified. It was then possible to analyse how to deal with these critical points and how to approach the following key factors in operational terms: timeliness, decisiveness in the response and adaptation.

Each of the three scenarios involves a specific course of events, and costing of the required response was calculated on the basis of real cost information provided by specialized agencies. To limit the risk of underestimating the cost involved, the initial costing of the response was multiplied by 3. The analysis of the actual costs incurred in the response comes from a series of sources including MSF, the IFRC, UNOCHA-managed FTS, UNMEER web site and documents and other sources of information including donor web sites.

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1 In particular the parametric costs used by MSF in the design of their fast deployable ETC, and the regular staff costing used by NGOs, UN agencies and national institutions.
4 http://simonbjohnson.github.io/ebola-fts-dashboard/
The likely impact of the response was then established using trends from previous EHF outbreaks which were then introduced into the CDC designed software for Ebola response\(^6\). It should be mentioned that there is still debate about the use of EHF predictive models\(^7\).

We used the statistical model developed by CDC Atlanta\(^8\) as the “best tool” available to run the scenario. This model is based on a spreadsheet that:

- allows users to estimate the number of EHF cases in a community,
- tracks patients susceptibility to disease through infectivity, incubation, recovery, and death,
- calculates the spread of Ebola and its impact for 300 days. The timeline of 300 days is longer than most of the previously recorded outbreaks of EHF or Marburg Virus Disease.

The model, which is based on population density (relatively similar to the one in forested Uganda and DRC where previous outbreaks took place) estimates the daily movement of patients using disease probabilities for three different categories of isolation: Hospitalization, Home Isolation, and No Home Isolation. It uses probabilities, drawn from reports of previous EHF outbreaks, to model the daily movement of patients between and within the various disease categories (i.e., susceptible, incubation, infectious, recovery/death).

Coherence of the curves produced by the model with the real ones is based on the comparison of the theoretical curves with those coming from the real data. The main data sets that were regularly consulted are:

- CDC Atlanta\(^9\)
- WM Jon web site\(^10\)
- WHO situation reports\(^11\)
- HUMANITARIAN DATA EXCHANGE BETA v0.8.4\(^12\)
- IFRC web site\(^13\)

Cost estimates for the responses are based on information provided by MSF and the Red Cross and project proposals from DG ECHO partners. Other budgetary information was taken from different sources, including the OCHA-run Financial Tracking System (FTS), UNMEER documents and web site, the USAID/OFDA web site, etc.

### 1.3. Limits and constraints

This study does not claim to represent a complete economic appraisal of the response to the 2014-2015 West Africa EHV outbreak, nor a comprehensive evaluation of its different impacts. Many more publications and evaluations are being produced and will contribute to understanding of the subject and help to identify ways for the aid community and national authorities to move forward and prepare for the next high-risk, deadly outbreak, which is sure to take place, but we just do not know when. The study simply highlights the fact that in this type of situation, decisiveness, anticipation, leadership and courage are essential ingredients for a timely and effective response which manages to keep a dramatic situation under control.

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\(^6\) [http://stacks.cdc.gov/view/cdc/24900](http://stacks.cdc.gov/view/cdc/24900)

\(^7\) [http://www.biomedcentral.com/1741-7015/12/196](http://www.biomedcentral.com/1741-7015/12/196)

\(^8\) [http://stacks.cdc.gov/view/cdc/24900](http://stacks.cdc.gov/view/cdc/24900)

\(^9\) [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6350a4.htm?s_cid=mm6350a4_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6350a4.htm?s_cid=mm6350a4_w)

\(^10\) [http://apps.who.int/ebola/en/ebola-situation-reports](http://apps.who.int/ebola/en/ebola-situation-reports)

\(^11\) [HUMANITARIAN DATA EXCHANGE BETA v0.8.4](http://reliefweb.int/sites/reliefweb.int/files/resources/MDR_Ebola_OU21_20_04_2015.pdf)

\(^12\) [http://www.johnstonsarchive.net/policy/westafrica-ebola.html](http://www.johnstonsarchive.net/policy/westafrica-ebola.html)

It is also important to mention that while the considerable in-kind contribution to the scaled-up Ebola response may be under-estimated in cost terms; equally the cash funded scaled-up response includes significant over-spending where there was insufficient adaptation to the needs. In particular, the cost of the military deployment is very difficult to compute into any model, as military expenditure is often sizeable, but not necessarily easy to disaggregate into specific operational terms\textsuperscript{14} \textsuperscript{15}

1.4. Structure of the report

The structure of the report is as follows:

Executive Summary

Full Report: The full report comprises:
- An Introductory section, describing objectives, methodology, limits and constraints
- Analysis of the key parameters to take into account, based on research on previous epidemics and the first lessons learnt from the current West Africa EHF outbreak;
- The description of different scenarios and the comparison of one of the most likely with what happened in reality;
- A conclusion

Annexes:
- Lessons learned from the past.
- A detailed description of the current EHF situation in West Africa;
- A detailed presentation of two relatively ideal scenarios which should be the objective if we are serious about “getting to zero” fast;
- A list of consulted documents;

\textsuperscript{14} http://www.defense.gov/home/features/2014/1014_ebola/
\textsuperscript{15} https://www.gov.uk/government/news/uk-military-to-provide-further-measures-to-tackle-ebola
2. RESPONDING BETTER: A MODEL FOR MORE RAPID ENGAGEMENT

2.1. Key parameters

Improving the response to any significant epidemiological risk means implementing an accelerated process to contain the disease to avoid the phenomenon reaching proportions which would become either uncontrollable or very expensive to control. This means:

- Better anticipation;
- Better surveillance;
- Better preparedness;
- Better and more rapid resource allocation;
- Sufficient attention to the situation of the health system, which is both part of the solution (treating patients, stopping contamination, and preventing additional pathologies) and part of the problem (an important part of the contamination chain).

For the current EHF outbreak in West Africa, there was no anticipation (the area is far from known Ebola endemic zones), nor any meaningful surveillance system in place (weak health systems). The only variable was the allocation of resources in order to have “the right resource, at the right time, in the right place”. Mobilization was uneven between different authorities, with rapid and strong mobilization in Liberia (at least until the perception that the outbreak was under control in June and it re-exploded in Monrovia in July) and very weak in Guinea (it required a Saudi ban on Guinean pilgrims for the 2014 Hajj for the Government to wake up).

While we know that the system globally failed, ex-post analysis of the mobilization and allocation of resources is problematic from a methodological point of view. These difficulties are partly linked to the difficulty of establishing a precise link between financial resources and actions, especially with respect to the critical differences between the different steps of the epidemiological management of Ebola:

- **Alert**: This implies that there is at least a minimum of health infrastructures covering the area with a basic health information system able to trigger the alert and to rapidly activate confirmation mechanisms;
- **Circumscribe and manage the area of concern**: This involves identifying people, tracing cases, conducting safe burials, isolating victims and controlling movements with a specific focus on helping health institutions to limit their potential as contamination hubs;
- **Treat** (caring for people and caring for responders): As there is no treatment available yet, this means supporting the capacity of cases to combat the disease and limiting the occurrence of additional diseases which would further reduce body capacities to combat the virus;
- **Prevent**: (communicating with public health messages, preventing the disease from spreading to other countries, and implementing preparedness measures);
- **Ensure** an acceptable level of systemic stability: (food/nutrition, essential services, recovery, psychosocial, support to the normal health systems to prevent their decline as a result of the Ebola epidemic);
- **Coordinate**: Coordinating the response and its different components, including multi-purpose logistics;
- **Prepare**: In particular, this involves supporting national health authorities in epidemiological surveillance, alert systems and the development of a rapid intervention capacity;

It is also difficult to compute the data linked to the heavy military/civil protection deployments (UK in Sierra Leone, US and Germany in Liberia, France in Guinea) about which there is very little disaggregated financial information available.
One constraint relates to the fact that financial allocations alone are not necessarily meaningful in terms of showing the way forward: ETCs by MSF or the IFRC were much more effective, more easily deployed and relatively cheaper than ETCs by, for example, Save, the French government or the US military. The “cost analysis” will inevitably be criticized as it is very difficult to take these differences into account.

Another constraint is related to the strong “health focus” of the debate. The key lessons learnt from previous Ebola responses is that it is important not to take into account only the “medical deployment” (health cluster, Foreign Medical Teams\(^\text{16}\)) in the cost analysis, but many of the other activities which go beyond the medical interventions alone and address other components of the effort to disrupt the contamination chain (communication vis-à-vis the population, managing houses and villages where there are possible or identified cases of contamination, managing border police stations, etc.). These activities are not easy to identify in the FTS or other financial reporting systems, as most reporting does not disaggregate data along these lines. Several OCHA and UNMEER documents have been very useful as they go down to activity level, which is critical in the epidemiological modeling.

While the use of lessons learnt from past EHF outbreaks is essential, it is difficult to compare resource allocation in past contexts (in the forest, limited scale) with the current context (open space, mobility, urban, regional). Trying to establish what was common to all EHF outbreaks and what was specific to the West Africa outbreak in terms of epidemiological dynamics was critical in order to identify bias.

In addition, developing a meaningful and robust model is challenging. Even the most specialized institution, CDC Atlanta, produced some models which turned out to be wrong, with significant differences between the proposed scenario and reality.

The approach proposed here is based on the identification of critical points in the response, as underlined by the lessons learnt, and using them as possible "entry points" with significant potential as "crisis modifiers". This provides a credible "evidence-based" approach for the construction of possible scenarios. We then conducted an appraisal of the costs involved and financial needs for the different scenarios.

Several other issues affected the response and its impact:

- using the wrong message at the beginning, due to poor cultural awareness;
- lack of standardized Personalised Protective Equipment (PPE) and knowledge of how it should be used;
- lack of logistical means, such as well-equipped cars/ambulances;
- corruption in the burial business;
- insufficient food for people in quarantine;
- poorly equipped teams for contact tracing (without thermometers, limited availability for them of Personalised Protective Equipment (PPE), etc.);
- capacity to trace possible case contacts and to keep them informed if the initial contact has been confirmed or tested negative
- lack of reliable sector-based assessments,
- preventive messages were not initially communicated by the right influential people,
- the demobilisation of community volunteers due to the nepotistic payment of cronies

\(^{16}\) FMTs are usually involved in post-trauma surgery, but during the Ebola epidemic they were deployed for the very first time in infection prevention and control. This is a welcome development that will help in a future crisis.
<table>
<thead>
<tr>
<th>Critical points</th>
<th>Entry points (action) / Crisis modifier</th>
<th>Requirements</th>
<th>Timeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveillance</td>
<td>Ensure reactivity</td>
<td>Surveillance Cell in the Ministry of Health with support from WHO and specialized epidemiological centres</td>
<td>Permanent</td>
</tr>
<tr>
<td>Alert</td>
<td>Activate Crisis Cell to ensure early action</td>
<td>Crisis Cell in the Ministry of Health with support from WHO and specialized epidemiological centres</td>
<td>Should be dormant, but easily activated, immediately after first rumors</td>
</tr>
<tr>
<td>Case identification Deployment</td>
<td>Allows rumor management</td>
<td>Small number of trained and equipped medical staff. Support by epidemiological specialists</td>
<td>Immediately after first rumors</td>
</tr>
<tr>
<td>Confirmation procedures</td>
<td>Make following steps robust</td>
<td>Connection with certified laboratories</td>
<td>Immediately after first rumors</td>
</tr>
<tr>
<td>Activation of coordination cell at the central level and in the area of concern</td>
<td>Ensure coverage and coherence</td>
<td>Decision at the interministerial level (MoH, Ministry of interior)</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Reporting to WHO and activation of the GOARN</td>
<td>Ensure alert is sent to international institutions</td>
<td>Will facilitate activation and resource mobilization in case further action is needed</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Establishment of light ETC or requisition of health structure for isolation ward</td>
<td>Engage in the containment of the contamination chain</td>
<td>Small number of trained and equipped medical staff with the required equipment to set up case management facilities</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Case management in the first area of confirmed cases</td>
<td>Engage in the containment of the contamination chain</td>
<td>Small number of trained and equipped medical staff with the required equipment to set up case management facilities</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Activation of telephone hotline for suspected case reporting</td>
<td>Improve surveillance and rapid case management</td>
<td>Agreement with private telecom companies</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Establishment of communication campaign for the population</td>
<td>Engage in the containment of the contamination chain</td>
<td>Well established cultural knowledge and strong communication skills and support systems</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Mobilize equipment in particular personal protection equipment (PPE)</td>
<td>Protect health staff</td>
<td>Mechanism to replenish stocks and keep a supply line activated</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Establish clear procedures to access health structures</td>
<td>Protect health staff and prevent health structures from becoming feared contamination hubs</td>
<td>Communication, physical space management for triage, quarantine, dead body management, family support</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Ensure proper communication with GOARN and Global Health Cluster</td>
<td>Increase the level of alertness</td>
<td>Make mobilization of external support more effective</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Step up health staff training</td>
<td>Protect Heath staff</td>
<td>Strong training capacity</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>Mobilize logistical means (in particular for the safe transport of suspected cases and case tracking)</td>
<td>Facilitate timely access to areas of concern</td>
<td>National requisition order as part of the political engagement. Mobilization of external actors</td>
<td>As soon as confirmation is available</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Significant effort made in communication campaigns to reach out fast with coherent messages</td>
<td>Engage in the containment of the contamination chain</td>
<td>Connections with all forms of media and the capacity to use social media</td>
<td>During the response</td>
</tr>
<tr>
<td>Clarification of the dead body management process and communication about safe burial</td>
<td>Engage in the containment of the contamination chain</td>
<td>Well established cultural knowledge and strong communication skills and support systems</td>
<td>During the response</td>
</tr>
<tr>
<td>Establish procedures to control movement and facilitate hand washing in most public places and along circulation routes</td>
<td>Engage in the containment of the contamination chain</td>
<td>Procedures in place with the Ministry of the Interior, the Ministry of Defense and local authorities (regional, departmental and municipal)</td>
<td>During the response</td>
</tr>
<tr>
<td>Psychosocial support to staff, victims and their families,</td>
<td>Engage in long term monitoring of EHF psychosocial impact and support staff</td>
<td>Trained psycho social staff, logistical support</td>
<td>During and after the response</td>
</tr>
<tr>
<td>Support to families of contaminated people and Ebola orphans,</td>
<td>Engage in long term monitoring of EHF psychosocial impact and support victims and their families</td>
<td>Trained psycho social staff, logistical support</td>
<td>During and after the response</td>
</tr>
<tr>
<td>Establishing an overview of the global situation</td>
<td>Facilitate strategic and operational steering of the response</td>
<td>System activated at the inter-ministerial level with a secretariat in MOH and support from WHO</td>
<td>During the response</td>
</tr>
<tr>
<td>Identify multi-sector consequences</td>
<td>Enable multi sector response</td>
<td>Inter-ministerial system linked to HCT</td>
<td>During the response</td>
</tr>
<tr>
<td>Identify exit strategy</td>
<td>Facilitate return to normality</td>
<td>Interministerial system linked to HCT</td>
<td>During the response</td>
</tr>
<tr>
<td>Return to normality,</td>
<td>Dispose of worn out equipment, replenish stocks Reactivation of routine surveillance</td>
<td>Legislation, infrastructures for HAZMAT disposal</td>
<td>After the response</td>
</tr>
<tr>
<td>Lessons learnt exercise(^\text{17});</td>
<td>Ensure that learning points are all gathered</td>
<td>Experienced teams are available</td>
<td>After the response</td>
</tr>
<tr>
<td>Activate communication to restore the image of the health system(^\text{18})</td>
<td>Communication capacity through media, social networks, etc.</td>
<td>Strong leadership from the top Experienced teams are available</td>
<td>During and after the response.</td>
</tr>
</tbody>
</table>


2.2. The scenarios

We looked at a number of different scenarios in terms of when the alert was given and the timeliness of the response:

**Scenario N°1, based on an alert in early March** Due to the particular situation of the 3 border areas (forest areas open to trade routes, specific socio-cultural contexts and difficult conditions inherited from the war), it was not possible to stop the outbreak while it was limited to the Guékedou area (as was done in Uganda) and there was a limited spillover to urban centers which meant that the response had to be upgraded. The outbreak crossed two borders and reached Lofa district in Liberia and Kailahun district in Sierra Leone. Rapid mobilization prevented the disease from reaching the capital cities.

**Scenario N°2: What really happened:** This scenario includes the slow and indecisive initial response (despite the early mobilization of MSF and the Red Cross in some of the affected countries), the indecisive mobilization of WHO, the crossing of borders by the epidemic, the WHO finally declaring that there was an emergency with global implications, the creation of UNMEER, the impressive but late mobilization of resources by Western governments (financial resources, the mobilization of armed forces with their logistical, health and engineering capacities) and the fact that after one full year, the epidemic is still not over.

**Scenario N°3: based on an alert in early February and rapid containment of the disease.** With an early reaction and proper support to national public health institutions, it would have been possible to reduce the spread of the outbreak to a relatively manageable level, and return to normal within a 3 to 4 month period. This scenario is largely based on the experience of Uganda.

**Scenario N°4: based on an alert in late March, but with a relatively rapid mobilization.** The outbreak spreads to Macenta and Xerekoré, and therefore a second line of defense, with additional ETCs and expanded logistical capacity, is mobilized. At the same time, there is a strong communication campaign which is well supported by the authorities. As a result the disease remains limited to Guinea and does not reach Conakry.

While, ideally, the objective should be to get as close as possible to scenario 3 or 4 (rapid containment of the disease), they are dependent on strong national and local health systems and risk-informed national authorities who are accountable to their populations. As these conditions do not yet exist in the countries involved, the main comparison we will look at is between scenario N°1 and scenario N°2 (a detailed description of scenarios 3 and 4 can be found in the annexes).
2.3. Scenario N°1

This scenario is the closest to what actually happened, with a cross-border outbreak. However, in this scenario, the leaders of the three countries are highly mobilized and receive support from WHO. With the rapid mobilization of the necessary resources, it was possible to prevent the situation from becoming difficult to control.

<table>
<thead>
<tr>
<th>Action</th>
<th>What this action involves</th>
<th>costs scenario 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support to surveillance</td>
<td>Staff, data management</td>
<td></td>
</tr>
<tr>
<td>Alert</td>
<td>telecommunications from the field upwards</td>
<td>9000</td>
</tr>
<tr>
<td>First sample collection and confirmation</td>
<td>Team sent to field, sample collected and sent to 2 reference laboratories</td>
<td>15000</td>
</tr>
<tr>
<td>Deployment of first front line</td>
<td>1 ETC, full staff, PPE and all the required decontamination equipment, WASH, logistics, incinerator, body bags, for 3 months</td>
<td>4500000</td>
</tr>
<tr>
<td>Regular sample collection and confirmation</td>
<td>Teams sent to field, samples collected and sent to 1 reference laboratory</td>
<td>180000</td>
</tr>
<tr>
<td>Communication with the population</td>
<td>Production of leaflets and notice boards, messages prepared and sent through local radio and TV;</td>
<td>270000</td>
</tr>
<tr>
<td></td>
<td>Staff and logistical capacity to visit local and traditional opinion makers</td>
<td>180000</td>
</tr>
<tr>
<td>Coordination</td>
<td>Staff with coordination equipment and an appropriate inter institution mechanism</td>
<td>270000</td>
</tr>
<tr>
<td>Public health measures</td>
<td>Material to establish “health check points” (thermometers, hand washing devices, soap, etc.) in markets, institutions, between villages, etc.</td>
<td>450000</td>
</tr>
<tr>
<td>Psychosocial support</td>
<td>For staff and affected populations</td>
<td>450000</td>
</tr>
<tr>
<td>Deep field deployment</td>
<td>Logistics for mobile teams for case tracking, case collection (body bags, etc.)</td>
<td>900000</td>
</tr>
<tr>
<td>Second line deployment</td>
<td>2 additional fully manned and equipped ETCs for a 2-month period per country</td>
<td>13500000</td>
</tr>
<tr>
<td>Disposal</td>
<td>Equipment and capacity to properly and safely dispose of waste and used equipment</td>
<td>135000</td>
</tr>
<tr>
<td>After Action Review and lessons learnt</td>
<td>Internal country level exercise, possibly supported by an external evaluation</td>
<td>90000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>20949000</td>
</tr>
</tbody>
</table>

![Daily case statistics](image)
2.4. Comparing Scenario N°1 and what actually happened

What actually took place was a very complex crisis, with international repercussions, a high socio-economic and societal impact and the risk of Ebola becoming endemic (see detailed description in annex N°2). There have been a total of 26,277 reported confirmed, probable, and suspected cases of EHF in Guinea, Liberia and Sierra Leone (figure 1, table 1), with 10,884 reported deaths (the outcomes for many cases are unknown). A total of 22 new confirmed cases were reported in Guinea, 0 in Liberia, and 11 in Sierra Leone in the 7 days leading up to 26 April 2015, which means that the situation is still not totally under control more than a year after the first confirmed case.

It is very difficult to disaggregate to the same level of precision the amount of resources mobilized during the West Africa EHF outbreak as they are not always recorded by activities or sequences in the donor databases that were consulted (FTS in particular). However, useful information was identified in several OCHA and UNMEER publications.

Different phases of resource mobilization need to be considered:

- March - August 2014
- September - December 2014
- January - April 2015

During the period from March to August 2014, resource mobilization and activities on the ground were those of the MSF family and of the Red Cross and Red Crescent Movement (CHF 4,2 M in the Emergency appeals for the 3 concerned countries19 20 21 adding together DREF, ERU deployment and additional donations), together with the early mobilization of GOARN. The real cost for that period was similar to that of Scenario N°1: between 20 and 30 Million US$.

19 adore.ifrc.org/Download.aspx?FileId=74469
20 adore.ifrc.org/Download.aspx?FileId=63589
21 adore.ifrc.org/Download.aspx?FileId=62144
During the summer, with the first cases arriving in Europe and the USA, there was a surge in resource mobilization. During Summer, the IFRC revised its Emergency Appeals to raise CHF 67.1M. In September, well into the crisis, OCHA launched an appeal\(^2\) for US$ 987.8M for the following activities.

**OCHA Appeal, September 2014.**

<table>
<thead>
<tr>
<th>action</th>
<th>Global amount</th>
<th>Requesting agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STOP THE OUTBREAK</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify and trace people with Ebola</td>
<td>$ 189,5 M</td>
<td>UNDP, UNFPA, UNHCR, UNMIL, WHO</td>
</tr>
<tr>
<td>Safe and dignified burial</td>
<td>$ 23,8 M</td>
<td>WHO</td>
</tr>
<tr>
<td><strong>TREAT THE INFECTED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Care for Persons with Ebola and infection control</td>
<td>$ 331,2 M</td>
<td>UNDP, UNFPA, UNICEF, UNMIL, WHO</td>
</tr>
<tr>
<td>Medical care for responders</td>
<td>$ 14,0 M</td>
<td>WHO</td>
</tr>
<tr>
<td><strong>ENSURE ESSENTIAL SERVICES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision of food security and nutrition</td>
<td>$ 107,7 M</td>
<td>FAO, UNICEF, WFP</td>
</tr>
<tr>
<td>Access to basic health services including non Ebola</td>
<td>$ 97,1 M</td>
<td>OCHCR, UNFPA, UNHCR, UNICEF, WHO</td>
</tr>
<tr>
<td>Cash incentives for workers</td>
<td>$ 2,5 M</td>
<td>UNDP</td>
</tr>
<tr>
<td>Recovery and economy</td>
<td>$ 64,8 M</td>
<td>FAO, IOM, UNDP, UNIDO</td>
</tr>
<tr>
<td><strong>PRESERVE STABILITY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliable supply of material and equipment</td>
<td>$ 42,6 M</td>
<td>UNFPA, UNHCR, UNICEF, UNMIL, UNOPS, WFP</td>
</tr>
<tr>
<td>Transport and fuel</td>
<td>$ 23,4 M</td>
<td>UNHCR, WFP</td>
</tr>
<tr>
<td>Social mobilization and community engagement</td>
<td>$ 45,8 M</td>
<td>FAO, UN WOMEN, UNDP, UNFPA, UNICEF, WHO</td>
</tr>
<tr>
<td>Messaging</td>
<td>$ 3,2 M</td>
<td>UNAID, WHO</td>
</tr>
<tr>
<td>Common services</td>
<td>$ 11,9 M</td>
<td>OCHA, UNICEF, GERC</td>
</tr>
<tr>
<td>Preparedness in countries non affected</td>
<td>$ 11,9 M</td>
<td>UNICEF, WHO</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$ 987,8 M</td>
<td></td>
</tr>
</tbody>
</table>

The Multi Donor Trust Fund (MDTF) which was created in September 2014, records how the funds that it distributes are used according to a set of well identified “Mission Critical Actions” which are in line with the factors and variables that we used in the other scenarios.


During the period from September to December, there were massive military deployments by the US Army\(^2^3\) (cost $US 330,2 M), the British Army\(^2^4\), and the French and German military. The cost of these operations is difficult to appraise.

\(^2^2^2\) [https://docs.unocha.org/sites/dms/cap/ebola_outbreak_sep_2014.pdf](https://docs.unocha.org/sites/dms/cap/ebola_outbreak_sep_2014.pdf)


A complex mix of response tools:

Part of the international response was the deployment of a British inter-agency task force to assist the government of Sierra Leone in countering the disease. This included volunteer medical staff from the National Health Service, military medical staff, logisticians, communication specialists and engineers as well as Royal Marines and naval helicopters.

The last period corresponds to the mobilization of resources from development instruments to cope with the continuation of the epidemic in 2015 and to mitigate its longer term impact. With regard to MSF, its provisional budget for 2014 and 2015 for its Ebola response in West Africa is €113M for a strong presence in the 3 countries most concerned and an additional low intensity presence oriented towards preparedness and alertness in other countries of the region. OCHA announced a global humanitarian funding need of $US3.34 billion out of which $2.27 billion requested through the interagency Response Plan for Ebola Virus Outbreak.

Reporting from the Office of the UN Special Envoy for Ebola indicates the following amounts of resources mobilized and allocated for the Ebola response.

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The World Bank Group\textsuperscript{27} announced in April 2015 that it would provide at least US$650 million during the next 12 to 18 months to help Guinea, Liberia and Sierra Leone recover from the devastating social and economic impact of the Ebola crisis and advance their longer-term development needs. The new WBG pledge brings the organization’s total financing for Ebola response and recovery efforts to date to US$ 1.62 billion. This announcement came as the WB just released new economic estimates showing that the Ebola epidemic had a significant impact on the economies of Guinea, Liberia and Sierra Leone. Estimated GDP losses for the three countries in 2015 rose to US$2.2 billion: US$240 million for Liberia, US$535 million for Guinea and US$1.4 billion for Sierra Leone.

The need to tackle many of the consequences of the EHF epidemic, including the weakening of food security in many urban centers and the extremely negative impact on the public health system and related consequences on the health situation. Aside from the UNMEER funding, OCHA made appeals for $2.27 billion\textsuperscript{28} to respond to the outbreak. So far, $1.5 billion (66\%) has been raised. In the end, more than US$ 3 Billion had to be raised just for the response and the mitigation of the primary negative impacts of the crisis.

On the epidemiological side, the following information describes the dynamic of the West Africa EHF outbreak.

<table>
<thead>
<tr>
<th>Country</th>
<th>Case definition</th>
<th>Cumulative cases</th>
<th>Cases in past 21 days</th>
<th>Cumulative deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea</td>
<td>Confirmed</td>
<td>3158</td>
<td>69</td>
<td>1962</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>415</td>
<td>*</td>
<td>415</td>
</tr>
<tr>
<td></td>
<td>Suspected</td>
<td>11</td>
<td>*</td>
<td>‡</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3584</td>
<td>69</td>
<td>2377</td>
</tr>
<tr>
<td>Liberia**</td>
<td>Confirmed</td>
<td>3151</td>
<td>0</td>
<td>‡</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>1879</td>
<td>*</td>
<td>‡</td>
</tr>
<tr>
<td></td>
<td>Suspected</td>
<td>5292</td>
<td>*</td>
<td>‡</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>10 322</td>
<td>0</td>
<td>4608</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>Confirmed</td>
<td>8586</td>
<td>32</td>
<td>3533</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>287</td>
<td>*</td>
<td>208</td>
</tr>
<tr>
<td></td>
<td>Suspected</td>
<td>3498</td>
<td>*</td>
<td>158</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12 371</td>
<td>32</td>
<td>3899</td>
</tr>
<tr>
<td>Total</td>
<td>Confirmed</td>
<td>14 895</td>
<td>101</td>
<td>‡</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>2581</td>
<td>*</td>
<td>‡</td>
</tr>
<tr>
<td></td>
<td>Suspected</td>
<td>8801</td>
<td>*</td>
<td>‡</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>26 277</td>
<td>101</td>
<td>10 884</td>
</tr>
</tbody>
</table>

Data are based on official information reported by ministries of health.


\textsuperscript{28} Response Plan for Ebola Virus Outbreak - Overview of Needs and Requirements (inter-agency plan for Guinea, Liberia, Sierra Leone, Region) - October 2014 - June 2015
It is interesting to note that the outbreak went through a series of waves, triggering some hope in June. This led to a drop in the level of alertness and the number of cases rapidly escalated again, especially in the capital cities.

A determining factor of a response to a crisis like this is political decision making. With a weak WHO not fully engaging with the authorities, and the authorities either not recognizing the importance of the threat or afraid that announcing that there was an outbreak of Ebola would undermine the economy, this led to a lack of decisiveness and leadership.

The poor quality of health workers in forested regions and remote areas and their lack of understanding of the nature of the threat and the precautions to take, slowed initial response and increased the spreading of the disease.

The difficulties that the major actors (USAID, CDC, WB) had in anticipating the evolution of the outbreak and adapting their strategy accordingly resulted in more overspending than any of the other factors considered in the analysis. For example, from mid-October ECHO Liberia has been advocating for flexibility in US /WB funding to focus on strengthening the existing health system rather than creating temporary mega-structures (e.g. CCCs, ETUs in Monrovia). These massive investments, which may have been justified in mid-September, were no longer rational in November; it was a case of “too much, too late”.

At the time of writing this study, cases are still being detected every week, which means that the outbreak is not yet over. The battle is far from over, even if a country like Liberia has been recently declared “Ebola free” after 42 days without new cases. The few remaining cases in remote areas are resistant and difficult to tackle. The tail of the epidemic may be long, and the disease may have become endemic.

There is still a significant presence of ETCs in different areas. ETCs scheduled for closure will be decommissioned only when and where the epidemiological situation and the strength of referral pathways through non-EHF facilities allow. Several ETCs will be unstaffed but remain on a stand-by level of readiness, whereby stocks of protective equipment and essential medicines will be kept on-site such that the facility can become operational within 48 hours. This transition would be triggered by higher occupancy rates in nearby ETCs. Strategically located core ETCs will remain fully operational at their current capacity (Maintain) or a slightly reduced capacity (Scale Down and Maintain).
3. CONCLUSION

Managing an EHF outbreak is a highly complicated task as it is not simply a “health” problem. Cultural behavior relating in particular to burial and stigmatization means that culturally inappropriate initial communication can inadvertently encourage the hiding of cases: if it is a lethal disease with no cure, why should people go to treatment centres?

The affected countries will come out of this period with more socio-economic vulnerabilities, and dramatically weakened health systems. It will take years to recreate confidence with job creating industries, especially external investors. Not only have lives been lost unnecessarily, societies have also been put under enormous pressure at a time when they were emerging from years of war or political turmoil. We should be able to do better. The experiences from Uganda and DRC show that this is possible and that efficient and effective measures can get an EHF outbreak rapidly under control.

The three theoretical scenarios and the reality (scenario 2) all have their specific characteristics:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Case number (approximate)</th>
<th>Duration of the outbreak</th>
<th>Approximate Cost</th>
<th>Multiplying factors between scenarios and reality</th>
<th>Corrective hypothesis with scenario costs multiplied by 3.</th>
<th>New multiplying factors between scenarios and reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3500</td>
<td>8 months</td>
<td>21 M US$</td>
<td>More than 150 times less expensive</td>
<td>63 M US$</td>
<td>Approximately 50 times less expensive</td>
</tr>
<tr>
<td>2</td>
<td>26 300</td>
<td>More than 12 months</td>
<td>3,328 M US$</td>
<td>More than 1700 times less expensive</td>
<td>5,7 M US$</td>
<td>Approximately 550 times less expensive</td>
</tr>
<tr>
<td>Reality</td>
<td>1300</td>
<td>3 to 5 months</td>
<td>1,9 M US$</td>
<td>More than 450 times less expensive</td>
<td>21 M US$</td>
<td>Approximately 150 times less expensive</td>
</tr>
<tr>
<td>4</td>
<td>2700</td>
<td>6 to 8 months</td>
<td>7 M US$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Even if the costs of the three theoretical scenarios are multiplied by 3, they remain significantly lower than the overall costs of the current operation. Significant savings could have been made...

Another major impact of the inadequately managed West Africa EHF crisis is that, due to the high cost of the overall international response, rare resources for humanitarian action have been used inappropriately. Strong national leadership supported by decisive international mobilization under dynamic and courageous WHO leadership, a capacity to anticipate and take risks, would have allowed for a much more rapid and more efficient response. The global cost of the current response is over US$ 3.3 Billion\(^{29}\) which does not include the post crisis funds made available by the World Bank and other institutions. This represents significant expenditure at a time when so many crises are putting the aid system under immense pressure.

The tropical and equatorial parts of Africa which are the habitat of are being transformed by economic and demographic changes. The development of cash crops, high population mobility, and increasing urbanization are all factors that could create the conditions for a new epidemic. Weak health systems with insufficient surveillance mechanisms and early warning/early action capacities do not only exist in the countries of the Mano river basin (Guinea, Liberia and Sierra Leone), they are also in at least 17 countries in West and Central Africa, the second largest source of zoonosis in the world and the main source of selvatic zoonosis, including HIV, a part of the world where other epidemics of this kind could happen. Strengthening surveillance and enhancing the preparedness level of health systems throughout West and Central Africa is vital not only for the African population. It is also vital for global security.

\(^{29}\) http://fts.unocha.org/reports/daily/ocha_R24_E16506___1504301628.pdf
ANNEXES
Ebola Hemorrhagic Fever (EHF) is caused by infection by *Ebolavirus* from the *Filoviridae* family. The zoonotic reservoir for the viruses is unknown, although suspected reservoirs are associated with consumed meat of wild animals from the forest. Outbreaks of EHF are associated most often with the introduction of the virus into the community by one infected person followed by dissemination by person-to-person transmission, either during normal family activities or within medical facilities where the patients are brought after the first clinical symptoms are declared. The first reported EHF outbreak occurred in 1976 in the southern Sudan towns of Nzara and Maridi and was concurrent with an Ebola-Zaire outbreak in Zaire (Democratic Republic of the Congo). The second Ebola-Sudan outbreak occurred in 1979 in the same locations. Similar to the 1976 and 1979 outbreaks, the 2000 outbreak in Uganda had a case fatality of approximately 50%. Also similar to the earlier outbreaks, the 2000 outbreak seemed to have begun with the introduction of the virus into Gulu District followed by transmission into the community and health-care facilities. However, in all epidemics, the first cases associated with this EHF outbreak remain obscure, which has limited the ability to investigate possible reservoirs of the virus.

Lessons learnt from these crises are critical to identify the shortfalls of the 2014-2015 Ebola epidemics in West Africa. The Uganda Ebola crisis has been well documented.

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**EHF in Uganda, 2000-2001**

On October 8, 2000, an outbreak of an unusual febrile illness with occasional hemorrhage and significant mortality was reported to the Ministry of Health (MoH) in Kampala by the superintendent of St. Mary's Hospital in Lacor, and the District Director of Health Services in the Gulu District. A preliminary assessment conducted by MoH found additional cases in Gulu District and in Gulu Hospital, the regional referral hospital. On October 15, suspicion of Ebola hemorrhagic fever (EHF) was confirmed when the National Institute of Virology (NIV), Johannesburg, South Africa, identified Ebola virus infection among specimens from patients, including health-care workers at St. Mary's Hospital. This report describes surveillance and control activities related to the EHF outbreak and presents preliminary clinical and epidemiologic findings.

Control activities were organized around surveillance and epidemiology, clinical case management, social education and mobilization, and coordination and logistic support. An active EHF surveillance system was initiated to determine the extent and magnitude of the outbreak, identify foci of disease activity, and detect cases early. Ill persons were encouraged to be assessed at a hospital and, if indicated, to be hospitalized to reduce further community transmission. Targeted prevention activities included follow-up of contacts of identified cases for 21 days; establishment of trained burial teams for all potential and confirmed EHF deaths; community education; cessation of traditional healing and burial practices; cessation of large public gatherings; and updates of hospital infection-control measures, including isolation wards. Laboratory testing was performed at a field laboratory established at St. Mary's Hospital by CDC and supplemented by additional testing at CDC and NIV. Sequence analysis revealed that the virus associated with this outbreak was Ebola-Sudan and differed at the nucleotide sequence level from earlier Ebola-Sudan isolates by 3.3% and 4.2% in the polymerase (362 nucleotides sequenced) and nucleocapsid (146 nucleotides sequenced) protein encoding genes, respectively. During the third week of October, active surveillance was established and included three case notification categories: alert, suspect, and probable. The alert category comprised persons with sudden onset of high fever, sudden death, or hemorrhage, and was used by community members to alert health-care personnel.

The suspect category comprised persons with fever and contact with a potential case-patient; persons with unexplained bleeding; persons with fever and three or more specified symptoms (i.e., headache, vomiting, anorexia, diarrhea, weakness or severe fatigue, abdominal pain, body aches or joint pains, difficulty swallowing, difficulty breathing, and hiccups), and all unexplained deaths. The suspect category was used by mobile surveillance teams to determine whether a patient required transport to an isolation ward. The probable category included persons who met these criteria and were assessed and reported by a physician. Laboratory tests included virus antigen detection and antibody ELISA tests and reverse transcriptase polymerase chain reaction. Laboratory-confirmed case-patients were defined as patients who met the surveillance case definitions and were either positive for Ebola virus antigen or Ebola IgG antibody. During October 5–November 27, among 62 persons with laboratory-confirmed EHF admitted to Gulu Hospital, symptoms included diarrhea (66%), asthenia (64%), anorexia (61%), headache (63%), nausea and vomiting (60%), abdominal pain (55%), and chest pain (48%). Patients presented for care a mean of 8 days (range: 2–20 days) after symptom onset. Bleeding occurred in 12 (20%) patients and primarily involved the gastrointestinal tract. Among the 62 confirmed case-patients, 36 (58%) died; among patients aged <15 years, four of five died (case fatality: 80%). Spontaneous abortions were reported among pregnant women infected with EHF.

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As of January 23, 2001, 425 presumptive* case-patients with 224 (53%) deaths attributed to EHF were recorded from three districts in Uganda: 393 (93%) from Gulu, 27 (6%) from Masindi, and five (1%) from Mbarara. The combined area comprises approximately 11,700 square miles (31,000 square kilometers; 2000 combined population: 1.8 million). Although the cluster of cases in early October triggered identification of the outbreak and response measures, investigations (i.e., case-record review and interviews with surviving patients or their surrogates) identified cases occurring in the community and patients hospitalized several weeks earlier. The onset of illness of the earliest presumptive case was August 30, 2000, and onset of last presumptive case was January 9, 2001. The ages of presumptive case-patients ranged from 3 days–72 years (median: 28 years); 269 (63%) were women. Mean time from symptom onset to death was 8 days (95% confidence interval=±5 days); 218 (51%) presumptive cases were laboratory confirmed.

![Figure 2](image)

While international attention was just starting to focus on the West Africa EHF outbreak, another one developed in Democratic Republic of Congo (DRC), a country equally affected by poverty and war.

**Jeera County EHF Outbreak, DRC, 2014**

On 24 August, an outbreak of Ebola virus disease (EHF) was identified in Jeera County, Equateur Province and immediately notified by the Health Authorities to WHO. This outbreak is the 7th outbreak of Ebola virus disease in the DRC since Ebola virus was first identified there in 1976. Under a strong leadership by the health ministry and effective coordination of the response that included rapidly mobilising an expert response team to Jeera County, identifying and monitoring contacts and organizing safe burials. The Government of the DRC moved quickly to mobilize expert teams. Early engagement of traditional, religious and community leaders played a key role in successful containment of this outbreak. WHO, Médecins Sans Frontières (MSF), the US Centers for Disease Control (CDC), UNICEF and other partners supported the Government of the Democratic Republic of Congo with expertise for outbreak investigation, a mobile laboratory, risk communications and social mobilization, contact tracing and clinical care.

By 20 November (3 months after the first identification), 42 days had passed without any new cases and the last case tested negative twice and discharged from hospital, Having reached the 42-day mark recommended by WHO, the Democratic Republic of Congo was considered free of Ebola transmission.

This outbreak, which was unrelated to the one which affected West Africa, caused a total of 66 cases of EHF including 8 among health care workers.

The Government of the Democratic Republic of Congo and staff in the WHO country office are aware that the country remains vulnerable to Ebola virus disease and the country surveillance system remains on high alert.
After action review on the Uganda and DRC experiences helped to identify four most important means of transmission as:

- **Nosocomial transmission or contamination between patients and health workers** (64% of 22 health-care workers in Gulu were infected after establishing the isolation wards). As in many other epidemics, transmission through the medical corps is one of the primary cause of contamination.
- **Attending funerals of presumptive EHF case-patients** where ritual contact with the deceased occurred,
- **Intra-familial contamination**, especially when people get sick and the families try to take care of them;
- **Movements to areas far from the initial infected ones**: the factors triggering this mobility are multiple: encroachment of the local ecological systems with deforestation and creation of roads; economic activities, fear of the diseases, etc.)

Community transmission was eliminated by:

- **Rapid recognition of the outbreak**: this is where both national and international political leadership are required
- **Immediate initiation of case finding**: The logistical and methodological capacities have to be in place rapidly
- **Rapid implementation of case isolation and other infection-control practices**: infrastructures, staff and procedures have to be put in place rapidly
- **Immediate hospitalization of identified case-patients in medical facilities which are properly designed, with clear identification of high risk zones, establishment of SOP for the use of personal protective clothing and protocols to enter and leave “hot zones”**;
- **Rapid establishment of a National notification system and enhanced surveillance efforts** to accelerate the identification of new areas of contamination foci and immediate measure for effective containment.
- **Fast Infection limitation and contamination-control procedures implemented at the village and family levels**. Decreased transmission also was the result of community education about the dangers of contact with symptomatic and deceased EHF patients, the establishment of specialized burial teams, and heightened awareness of the disease among health-care staff.

Key conclusions from these events:

- **Timeliness is the essence**: All processes have to go through a fast track approach and any delay will impact on the effectiveness of the response.” Getting back to zero” as fast as possible should be the core strategic goal.
- **Focus on health staff**: Too many cases of transmission to health-care workers occurred during these outbreaks, which puts the response capacity in danger. Training and provision of equipment as well as establishment and dissemination of proper SOP are “mission critical”
- **Focus on patients**: the use of isolation facilities remains the most effective means of controlling EHF outbreaks. Yet in many areas, this is the weakest element of the chain and health posts rapidly get the reputation of being the place where people get infected. This negative reputation induces a high reluctance in entering health premises, thus limiting their triage and isolation potentials.

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Focus on communities: Facing an Ebola epidemic and high mortality is traumatic for communities and teams in charge of Ebola treatment. It requires proper communication, cultural understanding and the capacity for empathy, including psycho-social support; The dimension of community engagement was not sufficiently used in the response. Given the cultural characteristics of communities and in particular the Kissi and the Soso, this should have been a priority and only a few agencies brought in anthropologists and specialists in social sciences. And community engagement is not only about doing or communicating, it is about listening, understanding and finding alternative solutions that can satisfy at the same time the requirements of disease control and the population’s values and priorities. Rapid communication is required but the content of the communication can backfire if inappropriate. Better communication messages (yes, some can survive and by being in an isolation centre you will protect your loved ones), community engagement, listening to cultural imperatives and finding dual solutions would have been required.

For the strategic steering of the epidemic, a series of ingredients are essential:

- **Identify specific risk factors** for disease acquisition in the community and hospitals,
- **Examine virological and clinical parameters** of infection and ensure their wide dissemination in health infrastructures at all levels, including at the basic Health care levels,
- **Increase the reporting of potentially epidemic diseases** into a national surveillance system linked to the highest Authorities, who can trigger national and regional reactions.
ANNEX N°2: The 2014-2015 EHF outbreak in West Africa

It is against the background presented above that an attempt to reflect on the 2014-2015 EHF epidemic in West Africa has been carried out in order to identify key entry points for a better management of future situations.

It is striking that the first sets of reviews and evaluations (IFRC, 2015) of the EHF epidemic in West Africa underlined very similar points to those identified during the early EHF epidemics. The outbreak probably started at the end of December 2013/ early January 2014 but went unnoticed in this Guinean deep tropical forest with limited health structures and a total absence of health surveillance and reporting systems. Already as of 24 March 2014, at the time of the first confirmation, cases were reported in Gueckedou, Macenta, Nzerekore and Kissidougou districts and three suspect cases including two deaths in Conakry were under investigation. One week later, cases were notified in Liberia and Sierra Leone.

Despite the fact the first confirmation of an EHF case is dated 24th of March 2014 and the call for action launched by MSF, the only early mobilization came from the GOARN (Global Outbreak Alert and Response Network), in line with standard procedures, which brought rapidly to the area key staff (lab technicians, physicians, epidemiologists, some foreign medical teams with experience in Ebola management from Uganda and DRC) and equipment (labs, Personal Protective Equipment) and from the Red Cross and Red Crescent system (IFRC, French Red Cross, in support to the Guinean Red Cross society.

The slow reaction of WHO during this outbreak which has been underlined by many actors, including WHO itself during a series of meetings in 2015 concerns in particular the slow recognition of the dynamics of the outbreak and the imperative to scale up (extend geographically) all elements of the response and the need to monitor the performance of the ongoing control interventions. This delay was very much politically motivated as the Guinean Government itself did not want to raise the alert in order to avoid fears and negative economic impact.

The ineffective and slow reaction of WHO at the country and regional level was highly criticized by many observers. It was not until July 2014 (4 months into the outbreak) that the World Health Organization (WHO) started to move ahead. It convened an emergency meeting with health ministers from eleven countries and announced collaboration on a strategy to co-ordinate technical support to combat the epidemic. This was “too little, too late”.

In August, WHO declared the outbreak an international public health emergency and published a roadmap to guide and coordinate the international response to the outbreak, aiming to stop ongoing Ebola transmission worldwide within 6–9 months. In September, the United Nations Security Council declared the EHF outbreak in West Africa a “threat to international peace and security” and adopted a resolution urging UN member states to provide more resources to fight the outbreak. WHO stated that the cost for combating the epidemic would be a minimum of $1 billion.

The fact that the lessons learnt from the past were used in a very limited way (and largely only by MSF and part of the Red Cross and Red Crescent system during the first part of the crisis) resulted in:

- The spread of the epidemic from the original limited area around Guekedou (Guinea) to the three countries (Guinea, Liberia, Sierra Leone) and into the complex urban contexts of medium and capital cities. The fact that the population of the countries concerned, especially Guinea and Liberia, displayed considerable distrust of the governments/authorities is one issue that has to be factored in to understand the sociological and political perception of the outbreak (denial, resistance).
- A significant death toll, although the most feared “worst case scenario” did not occurred\(^\text{32}\). In the worst-case scenario, the two countries could have had a total of 21,000 cases of Ebola by Sept. 30 and 1.4 million cases by Jan. 20 if the disease keeps spreading without effective methods to contain it. These figures take into account the fact that many cases go undetected, and estimate that there are actually 2.5 times as many as reported\(^\text{33}\).

- The need to set up a large number of Ebola treatment centers and isolation wards, which represented a high cost and a significant hindrance for both local economies and the normal public health system (which was any relatively weak).


- the crisis going regional beyond even the three most concerned countries; and bringing contaminated cases in the US and Europe;

- the need to reshuffle the aid system with the very costly mobilization and military resources and the quite expensive creation of a dedicated institution, UNMEER. UNOCHA felt at a stage that it was overwhelmed by the Syria and CAR crises and had no capacity (nor appropriate health resources) to coordinate the response. In view of the weak mobilization of WHO, UNMEER was established on 19 September 2014 after the unanimous adoption of General Assembly resolution 69/1, and the adoption of Security Council resolution 2177 (2014) on the Ebola outbreak. UNMEER was set up as a temporary measure to meet immediate needs related to the unprecedented fight against Ebola. UNMEER was established with the following objectives, principles and assumptions.

### Operational principles
- Adopting a regional approach
- Centrality of national ownership
- Complement work of governments and partners
- Clarity for national governments in what can be expected from the UN
- A singular UN system-wide approach in responding to Ebola
- A UN response that is specific to the need of each country

### Objectives
- Stop the outbreak
- Treat the infected
- Ensure essential services
- Preserve stability
- Prevent further outbreaks

### Main activities
- Case management
- Case finding, lab and contact tracing
- Safe and dignified burials
- Community engagement and social mobilization

### Key enablers
- Logistics
- Staffing and human resources
- Training
- Information management
- Cash payments and coordination
ANNEX N°3: Ideal Scenarios

Ideal scenario N°3: With early reaction and proper support to national public health institutions it is possible to reduce the spread of the outbreak and keep it relatively manageable, and to return to normal within a 3 to 4 month period. It is largely inspired from the experience of Uganda.

This scenario is based on the following hypotheses:

- Alert is rapid, based on an acceptable surveillance system and a high level of reactivity by national and international actors;
- The confirmation of the EHF is swift;
- Immediate early deployment of trained staff with PPE and the capacity to establish simple but effective ETC (MSF model) rapidly for front line action;
- Rapid mobilization of communication capacity to inform the populations of the risks and to promote proper behavior in possibly contaminated areas and when confronted with suspect cases;
- Mobilization of local and national authorities allows for specific public health measures (establish security perimeters if required, install hand washing devices at the entrance and exit points to villages or markets; etc.);
- Mobilization of staff, logistics and protection equipment to ensure safe case collection, contaminated item disposal and case tracking is timely and effective;
- Secondary mobilization of staff, equipment and logistics to support the front line action takes place on time and ensures a second line containment belt is not necessary;
- Psychosocial support to staff, victims and their families can be deployed in due time;
- Support to families of contaminated people and Ebola orphans, is less an issue as numbers remain below a certain limit;
- Return to normality, disposal of worn out equipment, replenishment of stocks are done effectively;
- Lessons learnt exercise takes place;
- The routine surveillance system is re-established.

The required budget for this scenario is described below:

<table>
<thead>
<tr>
<th>Action</th>
<th>What the action involves</th>
<th>Costs Scenario 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support to surveillance</td>
<td>Staff, data management</td>
<td>20000</td>
</tr>
<tr>
<td>Alert</td>
<td>telecommunication from the field to higher levels in the health institutions</td>
<td>1000</td>
</tr>
<tr>
<td>First Sample collection and confirmation</td>
<td>Team sent to field, sample collected and sent to 2 reference laboratories</td>
<td>5000</td>
</tr>
<tr>
<td>Deployment of first front line</td>
<td>1 ETC, full staff, PPE and all the required decontamination equipment, WASH, logistics, incinerator, body bags, for 3 months</td>
<td>1500000</td>
</tr>
<tr>
<td>Regular sample collection and confirmation</td>
<td>Teams sent to field, sample collected and sent to 1 reference laboratory</td>
<td>20000</td>
</tr>
<tr>
<td>Communication with the population</td>
<td>Production of leaflets and notice boards, messages prepared and sent through local radio and TV; Staff and logistical capacity to visit local and traditional opinion makers</td>
<td>30000 20000</td>
</tr>
<tr>
<td>Coordination</td>
<td>Staff with coordination equipment and interagency mechanisms</td>
<td>30000</td>
</tr>
<tr>
<td>Public health measures</td>
<td>Material to establish “health check points” (thermometers, hand washing equipment, soap, etc.) in markets, institutions, between villages, etc.</td>
<td>50000</td>
</tr>
<tr>
<td>Psychosocial support</td>
<td>To staff and affected populations</td>
<td>50000</td>
</tr>
<tr>
<td>Deep field deployment</td>
<td>Logistics for mobile teams for case tracking, case collection (body bags, etc.</td>
<td>130000</td>
</tr>
<tr>
<td>Second line deployment</td>
<td>2 additional fully manned &amp; equipped ETCs for a 2 month period per country</td>
<td></td>
</tr>
<tr>
<td>Disposal</td>
<td>Equipment and capacity to properly and safely dispose what will not be kept</td>
<td>15000</td>
</tr>
<tr>
<td>After Action Review and lessons learnt</td>
<td>Internal country level exercise, possibly supported by an external evaluation</td>
<td>20000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1891000</td>
</tr>
</tbody>
</table>
The impact model for this scenario is relatively similar to the one observed in previous EHF outbreaks in Uganda and DRC. The statistical curves follow similar trends.
Ideal scenario N°4: This scenario is based on the following hypotheses:

- Alert is rapid, based on an acceptable surveillance system and a high level of reactivity by national and international actors;
- Swift confirmation of the EHF;
- Immediate early deployment of trained staff with PPE and the capacity to establish simple but effective ETCs (MSF model) rapidly for front line action;
- The mobilization of communication capacity to inform the populations of the risks and to promote proper behaviors in the possibly contaminated areas and when confronted with suspect cases is not sufficiently effective;
- Mobilization of local and national Authorities is sub optimal and specific public health measures (establishing security perimeters if required, installing hand washing devices at the entrance and exit points to villages or markets; etc.) are not taken sufficiently rapidly;
- The mobilization of staff, logistics and protection equipment to ensure safe case collection, contaminated item disposal and case tracking is timely and effective;
- Secondary mobilization of staff, equipment and logistics to support the front line action takes place on time and ensures a second line containment belt with two additional ETCs;
- Psychosocial support to staff, victims and their families can be deployed in due time;
- Support to families of contaminated people and Ebola orphans, is less an issue as numbers remain below a certain limit;
- Return to normality, disposal of worn out equipment, and replenishment of stocks are done effectively;
- Lessons learnt exercise takes place,
- The routine surveillance system is re-established.

<table>
<thead>
<tr>
<th>Action</th>
<th>What the action involves</th>
<th>costs Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support to surveillance</td>
<td>Staff, data management</td>
<td></td>
</tr>
<tr>
<td>Alert</td>
<td>telecommunications from the field to higher levels in the health system</td>
<td>3000</td>
</tr>
<tr>
<td>First sample collection and confirmation</td>
<td>Team sent to field, sample collected and sent to 2 reference laboratories</td>
<td>5000</td>
</tr>
<tr>
<td>Deployment of first front line</td>
<td>1 ETC, full staff, PPE and all the required decontamination equipment, WASH, logistics, incinerator, body bags, for 3 months</td>
<td>1500000</td>
</tr>
<tr>
<td>Regular sample collection and confirmation</td>
<td>Teams sent to field, sample collected and sent to 1 reference laboratory</td>
<td>60000</td>
</tr>
<tr>
<td>Communication with the population</td>
<td>Production of leaflets and notice boards, messages prepared and sent through local radio and TV; Staff and logistical capacity to visit local and traditional opinion makers</td>
<td>90000 60000</td>
</tr>
<tr>
<td>Coordination</td>
<td>Staff with coordination equipment and inter-agency mechanisms</td>
<td>90000</td>
</tr>
<tr>
<td>Public health measures</td>
<td>Material to establish “health check points” (thermometers, hand washing devices, soap, etc.) in markets, institutions, between villages, etc.</td>
<td>150000</td>
</tr>
<tr>
<td>Psychosocial support</td>
<td>To staff and affected populations</td>
<td>150000</td>
</tr>
<tr>
<td>Deep field deployment</td>
<td>Logistics for mobile teams for case tracking, case collection (body bags, etc.</td>
<td>300000</td>
</tr>
<tr>
<td>Second line deployment</td>
<td>2 additional fully manned and equipped ETCs for a 2-month period per country</td>
<td>4500000</td>
</tr>
<tr>
<td>Disposal</td>
<td>Equipment and capacity to properly and safely dispose what will not be kept</td>
<td>45000</td>
</tr>
<tr>
<td>After Action Review and lessons learnt</td>
<td>Internal country level exercise, possible supported by an external evaluation</td>
<td>30000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6983000</td>
</tr>
</tbody>
</table>
The impact model for this scenario is different from the one observed in previous EHF outbreaks in Uganda and DRC. It implies a more sustained deployment with a second line of containment and more efforts in coordination. The statistical curves present new patterns.
ANNEX N°4: References

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The INSPIRE Consortium supports DG ECHO in developing policies through research, workshop facilitation and the dissemination of results.

The INSPIRE Consortium brings together three leading European institutions within the humanitarian sector: Groupe URD (France), as consortium coordinator, GPPi (Germany) and IECAH (Spain).