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Standard operating procedures for controlling Ebola and Marburg virus epidemics

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Standard Operating Procedures for controlling Ebola and Marburg virus diseases

World Health Organization

Disease Surveillance and Response Programme (DSR), Regional Office for Africa

Pandemics and Endemics Department (PED)

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1.1.1.1

List of Abbreviations and Acronyms

AFRO WHO Regional Office for Africa
AIDCO Europe Aid Co-operation Office
CDC Centers for Disease Control and Prevention
COMBI Communication for Behaviour Impact
DRC Democratic Republic of Congo
DSR Disease Surveillance and Response Programme
EVD Ebola Virus Disease
FAO United Nations Food and Agriculture Organization
GOARN Global Outbreak Alert and Response Network
IHR International Health Regulation
ITSCC International Technical and Scientific Coordination Committee
MSF Doctors without Borders
MVD Marburg Virus Disease
OIE World Animal Health Organization
PED Pandemic and Epidemic Department
PPE Personal Protection Equipment
UNICEF United Nations Children's Fund
VHF Viral Haemorrhagic Fever
WHO World Health Organization

Chapter 1
INTRODUCTION

2 Introduction

2.1 Objective of the document and target public

Out of the 2855 Ebola and Marburg cases recorded before the last epidemics in West Africa, 268 victims (or 9%) were health workers. To provide health workers in high-risk zones with a tool that will enable them effectively fight against Ebola and Marburg virus haemorrhagic fever epidemics, the Disease Surveillance and Response programme (DSR) of the WHO Regional Office for Africa (AFRO) and the Pandemic and Epidemic Department (PED) of the WHO Headquarters prepared the document entitled «Standard Operating Procedures for controlling epidemics of Ebola and Marburg virus diseases».

These standard operating procedures are mainly intended for health staff of the health districts (doctors and paramedical staff) and also health staff of the intermediate and central levels in charge of controlling epidemics, including national focal points appointed by virtue of the International Health Regulation (IHR).

They describe the prevention and control measures to be put in place during the pre-epidemic, outbreak and post-epidemic periods.

2.2 General information on Ebola and Marburg

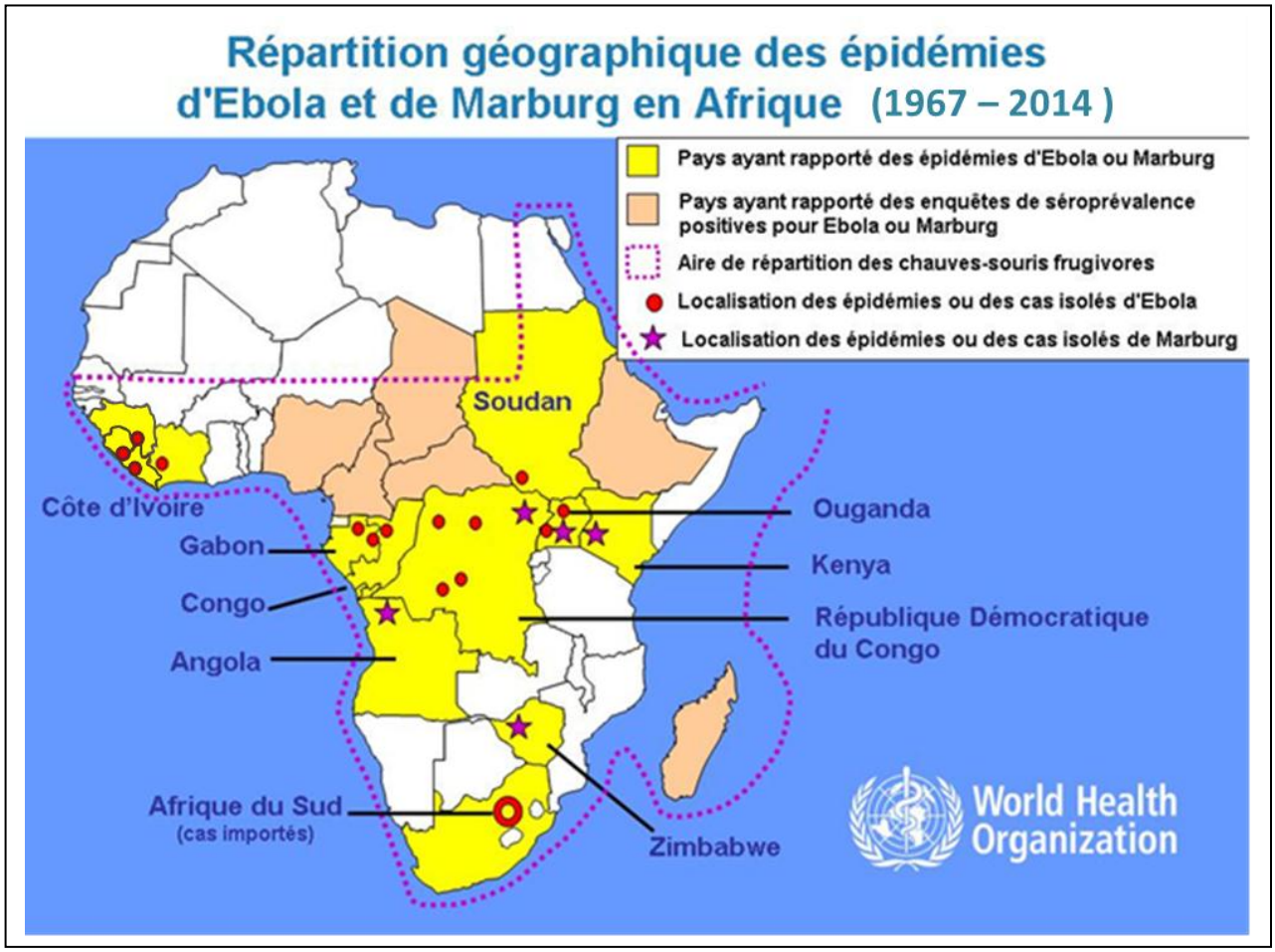
Epidemic outbreaks of Ebola or Marburg virus haemorrhagic fever constitute a major public health problem for sub-Saharan African States.

The *Marburgvirus* and *Ebolavirus* viruses belong to the same family of *Filoviridae* (filovirus). There are five different species of the *Ebolavirus* type - Bundibugyo, Côte d'Ivoire, Reston, Sudan and Zaïre - and only one viral species of the *Marburgvirus* type. The Marburg virus and the Ebola virus of the Bundibugyo, Sudan and Zaïre species have been associated with epidemics of viral haemorrhagic fever (VHF) of great dimension, characterized by high inter-human transmission and causing the death of 25 - 90% of the infected persons. Whereas the Ebola viruses of the Côte d'Ivoire and Reston species have, for the moment, not been associated with VHF outbreaks in humans, It should be noted that the term viral haemorrhagic fever was replaced by "Ebola virus disease (EVD)" or "Marburg virus disease (MVD)" due to the fact that the fever and haemorrhage are not common signs in all patients. The haemorrhagic signs often occur in the terminal phase, when there is no longer need for early diagnosis.

Since it was discovered in 1976, the Ebola virus disease has been raging mainly in sub-Saharan Africa. Sudan (1976, 1979, 2004), Democratic Republic of Congo (DRC) (1976, 1977, 1995, 2007,2012), Gabon (1994, 1996, 2001, 2002), Uganda (2000, 2007, 2012), Republic of Congo (2001, 2002, 2003, 2005), Guinea (2013, 2014), Liberia (2014) and Sierra Leone (2014) have reported epidemics of EVD (Figure 1). Côte d'Ivoire (1994) reported one isolated case – caused by the EboCôte d'Ivoire virus – due to an infection during an autopsy of an infected chimpanzee; there was no secondary transmission and the patient survived the infection.

Marburg virus disease is also rampant in Africa. Uganda (1967, 2007), (1975), Kenya (1980, 1987), DRC (1994, 1998-2000), and Angola (2005) reported isolated cases and epidemics of MVD. South Africa reported epidemics of Marburg (1975) and Ebola (1996), following the importation of patients from Zimbabwe and Gabon respectively. Apart from Africa, it should be noted that in 1967, following the importation of infected green monkeys (*Cercopithecus aethiops*) from Uganda, Germany and Yugoslavia experienced epidemics of

MVD, which killed 32 people. In 2008, Netherlands and the USA reported each an imported case of Marburg; the two patients - travellers – had visited the cave of Maramagambo forest situated in the south-east of Uganda.



Geographical distribution of Ebola and Marburg Epidemics in Africa (1967 – 2014)

- Countries that have reported Ebola or Marburg Epidemics
- Countries that have reported positive seroprevalence investigations for Ebola or Marburg
- Area of distribution of frugivore bats
- Location of epidemics or isolated cases of Ebola
- Location of epidemics or isolated cases of Marburg

Côte d'Ivoire	Sudan
Gabon	Uganda
Congo	Kenya
Angola	Democratic Republic of Congo
South Africa (imported cases)	Zimbabwe

Figure 1: Geographical distribution of Ebola and Marburg Epidemics in Africa (1967-2014).

In Africa, frugivore bats of the *Pteropodidae* family are considered as natural hosts of filoviruses. The species belonging to the *Rousettus* species are considered as natural hosts of the Marburg virus, whereas those belonging to the *Hypsignathus, Epomops* and *Myonycteris* species are considered as potential natural hosts of the Ebola viruses. However, traces of Ebola and Marburg have also been found in other species of bats. It

is likely that the geographical distribution of the Ebola Marburg viruses correspond to that of bats of the *Pteropodidae* family. Consequently, the Ebola and Marburg viruses should be considered as endemic in all sub-Saharan African countries (Figure 1).

Ebola and Marburg viruses are transmitted through direct contact with blood, secretions, biological organs or liquids of infected persons, hence a major risk of transmission when providing care to the patient or taking over the deceased person by members of the health staff and the communities. Funeral rites, during which relatives and friends are in direct contact with the dead body, play a major role in the transmission of the viruses.

Health workers, who provide care to Ebola or Marburg patients without the basic measures of protection against the infection in medical environment and without respecting the techniques of care in isolation, were contaminated. To date, about 9% of victims of the Ebola or Marburg virus happen to be health workers.

In Africa, it has been observed that Ebola could be transmitted to humans during the manipulation of animals carrying the virus, alive or deceased: chimpanzees, gorillas, monkeys, bats of the *Hypsignathus* and *Epomops* species, forest antelopes and porcupines. For Marburg, the majority of the initial cases (index cases) were infected after a prolonged stay in mines or caves inhabited by colonies of bats of the *Rousettus* species.

A symptomatic treatment and intensive care should be administered in serious cases. There is no specific treatment or vaccine for Ebola or Marburg. Several candidate vaccines are being developed, but we should wait for a few more years before a vaccine can be available in the field for the epidemic control medical teams.

Since filoviruses are considered as very dangerous agents of infection, they should be manipulated with extreme care. In the laboratory, studies on the active virus – in the cell cultures, in animals or in sampling– present maximum security risk and WHO recommends that they should only be carried out in level 4 biological safety laboratories (very high risk of infection). On the other hand, if these samples are inactivated (virucidals, gamma rays, formol, heat, etc.), the laboratory can manipulate them in a basic biologically safe environment in order to confirm the diagnosis by highlighting the RNA of the viruses or antibodies targeting these viruses.

During Ebola and Marburg virus hemorrhagic fevers, only the strict respect of the biosafety rules (basic measures against the infection in medical circles, isolation of the patients, protection of health workers in charge of patients by wearing personal protection equipment, disinfection of soiled objects and places, safe burials, etc.) and strengthening of the surveillance system help to stop the progress of the epidemic, thus contributing to reduce the number of victims.

Informing the population and pursuing an intensive social mobilization campaign are essential measures for effectively fighting against outbreaks. These measures encourage people to abandon high-risk behaviours and promote practices that prevent infection or reduce community transmission. During outbreaks, social mobilization programmes help affected populations to better accept the medical directives, which are sometimes very strict.

NEW DEVELOPMENTS IN PIGS

In 2008-09, the Reston Ebola virus was isolated in pigs in Philippines during epidemics of Porcine Reproductive and Respiratory Syndrome (PRRS). On the other hand, part of the experimental inoculations showed that Ebola Zaïre could infect pigs and multiply in them. Breeding pigs in epidemic-prone areas should therefore be considered as a potential avenue for spreading the virus and, consequently, manage this risk.

In order to reduce the risk of spreading the Ebola or Marburg virus in pigs, public and animal health authorities should:

- implement control measure to avoid pig-to-human infections, including strengthening the animal production system;
- control Ebola infection among the pig population, if confirmed;
- adopt appropriate biosafety measures in order to avoid introducing Ebola in pig breeding from bats.

Key messages

Ebola and Marburg are transmitted through blood, body fluids and contaminated objects.
Only the strict respect of the biosafety rules help to halt the spread of the epidemic and reduce the number of victims.
A coordinated multidisciplinary approach is required to prevent and control the disease.

Chapter 2
GENERAL STRATEGY

3 General strategy

The Ebola and Marburg viruses infect bat populations of the *Pteropodidae* family with prevalences (percentage of animals carrying the virus) that vary depending on the seasons and composition of the populations (proportion of non-immunized youth likely to be infected by chronic infected adults).

In the tropical forest, frugivore bats - carriers of the virus – come into direct or indirect contact with other animals, which they infect, sometimes causing large-scale epidemics among chimpanzees, gorillas and other monkeys (Figure 2). For Ebola, human beings can be contaminated, either through direct contact with infected bats, or during the manipulation of infected chimpanzees, gorillas, monkeys, forest antelopes and porcupines – found dead or sick in the forest. For Marburg, humans may be contaminated during prolonged stay in caves or mines inhabited by large colonies of frugivore bats.

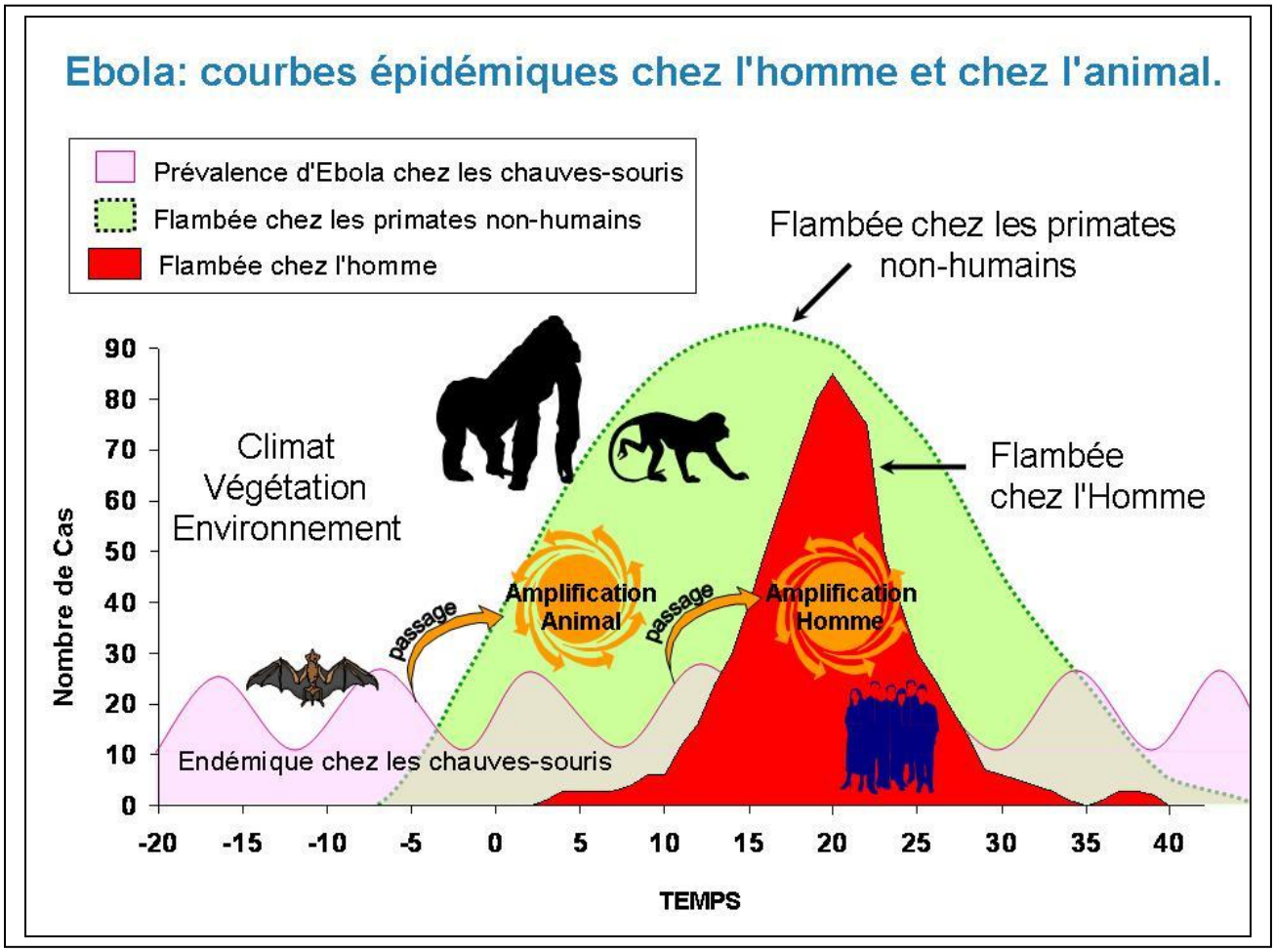


Figure 2: Ebola, epidemic curves in human and animal.

Ebola, epidemic curves in humans and animals

- Prevalence of Ebola in Bats
- Outbreak in non-human primates
- Outbreak in humans

Climate Vegetation Environment

Number of cases

Bat passage Spread in Animals passage Spread in humans
Endemic in bats

TIME

Circulation of the Ebola and Marburg viruses among populations of chiroptera and among monkeys precede outbreaks among men. That is why the epidemic prevention and control strategy considered three distinct periods: pre-epidemic period, during the outbreak and after the epidemic.

3.1 Before: pre-epidemic period

During the pre-epidemic period, public health services should put in place a system for monitoring cases of Ebola or Marburg virus diseases (EVD or MVD).

Ebola outbreaks in animals precede the case of humans. Collaboration with the system for monitoring the mortality of wildlife in national parks is therefore essential to quickly alert public health. The strategy consists in using the monitoring of animal mortality as a warning system in order to activate a prevention programme with the main objective of reducing the risks of emergence of the epidemic in humans.

It is also in pre-epidemic period that the basic measures against the infection should be intensified in all health facilities in the district.

Similarly, it is important to take advantage of this period to inform the public about Ebola and Marburg diseases and high-risk behaviours, and protection measures that each person can take to prevent infection. If the financial resources are available, the health authorities may put in place social mobilization campaign to promote practices that prevent infection.

3.2 Warning: suspicious Ebola or Marburg cases

If suspicious cases of Ebola or Marburg are reported by rumour or the monitoring system, a team should be quickly sent there – equipped with the necessary protection gear to investigate, assess the risk of epidemic, collect samples and send them to the reference national laboratory, and take the initial necessary control measures while waiting for the results from the laboratory.

3.3 During epidemic period

As soon as the Ebola or Marburg epidemic is confirmed, a multisectoral control strategy should be put in place based on the following main points:

a) **Establish the coordination** of the epidemic prevention and control activities, as well as **resource mobilization**.

b) **Put in place a monitoring system for active search for Ebola and Marburg cases** and monitoring of all contact-subjects for 21 days after their last exposure, and their isolation if the latter fall sick.

c) **Promote a health promotion and communication programme** with the objective of informing the public and promoting practices that reduce community transmission.

c) Provide **treatment and care for Ebola and Marburg patients** in the affected zone, by observing the following four rules:

- Respecting the dignity and right of patients and their family
- Installation of an isolation ward and adoption of protected care rules
- Organization of safe transportation of patients from their home to the ward
- Conduct of protected burials in the respect of funeral ceremonies.

d) **Put in place or intensify basic measures against the infection** in medical community within or outside the affected zone.

e) **Provide efficient logistics** for establishing, as soon as possible, all the necessary inputs, and ensure as early as possible movements of experts, patients and samples under safety conditions.

3.4 After: post-epidemic period

At the end of the epidemic, the monitoring activities of the pre-epidemic phase are reviewed.
The district supervising team should take advantage of the official announcement of end of the epidemic to thank all the control actors as well as the press for the work done, but also express its solidarity and empathy with the affected populations. It should also conduct an assessment of the management of the outbreak, prepare an end-of-epidemic report, while filing all the documents on the international outbreak, which could serve as reference document for the health district, the country and international community during future episodes. Psychosocial care must be provided to cured patients, orphans, affected communities, as well as the health staff who participated in the management of cases, to ensure their social reinsertion and moral support.

Chapter 3
BEFORE OUTBREAK: WHAT SHOULD BE DONE DURING THE PRE-EPIDEMIC PERIOD?

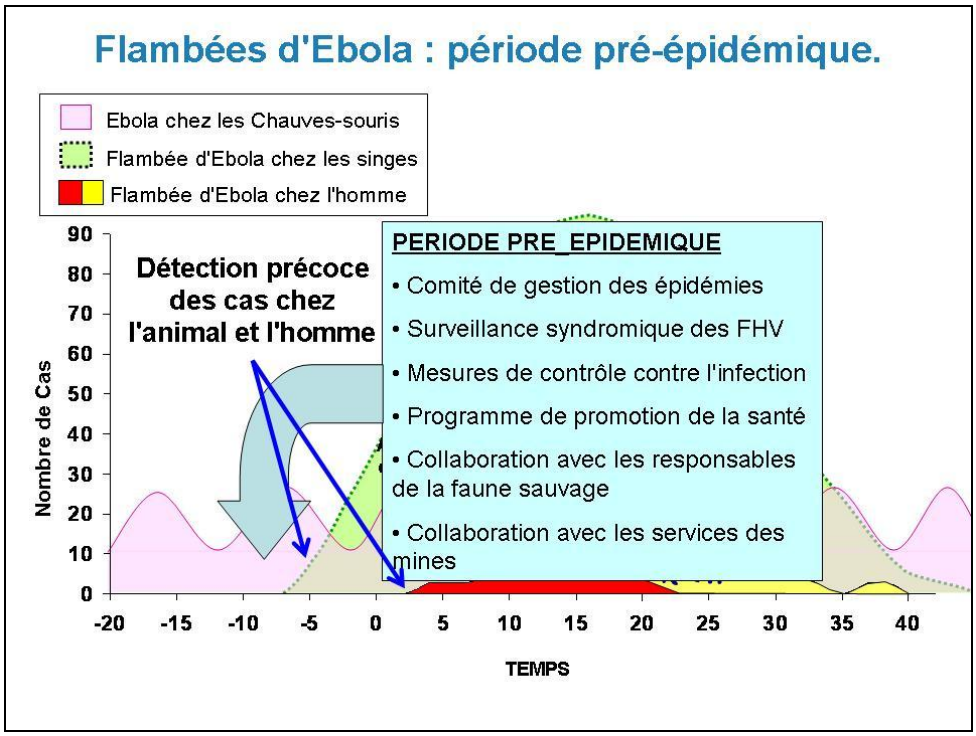


Figure 3. Diagram of the pre-epidemic period.

Ebola Outbreaks: pre-epidemic period

- Ebola in bats
- Ebola outbreak in monkeys
- Ebola outbreak in humans

Early detection in animals and humans

Number of cases

PRE-EPIDEMIC PERIOD

- **Epidemic management committee**
- **Syndromic monitoring of VHF**

- **Infection control measures**
- **Health promotion programme**
- **Collaboration with those in charge of wildlife**
- **Collaboration with mining authorities**

4 Before Outbreak: what should be done during the pre-epidemic period?

Improvement of the health system:

- Rehabilitate the structures
- Improve the capacities of the human resources of the health structures
- Improve the water and electricity supply system, and health and sanitation equipment
- Improve management of the bio-medical waste of health structures
- Supply basic medicines
- Revitalize the health information system.

4.1 Put in place a system for monitoring viral haemorrhagic fevers

4.1.1 Stage 1: Intensify routine monitoring of all viral hemorrhagic fevers

- Obtain from the provincial or national level standard definitions of cases (Annex 7);
- Disseminate the definitions of cases in health facilities;
- Apply the regulatory definition of cases for routine monitoring;
- Systematically search for eventual suspicious EVD and MVD, during supervision visits;
- Immediately notify any case that meets the case definition (Annex 4);
- Train/retrain staff in monitoring of EVDs and MVDs;
- Inform the district health personnel about the capacities required for monitoring in the framework of the International Health Regulation (Annex 24).

4.1.2 Stage 2: Put in place a community-based monitoring system

- Describe and disseminate the early warning system at community level;
- Select and train resource persons (community health workers, Red Cross volunteers, religious leaders, traditional birth attendants, traditional healers, community leaders, etc.) in community-based monitoring;
- Organize periodic sensitization meetings with the communities, notably those living in high-risk areas and those exercising high-risk activities (hunters, miners);
- Disseminating the simplified case definitions for community use;
- Report any case suspicion or rumour to the health authorities/health staff and apply the basic hygiene measures;
- Communicate the feedback to the resource persons on the rumours reported or notified.

4.1.3 Stage 3: Put in place a system for collection, packaging, storage and transport of samples for the laboratory

- Have material for taking samples and personal protection uniform in high-risk districts;
- Have boxes and containers to ensure transportation in a triple packaging of the samples taken on suspicious cases of EVD and MVD;
- Know and apply the guiding principles for the sampling, packaging, storage and transport of the samples taken on suspicious cases of EVD and MVD;
- Have the correct address of national reference laboratory/laboratories;
- Know the channel for shipping samples to the national reference laboratory;
- Establish/pursue the collaboration with the national reference laboratory/laboratories.

Note: The national reference laboratory is responsible for shipping samples to international reference laboratories.

4.1.4 Stage 4: Put in place (or revive) the epidemic management committees and rapid response teams

- Develop or review the mandates of the epidemic management committees and rapid response teams;
- Obtain the appointment of members of the epidemic management committees and rapid response teams;
- Ensure multisectoral composition of the epidemic management committees and rapid response teams;
- Make functional epidemic management committees and rapid response teams;
- Hold regular meetings to report on the epidemiological situation in the district and the status of stocks of medicines, equipment and other necessary products;
- Pre-position the necessary materials and equipment for an eventual response to EVDs and MVDs.

4.2 Measures for controlling the infection in medical community

4.2.1 Stage 5: Apply the basic measures against the infection in medical community

- Disseminate the *aide-mémoire* on basic measures against the infection in medical community (Annex 16);
- Train health personnel in the basic measures against the infection in medical community;
- Post the basic measures against the infection in medical community;
- Apply the basic measures against the infection in medical community;
- Have basic material for protection against the infection in medical community (gloves, masks, coats) and hygiene and disinfection materials (soap, alcohol, etc.) in health facilities;
- Apply the *aide-mémoire* on safe management of waste produced by health care (Annex 17).

4.2.2 Stage 6: Constitute stocks of personal protection uniforms and other material required for epidemiological investigations at the district, provincial and national levels

- Obtain the regulatory list of personal protection uniforms and other equipment required for epidemiological investigations (Annex 22);
- Create, manage and maintain, under regulatory warehousing regulations, a minimum stock of personal protection uniforms (equivalent to three modules A and one module B of the PPE Kit of the WHO catalogue), of disinfection products and other materials for putting place the basic measures for combating the infection in medical community;

- Create, manage and maintain, under regulatory warehousing conditions, a minimum stock of sampling material and transport of samples;
- Update the list of equipment of the cold chain, the waste management system, the telecommunication network and available and functional vehicles in health units of the district. Envisage the repair of faulty equipment;
- Maintain fuel reserve.

4.3 Health promotion programme

4.3.1 Stage 7: Improve behaviours by putting in place a health promotion programme

- Obtain from the provincial/national and adapt locally the key messages for reducing high-risk behaviours and promote practices that prevent the infection or reduce community transmission;
- Disseminate the health promotion material;
- Sensitize the population, particularly high-risk groups like hunters, miners, traditional leaders, religious communities, health personnel, opinion leaders, etc. to EVDs and MVDs.

4.4 Collaboration with mining health services (Marburg) and wild life health services (Ebola)

4.4.1 Stage 8: Establish or strengthen collaboration ties between human health services and mining health services (Marburg)

- Put in place a collaboration framework;
- Organize periodic meetings in the locality with those who are responsible for monitoring mining services;
- Inform minors about Marburg disease, high-risk behaviours and protection measures that can be taken at the personal level to prevent infection;
- Monitor pathologies among miners in high-risk areas;
- Warn local health authorities if the mining health service reports epidemics in miners or suspicious MVD cases and assist them in their investigations (epidemiological investigation, samples, transport of samples to the national reference laboratory, obtaining and disseminating laboratory results).

4.4.2 Stage 9: Establish or strengthen collaboration ties between human health services and wild life health services (Ebola)

- Put in place a collaboration framework;
- Organize periodic meetings in the locality with those who are responsible for monitoring wildlife;
- Inform water and forestry officers as well as hunters about the Ebola disease, high-risk behaviours, protection measures that can be taken at the personal level to prevent infection;
- Monitor pathologies among hunters in high-risk areas;
- Request those who are responsible for wildlife in national parks and forest reserves to intensify the monitoring of unexplained cases of death among wildlife (notably gorillas, chimpanzees and monkeys);
- Warn local health authorities if the mining health service reports epidemics in miners or suspicious MVD cases and assist them in their investigations (epidemiological investigation, samples, transport of samples to the national reference laboratory, obtaining and disseminating laboratory results).

4.5 Pre-warning: what should be done if animal samples are tested positive for Ebola or Marburg

4.5.1 Stage 10: Inform veterinary services and public health authorities

- If samples from animals are tested positive for Ebola or Marburg, the veterinary services and public health authorities should be informed immediately.

4.5.2 Stage 11: Conduct an intensive prevention campaign

- As soon as the warning about positive cases in animals is given, the minister of health should prepare its rapid intervention teams;
- The district health teams should prepare a prevention campaign with the main objective of preventing the introduction of the virus into the human population and its spread;
- The prevention campaign should be used to:
  - inform the public about the disease, high-risk behaviours and protection measures that can be taken at the individual level to prevent infection;
  - put in place an intensive social mobilization campaign to promote practices that prevent infection
  - strengthen the basic measures against the infection in medical community
  - incinerate and bury carcasses of suspicious wildlife and disinfect surrounding areas
- The intervention teams should also:
  - intensify the monitoring of humans and animals
  - strengthen the diagnostic capacities for Ebola and Marburg
  - strengthen the collaboration between human and animal health services.

Chapter 4
WARNING: WHAT SHOULD BE DONE IN CASE EBOLA OR MARBURG IS SUSPECTED?

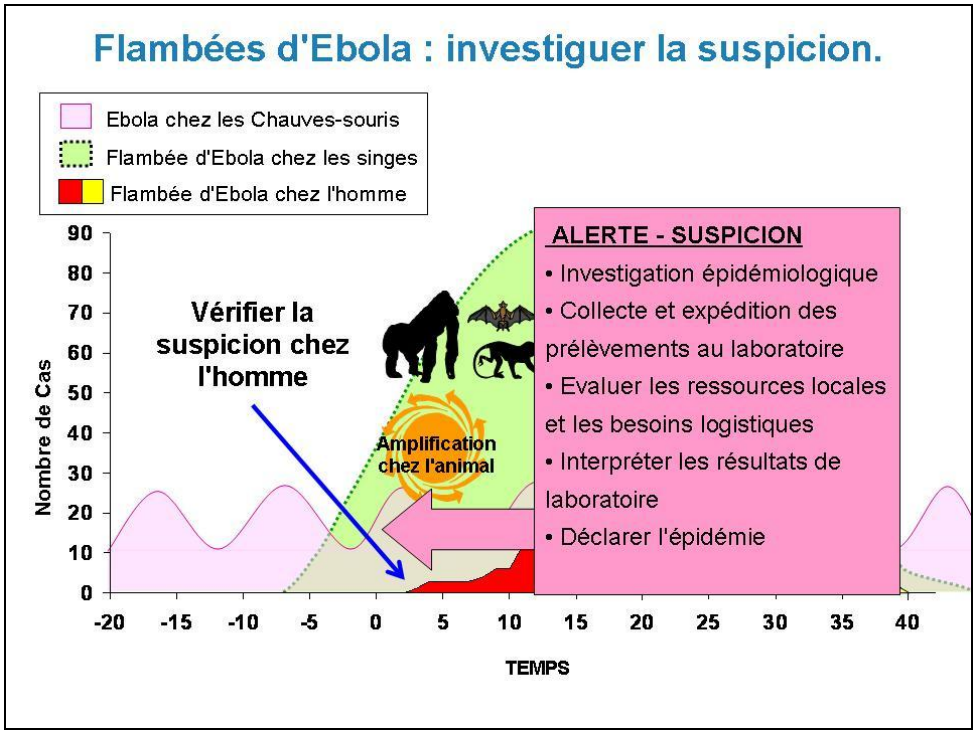
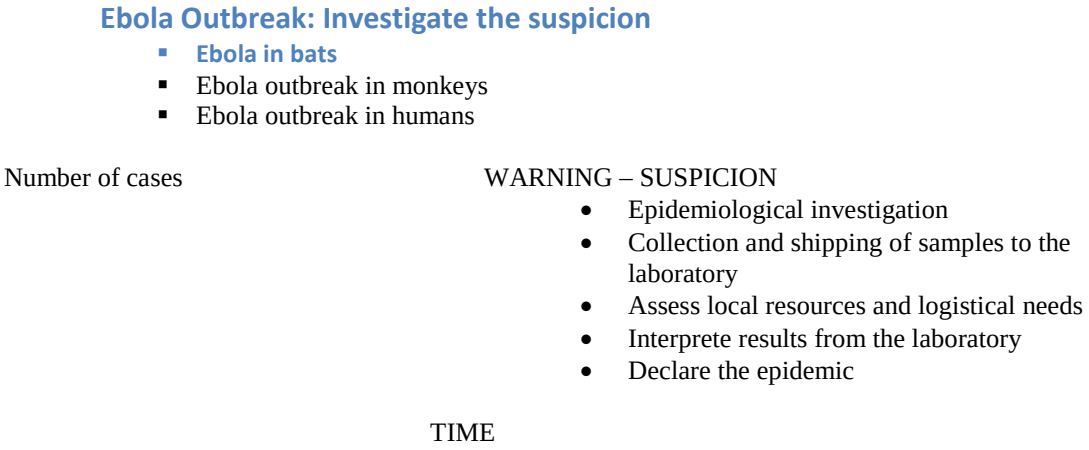


Figure 4. Diagram of the epidemic warning period



5 Warning: What should be done in case Ebola or Marburg is suspected?

5.1 Investigate a suspicion of Ebola or Marburg

In basic health structures

1. Protect oneself from any suspicious case (wearing of gloves, etc.)
2. Isolate suspicious cases (find an adapted ward in the health structure)
3. Seek assistance from the higher level, while avoiding referrals.

5.1.1 Stage 1: Epidemiological investigation

1. Mobilize members of the national rapid response team

This is a multidisciplinary team comprising an epidemiologist, a clinical management expert, a laboratory specialist, a logistician, an administrative assistant and any other expert whose presence would be necessary (hygiene and sanitation agent, anthropologist, social mobilizer, geographer, veterinary officer, etc.).

2. Specify the functions of each member of the investigating team

This definition of tasks to be accomplished will enable each member of the team to know exactly what he should do once on the field and what he needs to be able to fulfil his mission.

3. Gather the investigation equipment (personal protection equipment, sampling equipment, equipment for transporting samples, investigation form, case definition, *aide-mémoire* on the disease(s), etc.)

Use a list to control the necessary materials and equipment in the field. Any neglect of material or equipment could be prejudicial to the investigation.

4. Inform the authorities of the district about the epidemic suspicion

Request for their authorization and support to conduct the investigation.

5. Inform and meet the local authorities and obtain their support

Support of the local authorities of the outbreak area where the investigation will be conducted is very important. These authorities should facilitate the conduct of the investigation. A local official should join the team to facilitate the conduct of the investigation.

6. Organize transportation in the field

Ensure the availability of transport facilities. Fuel and lubricants should be in adequate quantities. The subsistence of members of the investigating team should be taken into account (accommodation, drinking water, food, per diem, etc.).

7. Conduct an investigation on suspicious Ebola or Marburg cases

The information shall be collected from members of the community, opinion leaders, local authorities, health staff and others, with a view to:

- Confirming the existence of the epidemic;
- Adopting a case definition adapted to the local context, make a list of the cases;
- Complete a standard investigation form for each suspicious case reported (Annex 8);
- After informed consent of the patient/case, collect blood samples in all suspicious cases to confirm the diagnosis at the laboratory (while respecting the personal protection measures);

- Make a list of all contacts of suspicious cases and describe the chain of transmission of the virus in all suspicious cases reported, and initiate a system for following up the contact-carriers;
- Analyse and interprete the information collected. Analyse the data in terms of time, venue and persons;
- Pursue the investigation to identify the possible zoonotic source of the outbreak. Compare the results of the epidemiological analysis obtained with the established knowledge on Ebola and Marburg virus diseases;
- Prepare an investigation report.

8. Assess the risk of Ebola or Marburg epidemic

The team should make diagnostic hypotheses, which will guide the biological analyses. Hypotheses should be made on the source of the infection, the cause of the outbreak, the modes of transmission and the populations at risk. These hypotheses will be compared with the established knowledge on Ebola or Marburg.

In view of the clinical, epidemiological and socio-cultural elements, the investigating team should assess the risk of Ebola or Marburg epidemic: i.e. confirm a strong suspicion of Ebola or Marburg or invalidate it.

9. Implement the initial control measures

If the risk of Ebola or Marburg epidemic is confirmed – even in the absence of the laboratory results- the team should propose the immediate implementation of a strategy for controlling the epidemic, using a multi-sectoral approach and putting in place the initial control and prevention measures to protect the healthcare staff, the patients and their families (See paragraph 5.1. Implementation of control strategies).

10. Inform WHO about the suspicion of Ebola or Marburg and the sending of the investigating team

The team should keep WHO regularly informed about the situation, notably if it feels that the support of a more important team is necessary.

5.1.2 Stage 2: Collection and shipping of samples

1. Inform the national reference laboratory about the imminent shipping of the samples so that the latter can make appropriate arrangements to receive them. The national reference laboratory should eventually re-ship the samples to a WHO collaborating centre capable of diagnosing the VHF, notably Ebola and Marburg. It should, therefore, contact the collaborating centre concerned as early as possible.
2. Correctly wear the personal protection equipment to avoid any risk of contamination when collecting the samples. Collect the necessary samples according to the procedures described in the guide (Annex 11).
3. Conserve and package the samples following the safety instructions (Annex 12).
4. Re-contact the national reference laboratory when shipping the samples and ensure that it is ready to receive them. Verify again with the laboratory the accuracy of the address and the conveyance.

5. Ship the samples to the national reference laboratory. These samples should be sent in adequate boxes and containers to ensure transportation in triple packaging. The clinical and epidemiological data collected should be imperatively attached to the laboratory examination request form accompanying the samples.
6. A day after sending the samples, it is important to verify that the samples have arrived at the national reference laboratory and that they are in good state.
7. When the national reference laboratory receives the samples, it should inform the medical team and the sending district.

5.1.3 Stage 3: Continue the active search for cases and monitoring of the contacts

If the investigating team – given the results of the clinical studies and epidemiological investigations – confirms a strong suspicion of an Ebola or Marburg virus epidemic
and Pending the confirmation of the diagnosis by the laboratory
and Pending the eventual mobilization of a more important team

→ The investigating team should pursue the active search for cases, using the case definition adopted at the local level and initiate the monitoring of contacts. For each case identified, the investigating team should prepare the list of its contacts using the definition of contact carrier (Annexes 7A, 7B and 7C).

Note: Where appropriate, the initial case definition can be reviewed depending on the diagnostic hypotheses issued by the investigating team and the clinical and epidemiological data collected.

5.1.4 Stage 4: Assessment of local resources and logistical needs

If the investigating team confirms a strong suspicion of Ebola or Marburg virus epidemic
and If the investigating team considers that it will be necessary to send a more important team

→ The investigating team should assess local resources and estimate the logistical needs

1. List and assess existing logistical resources in the locality and list those that are lacking: road and river transport systems, animal drought power, access to fuel, etc. (Annex 23).
2. Verify the state of stocks of consumable products (personal protection equipment (PPE), disinfectant, sampling and transport of samples, medicines and other items) as well as disinfection materials at the local or district level (Annex 22).
3. Assess the communication channels and resources and note down their GPS contact details (roads, bridges, radio, telephone, landing strips, computer and office automation equipment, etc.).
4. Gather the geographical maps of the affected zone available locally.
5. Assess the local resources in terms of accommodation, water, electricity and food for the intervention teams.
6. Assess the local resources in terms of staff (health personnel, community health workers, Red Cross volunteers, external technical assistance available in the outbreak area).
7. Make an initial estimation of the needs in financial resources for local expenditures during the response to the epidemic.
8. Inspect and assess all health structures in the affected zone (incinerator, cold chain, space for the creation of an isolation area, storage area) and estimate eventual amendments to be made.

9. Assess the security situation in the outbreak area and verify the level of current security phases in the area and in the country. The security situation must be periodically reviewed.

5.2 Laboratory results

5.2.1 Stage 5: Following up the samples and obtaining the laboratory results

If the national reference laboratory cannot analyse the samples, it should immediately send them to a WHO collaborating centre for EVDs and MVDs (Annex 13). It should contact the collaborating centre to obtain its accord, send the samples according to the requisite international standards, confirm their reception and ensure that it quickly obtains the results.

The investigating team should re-contact the national reference laboratory to obtain the results, or contact the WHO collaborating for EVDs and MVDs to which the samples were shipped. The results of the analyses may be obtained initially by telephone to avoid any delay. The original hard copies can be later sent by ordinary mail, express mail, fax or electronic mail.

When received, the results should be sent to the clinical practitioners of the district, the local authorities and those of the district. It is imperative that local health authorities communicate the laboratory results to the patients and/or their family.

5.2.2 Stage 6: Interpretation of the laboratory results

A case is considered positive or confirmed if the laboratory has detected a recent Ebola virus or the Marburg virus epidemic, using one of the following techniques:
- detection of the antigen with the ELISA test;
- detection of IgM antibodies directed against Marburg or Ebola;
- seroconversion or increase in titles of the IgG antibodies on a series of two samples collected at one week interval;
- detection of the ARN of the virus by reverse transcription followed by polymerasis chain reaction (RT- PCR) and the sequencing;
- detection by immunohistochemistry (IHC) on the clothes and blood of the patient
- viral isolation.

5.3 Take a decision according to the laboratory results and those of the investigation

When the investigating team receives the laboratory results, three cases may be presented:

1. The results are positive for Ebola or Marburg, the epidemic is confirmed
   ⇨ Implement the response strategy (Chapter 5)
   ⇨ Declare the Ebola or Marburg epidemic to WHO

2. The results are negative for Ebola or Marburg, but another etiology was identified by the laboratory
   ⇨ Follow the usual procedures to prevent and control the pathology

3. The results are negative for Ebola or Marburg and no other etiology could be identified

   3.1 If the suspicion of Ebola or Marburg epidemic is very strong:

   ⇨ Continue the investigations and send new samples to the laboratory for analysis

   3.2 if the suspicion of Ebola or Marburg is very weak:

   ⇨ Reassess the situation and envisage other possible etiologies.

Chapter 6
DURING OUTBREAK: WHAT SHOULD BE DONE WHEN THE EBOLA or MARBURG EPIDEMIC IS CONFIRMED?

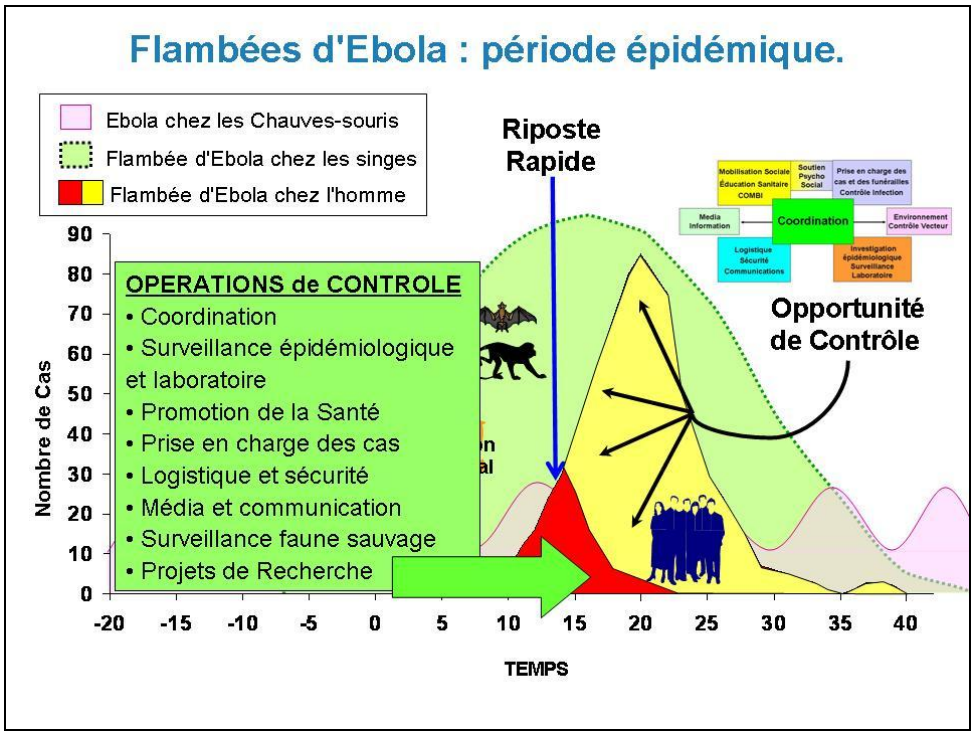
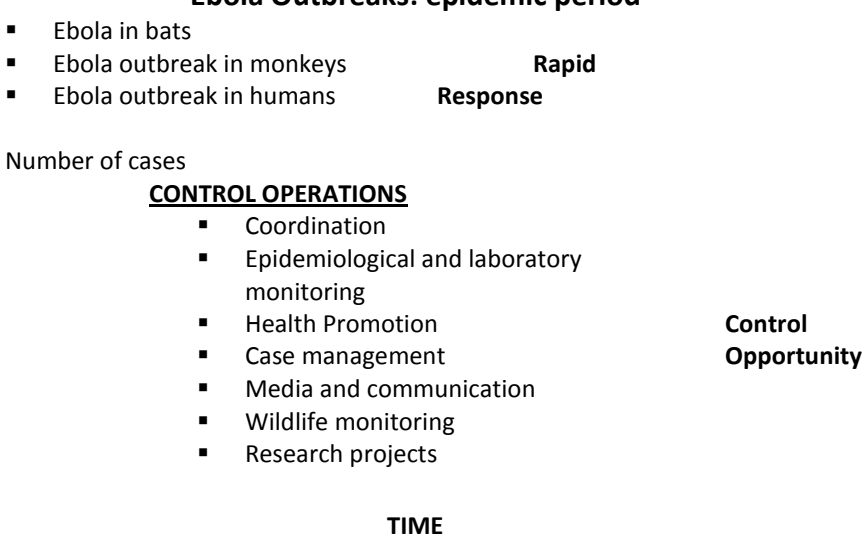


Figure 5. Diagram of the epidemic confirmation period



6 During outbreak: what should be done when the epidemic is confirmed?

6.1 The strategy for controlling Marburg or Ebola epidemics

In the case where Ebola or Marburg is confirmed, it is necessary to:

- Immediately inform the local, regional and national authorities
- Inform the partners (notably those present at the local level)
- Declare the Ebola or Marburg epidemic to WHO

As soon as the Ebola or Marburg epidemic is confirmed, a strategy should be put in place to control the Marburg or Ebola epidemics. This strategy is based on a multisectoral approach and comprises the following strategic objectives:

1. The establishment of a committee to coordinate the epidemic prevention and control activities and mobilize resources. The role of the committee is to ensure the general coordination of the operations; it should clearly define the responsibilities of the different teams and channels of information during the operations in response to the epidemic.

2. The establishment of a partnership with the media.

3. The establishment of a monitoring system with the main objective of halting the chains of transmission:
   a. Active search for new cases and their transfer to the care and treatment ward;
   b. Monitoring all contact carriers for 21 days after their last exposure and their transfer to the care and treatment ward if they fall sick;

c. Establishment of a system for monitoring the persistence of the virus in convalescent patients (sperm);
d. Identification of the source(s) of infection (link with the animal monitoring) and the establishment of a strategy for preventing new introductions of the virus in the human population (link with the social mobilization);
e. Publication and dissemination of a daily monitoring bulletin.

4. Establishment of a social mobilization and health education programme with the main objective of informing the public and promoting practices that reduce community transmission of the disease.

5. Safe and humanized care and treatment of Ebola and Marburg patients in the area affected by the outbreak by respecting the following rules:
   a. Preparing a specific ward for treating patients;
   b. Introducing protected care rules;
   c. Respecting the dignity and rights of patients and their family;
   d. Organizing protected transport of patients from their home to the ward;
   e. Organizing temporarily home care and treatment of patients by their family in case of refusal of patients to be hospitalized;
   f. Conducting protected burials while taking care to respect the funeral ceremony to assist the families in their bereavement;
   g. Provision of psychosocial assistance (patients, families, health workers).

6. Strengthening the basic measures against the infection in all health centres in the affected health district apart from the outbreak area, as well as in all hospitals in the outbreak area in order to prevent secondary outbreaks.

7. Link with animal health:
   a. Continue monitoring the causes of mortality of wildlife
   b. Test the samples and warn the public health authorities
   c. Control the slaughter/cutting up of wild animals, at home and in markets.

8. Notification of the event in accordance with the IHR (2005):
   a. Ministry of health: by virtue of the International Health Regulation (IHR), the ministry of health should report the event to WHO
   b. WHO: WHO should:
   - Inform the Member States and the international community
   - Assess the risk in terms of global health safety
   - If the risk for international health safety is high, make recommendations on travel and international trade.

Key message

Importance of coordination:

Efficient coordination by a multisectoral and pluridisciplinary group is indispensable in the establishment of strategies in response to epidemics caused by the Ebola and Marburg viruses for effectively conducting activities in

various areas of the preparation of the response to the epidemic, namely coordination of the monitoring, case management, control of the infection, social mobilization and mobilization of resources.

The committee should, to that end, develop an action plan for preparation and response to epidemics at the national or regional level and coordinate all aspects of the response.

Coordination is the key to success in any strategy to combat an epidemic of the Ebola or Marburg virus disease.

6.2 Coordination and mobilization of resources

6.2.1 Objective of the coordination and resource mobilization committee

The main objective of the coordination and resource mobilization committee is to ensure the general coordination of the operations.

The composition of the coordination and resource mobilization committee is as follows (Annex 3):
- Ministry of Health, Family Planning and Social Protection (President)
- Ministry of Agriculture, Lifestock and Fisheries,
- Ministry of Defence in case the health service of the armed forces is involved,
- National reference laboratory, which often depends on the Ministry of Research
- International partners: WHO, MSF, CDC, UNICEF, USAID, FAO, IEO, etc.

The national coordination committee should prepare a list of all the technical partners and donors that are involved in the management of the epidemic in order to regularly inform them about the trend of the epidemiological situation and management of the event.

In some countries, the committee may be attached to the national risk and disaster management bureau.

During Ebola and Marburg epidemics, it is advisable to avoid systematically adopting the following measures, which have proved to be inefficient, costly and counterproductive:

- restrictions to freedom of movement of persons and goods between the countries and the different regions of a country;
- the establishment of a *cordon sanitaire* around outbreak areas or at the borders, a measure that diverts resources and prevents a good spirit of cooperation between institutions and countries instead of combining the efforts.

"The establishment of coercion must be decided after an in-depth assessment of the situation by the health authorities".

6.2.2 Mandate of the coordination and resource mobilization committee

The role and responsibilities of the national committee for coordination of the control activities are presented in the following box:

The committee is charged with the following tasks:

1. Adopt the Ebola or Marburg epidemic control strategies recommended by WHO (see paragraph 5.1);
2. Develop a detailed action plan for the response to the epidemic;
3. Define the responsibilities of the different (national and international) teams operating on the ground;
4. Organize the mobilization of resources in concert with the partners;
5. Define the channels of information during operations in response to the epidemic;
6. Communicate regularly with the national and international press;

7. At the local level, put in place, with the assistance of international partners, an international technical and scientific coordination committee for the control of the epidemic, which will coordinate the day-to-day activities of the field teams;
8. Organize coordination meetings and monitoring of operations;
10. Organize the coordination with services responsible for monitoring animal health in wildlife (national parks, veterinary services);
11. Organize the coordination with the authorities in charge of the management of mines, if, for example, Marburg cases are reported among miners;
12. Ensure regular rotation of the field staff in consultation with the ITSC;
13. Avoid the application of abusive restrictive measures in accordance with the IHR (2005);
14. Prepare the end-of-epidemic report (technical, administrative, financial and logistical reports);
15. Assess the economic and social impact of the epidemic;
16. Assess the management of the epidemic;
17. Based on the experience acquired, make recommendations for prevention and management of future epidemics.

6.2.3 Main Activities of the coordination and resource mobilization committee

Strategies for controlling Ebola and Marburg epidemics are based on the energetic management of the ministry of health expressed, among other things, by the establishment (or revitalization) of a national committee for coordination of the control and resource mobilization activities.

Generally, the national coordination committee is based in the capital city of the country and placed under the direct authority of the minister of health.

It is necessary to put in place a coordination of international teams; in that regard, it is the responsibility of WHO to ensure the coordination of international teams (*Médecins sans frontières*, Red Cross, GOARN, CDC, UNICEF, etc.).

At the local level, the national coordination committee should put in place, with the assistance of international partners, an **international technical and scientific committee (ITSC)** to combat the epidemic, which will play the role of a district coordination committee to coordinate the day-to-day activities of the field teams. The structure of the ITSC is similar to that of the national committee. This committee organizes coordination meetings with representatives of partners who are working in the field. It ensures the coordination of the technical and scientific aspects of the response within the national and international teams and sees to the efficient application of the strategies adopted by the coordination committee.

Note: In certain situations, the national coordination committee and the ITSC are one and the same entity, which reports directly to the ministry of health.

The **International Technical and Scientific Coordination Committee** for combating the epidemic is divided into several sub-committees, which reflect the basic principles of the strategy for controlling Ebola or Marburg epidemics. There are at least seven of them:

- Monitoring, Epidemiology, Laboratory and Research Sub-committee
- Health Promotion, Social Mobilization and Health Education Sub-committee
- Case Management and Safe Burial Management Sub-committee
- Psychosocial Care and Support Sub-committee

- Logistics and Security Sub-committee
- Media and Communication Sub-committee
- Environment and Vector Control Sub-committee.

Figure 6 summarizes the main activities of the different sub-committees.

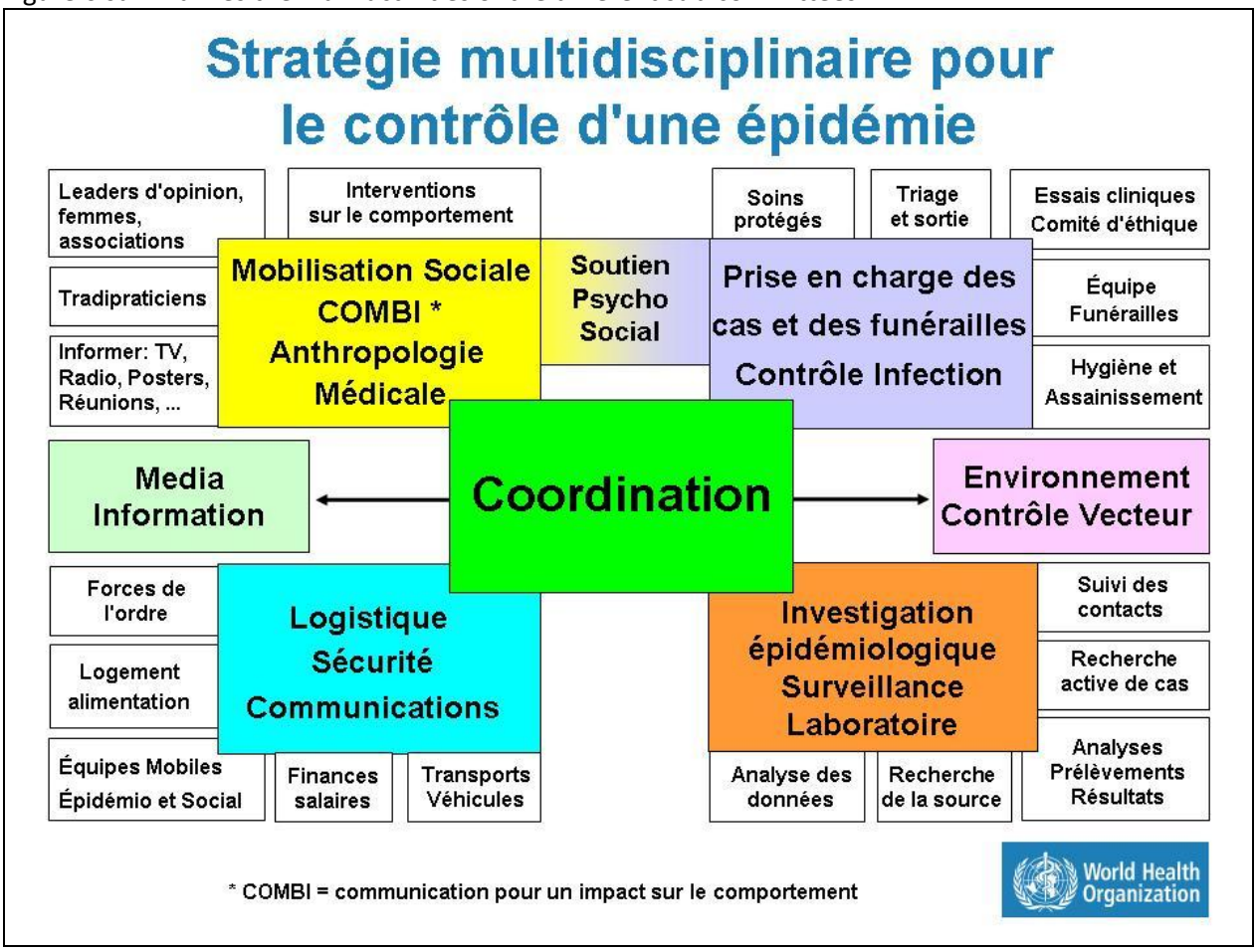


Figure 6. Organizational Chart for the control of Ebola or Marburg epidemics

Opinion leaders, women, associations	Interventions on behaviour		Safe Care	Sorting and exit	Clinical tests
Traditional healers	Social Mobilization COMBI* Medial Anthropology	Psychosocial care and support	Case and funeral management		
Inform: TV, Radio, Posters Meetings,...					Hygiene and Sanitation
Media Information	Coordination			Environment Vector Control	
Security forces	Logistics Security Communications		Epidemiological investigation Laboratory Surveillance		Follow-up of contacts
Accommodation, feeding					Active case research
Epidemic and social mobile teams	Finances Salaries	Transportation Vehicles	Data analysis	Source search	Analyses Samples Results

***COMBI = Communication for behaviour impact**

Generally, the Logistics and Safety Sub-committee and the Media and Communication Sub-committee depend directly on the Coordination and Resource Mobilization Committee.

6.3 Surveillance, epidemiology and laboratory

6.3.1 Objective of the Surveillance, Epidemiology and Laboratory Sub-committee

The main objective of the Surveillance, Epidemiology and Laboratory Sub-committee is to stop, as early as possible, transmission of the disease in the community subject to:

- the improvement of the exploitation of the surveillance data, which will help to:
  - ✓ conceive, organize and apply a health policy and updating the standards and case definitions;
  - ✓ detect on time any unusual event and responding quickly to epidemic presumptions;
  - ✓ closely monitor the impact of the interventions leading, for example, to a reduction in the incidence, spread of the disease, or mortality;
  - ✓ facilitate a factual response.
- the facilitation of circulation of the surveillance data among the different levels of the health system and within each of these levels;
- the strengthening of the capacities and role of the laboratories in the identification of the pathogens and monitoring of their sensitivity to medicines;
- The promotion of the participation of clinical specialist agents in the surveillance system in the clinical investigations;
- The promotion of the participation of the community in the detection of health problems and the response;
- The conduct of epidemiological surveys for the detection, investigation and notification of cases in new areas, and the implementation of efficient health interventions in keeping with the IHR (2005).

6.3.2 Mandate of the Surveillance, Epidemiology and Laboratory Sub-committee

The Surveillance, Epidemiology and Laboratory Sub-committee is responsible for developing a joint action plan for the ministries of health, Lifestock, Environment (in charge of wildlife), Defence and the national and international partners.

The Surveillance, Epidemiology and Laboratory Sub-committee should conduct studies to facilitate analysis of the epidemiological situation of human and animal populations affected by Ebola or Marburg outbreaks.

The Surveillance, Epidemiology and Laboratory Sub-committee is responsible for

- Creating and forming mobile epidemiological surveillance teams;
- Adopting a case definition adapted to the local context of the epidemic;
- Actively searching for cases and investigating each case reported;
- Preparing, for each suspicious, probable or confirmed case, the list of its contacts and monitoring them for 21 days;
- Publishing on daily basis, the epidemiological information in the form of a situation report;

- After consultation with the national reference laboratory and partners, and, where necessary, putting in place a field mobile laboratory;
- Linking and coordinating surveillance of the epidemic in humans with surveillance of cases in wildlife;
- Gathering technical elements with a view to declaring the end of the epidemic.

6.3.3 Activities of the Surveillance, Epidemiology and Laboratory Sub-committee

5.3.3.1. Creating and training the mobile epidemiological surveillance teams
The Surveillance, Epidemiology and Laboratory Sub-committee should, as a matter of priority, ensure the creation, training and deployment of mobile epidemiological surveillance teams.

5.3.3.2. Adopting a case definition
The Surveillance, Epidemiology and Laboratory Sub-committee should adopt a definition of cases adapted to the local context of the epidemic.

The case definition should always be adapted according to the clinical and epidemiological elements collected. Where necessary, the initial definition of cases can be reviewed according to the diagnostic hypotheses made by the investigating team and the clinical and epidemiological data collected. This case definition should be as most operational as possible.

5.3.3.3. Active case research
After adopting a definition of cases and contacts adapted to the local epidemiological context, the sub-committee must organize the active search for cases and the investigation of each case reported.

1. **Actively search for cases** in public, private and religious facilities, including in the homes of traditional healers (consulting registers, discussions with health staff and practitioners), using the definition of cases (Annexes 7A, 7B and 7C);
2. Search for cases in the community (discussions with local chiefs, families and other key informers);
3. Complete a regulatory investigation form for each case investigated (Annex 8);
4. For each case investigated, collect a biological sample (blood, saliva, etc.) for analysis, after obtaining the consent of the patient, and if the biosafety conditions are met;
5. Send the suspicious cases detected in the community to the isolation ward for the attention of the care and treatment team;
6. Establish epidemiological links between the cases and describe the transmission chains;
7. Register the cases, deaths and contact carriers. Create a detailed database of the cases reported and the contact carriers (Annexes 9A, 9B and 9C);
8. Organize the most important data on the cases in the form of a linear list prior to feeding them into the computerized database. Update the list of all the cases on daily basis (Annex 6);
9. Collect for each contact the following information: name, address, relationship with the case, date of the last contact with the case, type of contact (Annex 9B).

5.3.3.4. Follow-up of contact carriers
After having identified and classified the cases, it is important to establish the list of contact carriers for each suspicious, probable or confirmed case, and organize the follow up of the contact carriers for 21 days:

1. Establish the list of contacts for each case detected, using the definition of contact carrier (Annex 9);
2. Register the contact carriers in the contact carriers database;
3. **Follow up all the contact carriers** for 21 days after their last exposure:

- assess with a clinical practitioner the status of the contacts if the latter fall sick during the 21-day period (epidemiological and clinical assessment with a view to classifying the case according to the case definition);
- organize the offer of care in the isolation ward of the carriers that are declared suspicious or probable cases.

The team is responsible for the daily publication of the epidemiological information in the form of situation report.

5.3.3.5. Deployment of a mobile field laboratory:

1. After consulting with the national reference laboratory and the partners, and, if necessary, put in place a **mobile field laboratory** to conduct a rapid and differential diagnosis of Ebola and Marburg; the mobile laboratory will assist with the identification and care of the patients, notably during large-scale outbreaks;
2. Put in place a mobile medical laboratory to monitor the biochemical, haematological and immunological parameters of patients in order to improve their care and treatment;
3. Encourage the collection of blood samples (inactive serum) from survivors to constitute a blood bank that will facilitate the development of future laboratory rapid tests (research and development component). The national reference laboratory should coordinate this type of activities;
4. The national reference laboratory should intervene in the deployment of mobile international laboratories, participate actively in the diagnosis in the field, and benefit from technology transfer;
5. Consolidate the relationships with the laboratories and WHO reference collaborating centres, VHFs and encourage the regional approach and international collaboration.

5.3.3.6. Liaison and coordination between surveillance of the epidemic in humans and monitoring of cases in wildlife (see paragraph 5.9.1 Enhanced monitoring of wildlife):

1. Concerning the **surveillance of outbreaks in wildlife**, a structure should be put in place for receiving presumptions and sensitizing rural populations so that they report suspicious cases (animals dead in the forest);
2. Create and form mobile teams to investigate rumours and presumptions (animals found dead in the forest) and equip them (sampling equipment, protection equipment);
3. Organize the collection of biological samples (taking of blood, kidney and spleen if post-mortem is performed) for analysis, following the biosafety recommendations;
4. Create and update a detailed database of animal cases reported;
5. Define a procedure and organize a chain for the diagnosis of wild animals: organize the preparation and shipment of the samples to the regional or central laboratory, provide the conditions required for the diagnosis under adequate biosafety conditions, establish collaboration with laboratories that have higher technicity to ensure more in-depth analyses;
6. Organize the feedback of the information from the laboratory results;
7. Consolidate the ties with laboratories and WHO reference collaborating centres and encourage regional approach and international collaboration;

8. Conduct studies to facilitate the assessment of risk of infection in animals and formulation of recommendations.

The Surveillance, Epidemiology and Laboratory Sub-committee is responsible for determining the date of the end of the epidemic, or twice the maximal incubation period for Ebola or Marburg (42 days) after the last infectious carrier with a confirmed or suspicious case.

6.4 Health promotion

6.4.1 Objective of the Health Promotion Sub-committee

The main objective of the Health Promotion Sub-committee is to inform the public and promote practices that reduce transmission within the community.

During outbreaks of Ebola or Marburg, in the absence of efficient treatment and vaccine, the only means of reducing the risk of infection in men consists in sensitizing the population factors of risk of infection by viruses and educate them on protection measures that can be taken to reduce exposure to the virus.

6.4.2 Mandate of the Health Promotion Sub-committee

The Health Promotion Sub-committee has the following mandate:

- Informing the community of the affected zone and the entire population about the disease, its modes of transmission and the control measures, using appropriate means (education of community leaders, using printed media - posters, brochures -, radio messages, public meetings);
- Informing high-risk population groups (hunters, health workers, miners, burial officials, traditional leaders, wildlife agents, ecologists, etc.) not forgetting women, who are often responsible for home care and funerals;
- Prepare the minds of the population to accept the recommended control measures;
- Encourage, through the intervention of opinion leaders, the community and the hospital, behaviour change in order to limit practices that favour transmission.

6.4.3 Activities of the Health Promotion Sub-committee

<u>Among opinion leaders (administrative, traditional, community, religious, sports)</u>

- Conducting advocacy actions to ensure greater involvement of all community entities;
- Undertaking social mediation actions in case of conflicts of interest within the community;
- Carrying out psychosocial assistance and support activities;
- Mobilizing all entities within the community to support programmes aimed at preventing and controlling the transmission of the disease.

<u>Among the community</u>

- Informing the community of the outbreak area and the population about the disease and the control measures, using appropriate means (education of community leaders, use of printed media - posters, brochures -, radio messages, public meetings)
- Understanding the points of view of the populations in their socio-cultural diversities and consequently adapt the messages on behaviour change;

- Informing the high-risk population groups or professions (hunters, health workers, care providers, miners, burial officials, traditional leaders, wildlife agents, ecologists, veterinary officers, etc.)
- Informing women, through women's associations, as they are often responsible for home care and funerals in the affected populations;
- Holding discussions with traditional healers with a view to their eventual participation in prevention activities;
- Preparing the population to accept the recommended control measures;
- Encouraging behaviour change to limit practices that favour transmission;
- Enhancing the skills of community workers:
    - ✓ to supervise the application of the universal precautions in case of observation of animals found dead in the forest or when caring for patients at home;
    - ✓ to promote community participation in the epidemiological surveillance at community level (declaration, warning);
- Promoting the organization of safe burials by specialized teams under the supervision of the medical team in the respect of funeral ceremonies;
- Encouraging the community to quickly report suspicious cases of viral haemorrhagic fever to the health personnel (surveillance team).

<u>At the level of care structures</u>

- Ensuring the transmission of information on patients to their family
- As much as possible, facilitating safe visits of families to the patients.

<u>For Ebola and Marburg, the following prevention messages can be used at the level of the community</u>:

- Reduce the risk of transmission from wild animals to humans following contact with these wild animals (monkeys, forest antelopes, bats, etc.) when manipulating animal tissues, when slaughtering or cutting them up and when consuming their raw meat
    - Do not touch animals found dead or sick in the forest;
    - In endemic zones for Ebola and Marburg, bats and bush meat should be consumed well cooked;
    - while working or carrying out research or tourism activities in mines or caves inhabited by colonies of bats, gloves and appropriate personal protection equipment (including masks) should be worn;
    - Gloves and other appropriate protective clothing should be worn when manipulating wild animals or their tissues and when slaughtering these animals.

- Reduce the risk of interhuman transmission in the community resulting from direct or close contact with infected patients, particularly with organic fluids
    - Do not touch patients without protection. Any close physical contact with a person suspected of Ebola or Marburg must be avoided;
    - Gloves and appropriate personal protection clothing should be worn when providing care to patients at home;
    - Always wash your hands with soap after visiting sick relatives in the hospital, and also after providing care to patients at home;
    - Declare suspicious cases detected in the community as early as possible to the intervention teams, and send patients to the health centre;
    - During outbreaks, it is forbidden to give injections at home.

- Reduce the risk of interhuman transmission associated with funerals, for example direct or close contact with infected persons, particularly with their organic fluids
    - Persons who died from Ebola or Marburg should be buried quickly and in total safety in the presence of the family or at least its representatives;
    - Do not touch the body of the deceased without protection.

6.4.4 Contribution of medical anthropology

The Health Promotion Sub-committee should use the contribution from medical anthropology to:

- understand the populations in their sociocultural diversity and adapt the messages on behaviour change;
- adapt the behaviour of the medical and veterinary teams;
- contribute to the reading of the epidemiological chains, from the forest to the city;
- hold discussions with traditional healers about their eventual participation in the prevention activities.

During operations for controlling Ebola and Marburg epidemics, anthropologists have been associated with international responses in the framework of different activities: epidemiological surveys, surveillance, care and support for patients and families, organization of burials, sensitization and social mobilization, permanent vocational training.

Their presence has confirmed that the urgency and seriousness of an epidemic should not prevent listening to the populations or taking into account local customs and beliefs. Anthropology contributes to improve the understanding of the chains of transmission of the virus and behaviours of the populations. It helps to analyse and respond to crisis situations by giving immediate explanation of the reactions of local populations, notably defiance or even hostile reactions.

On each occasion, the study of local perceptions has shown that the affected populations do not easily accept the explanation of the epidemic proposed by the medical teams. The local causality models challenge especially the “awakening” actions of human and non-human individuals. Without treatment and without vaccine, the model proposed by modern medicine is nothing but an explanatory model among others, leaving the way open for any social, economic and political use of the misfortune.

This situation must be taken into account before and after the epidemics, in health districts of poor public health structures, notably around national parks. The fight against emergence of viruses from the forest requires an improvement of living conditions and access to health of populations living around these national parks.

The anthropological approach proposes precise recommendations to facilitate humanization of the care and treatment of the victims (alive or deceased and their families). It recommends the need to avoid inflicting other “traumas” to a population terrified and weakened by a misfortune difficult to understand. It helps to improve the observance (of the prevention measures proposed) by populations, doubting the existence of the virus, scarred by misery and sometimes decades of war, suspicious of the competence of politicians and national and international experts.

In a context where the emergency operations leave very little room for the individual, where the health measures imposed risk adding poverty to the loss of a dear one, the medical teams should be constantly

concerned by the validity and feasibility of its proposals, and hence their acceptance by the local populations:

⇨ Would these health measures be acceptable to the medical team if it were in the place of the affected populations, or if their dear ones were threatened?

The experience acquired during previous epidemics has taught us that it is important to “humanize" the care and treatment of the living and the dead, trying as much as possible to take into account the different cultures and views of the communities in the handling of their deceased relatives, while improving the communication and social mobilization techniques to get them to better understand the risks they face and the precautions taken by the staff managing the epidemic. Besides, the epidemic management teams should show a little more capacity to ensure that they are accepted by the communities they cater for.

It should be retained that apart from the instruction manuals and directives, measures appropriate to each local situation should be invented each time, in order to adequately manage the health constraints and local necessities: the native, ecological, economic, political, cultural, psychological, historical and religious specificities.

6.4.5 Contribution of the COMBI methodology

To put in place the health promotion activities, the COMBI (Communication for behavioural impact) methodology developed by WHO and its partners can be used to promote behaviour change. The method relies on specific and clear objectives for the behaviours to be adopted.

It uses multiple points to ensure wide dissemination of the prevention messages:

- Administrative mobilization/public relation/advocacy: strong collaboration with the administration, civil, political, military and traditional authorities;
- Relational communication/counselling/credibility: psychosocial aid to families, choice of teams, advice to families;
- Mobilization of the community: door-to-door meetings, etc.;
- Promotion of public health activities (T-shirts, posters, etc.).

6.5 Case management, control of the infection and safe management of burials

6.5.1 Objective of the Case Management Sub-committee

The main objective of the Case Management Sub-committee is to ensure that adequate care and support is provided to patients, that the rules for controlling the infection are followed in all health centres and that the medical team organizes the funerals of the deceased in the respect of the customs to facilitate the bereavement of the families.

6.5.2 Mandate of the Case Management Sub-committee

It is incumbent upon the Case Management Sub-committee to:

- Ensure the respect of the charter on care to patients;
- At the level of the outbreak area, organize the care and treatment of Ebola or Marburg patients and put in place adequate rules for controlling the infection;

- At the level of the outbreak area, for the management of any other pathology, strengthen or put in place the basic measures against the infection in medical community in all health structures;
- Strengthen or put in place the basic measures against the infection in medical community in all hospitals serving this area;
- Organize, the safe transport of patients from their home to the health centre;
- Organize the burial of the deceased.

6.5.3 Activities of the Case Management Sub-committee

The management of Ebola or Marburg cases should respect the **Charter on care to patients**:

- The safety of patients in health establishments is a basic right, which should be guaranteed for all persons on admission;
- The quality of care must be a priority for the health-care personnel;
- Psychological aid must be provided by hospital staff to patients and their families;
- The information given to patients and their families must be honest;
- For each medical intervention, the rule is to request for the patient's informed consent;
- The written consent in the national language must be obtained prior to the conduct of a biomedical research;
- The beliefs and religion of the patients must be respected;
- The intimacy of patients must be protected;
- The medical team must offer patients and their families the opportunity to express their view on how their case is managed.

Therapeutic care is based on:

- Support treatment: oral rehydration, maintenance of the electrolytic balance (e.g. potassium supplement), support for renal and hepatic functions;
- symptomatologic treatment: analgesic, antiemulsin against vomiting, antifungal against agitation, antibiotics, anti-malaria drugs;
- intensive care: use of oxygen, assisted ventilation;
- in case of severe bleeding: replacement of the blood volume and pre-tested blood components (red blood corpuscles, platelets, FFP)
- the use of equipment for monitoring the biochemical and haematological values of patients to maintain their electrolytic balance;
- the ban on the use of salicylal products (ex. acetylsalicylic acid);
- the use of serotherapy is not recommended in the treatment of Ebola or Marburg based on current scientific knowledge;
- the results of the laboratory diagnosis for Ebola or Marburg (important in the field for classification of suspicious cases).

ATTENTION. In case of accidental exposure (injection, contact with body fluids):

- Immediately sprinkle with soapy water (if it affects the eye, use clean water);
- Immediately inform the supervisor;
- Ensure the follow up of the person exposed for 21 days (general state, psychological state, temperature);
- Envisage an evacuation of the person exposed.

Figure 7. Action to be taken in case of accidental exposure to the Ebola or Marburg virus

ACTION TO BE TAKEN IN CASE OF ACCIDENTAL EXPOSURE

1. Injection Act without delay
2. Wash with soft soap and rinse abundantly
3. Apply DAKIN antisepsy on the wound for at least 5 minutes
4. Always declare the AES to the surveillance team

If the patients and/or their family refuse hospital care, home care for suspicious cases should be organized with a view to reducing the risk of transmission in home setting (supply protection equipment). The home care must be an exception as it does not guarantee the same safety and quality as in hospital setting. For a detailed description of care and treatment of patients at home, see Annex 19.

The Case Management Sub-committee should develop, in collaboration with the psychosocial support team, a protocol for reintegrating patients on their return to their family and their community (Annex 20). The successful reintegration of survivors of Ebola or Marburg requires in-depth discussions with families and prominent citizens in the community prior to their return to the community. The successful return to the community reinforces the following message: if the care and treatment proposed by the medical team is accepted, it increases the chances of cure and prevents the transmission of the virus to the family and the community.

The Case Management Sub-committee should issue a medical certificate to accompany the discharge of the patient from the care establishment. The certificate must certify that the patient does not constitute a danger for his family and neighbours. If the patient is a man, he should be informed that his sperm can still

be infected for three months and that every sexual intercourse during this period must be protected. The medical team must supply condoms in sufficient quantity. This warning must feature on the medical certificate.

New vaccines and therapies against Ebola and Marburg (e.g. antiviral drugs, vaccines) are not yet ready for large-scale use in the field. A strategy using recombining vaccines in post-exposure (e.g. after contact with an Ebola case or exposure to the virus) could be proposed in the near future, but will require the agreement of the ethics committees of the countries concerned.

6.5.4 Controlling the infection

6.5.4.1 At the level of the outbreak area, care and treatment of Ebola or Marburg patients

At the level of the outbreak area, the Case Management Sub-committee should put in place safe care techniques to care for Ebola or Marburg patients (Annex 16):

- Creation of an isolation ward (see figure/plan in Annex 18B);
- Training of health workers who will be working in the isolation ward;
- Supply and verification of the personal protection equipment (masks, boots, etc.) specific instruments for the safe invasive procedures;
- Safe transport of patients to the isolation ward;
- Decontamination of the places soiled by the patient and the means of transport used;
- Safe management of waste produced by the health care (Annex 17);
- Examination and sorting of patients on their admission to the isolation ward;
- Development of bad posting of a model treatment for patients;
- Supply of necessary drugs and equipment to patients;
- In the isolation ward, the medical team is responsible for the wellbeing of patients on admission (water, food, light, hygiene), the patients are treated free-of-charge and they are given free food;
- Regular visits of doctors to patients;
- Visits of families to patients. For their own safety, visitors should wear adequate personal protection equipment;
- Restriction of access to isolated zones to:
    - protect the intimacy and dignity of patients (e.g., avoid intrusion of the media)
    - avoid contamination of visitors and the spread of the disease.

6.5.4.2 At the level of the outbreak area, care and treatment of other patients

At the level of the outbreak area, for the care and treatment of other patients, the Case Management Sub-committee should put in place, in all health structures (and in the homes of traditional leaders), the regulatory safety measures (Annex 17 and 18) for care and treatment of any pathology other than Ebola or Marburg.

6.5.4.3 Outside the outbreak area

The Case Management Sub-committee should put in place the regulatory precautionary measures in all hospitals serving this area.

6.5.5 Organization of burials by the Case Management Sub-committee

During epidemics of Marburg and Ebola virus haemorrhagic fever, the dead bodies of infected persons constitute a biological risk if they are manipulated without protection; that is why the management of burials should be incumbent upon the medical team. For more detailed information on the organization of burials, consult Annex 21.

The Case Management Sub-committee is in charge of creating an expert team that will be responsible for the safe conduct of burials of victims. The team will be guided by the following main principles:

- Burials should be conducted as a funeral ceremony, with due respect to the deceased, to facilitate the mourning by the families;
- During the funeral rites, the team should explain the concept of disinfection and put it into practice;
- The medical team should present its condolences to the families of the victims;
- The funeral team should disinfect the home of the victim.

To prepare the dead body of a patient who dies from Ebola or Marburg, the following precepts should be followed:

- The persons in charge of preparing the dead body should be well protected;
- The dead body is decontaminated with a disinfectant (e.g. bleach at 10%); if possible, the orifices are blocked with gauze and injection sites blocked or covered (e.g., with sticking plaster);
- The dead body is deposited in a waterproof body bag, which is hermetically closed to contain the blood and body fluids. There should no leakage of liquid, and the outside of the body bag should be clean;
- The body bag containing the dead body is placed in a coffin. Before being transported, the coffin must be sprayed with a disinfectant. The coffin can be safely transported by using ladies' chore gloves;
- If the family so demands, the coffin can be buried according to local beliefs. The family can help to carry the coffin to the cemetery under the supervision of the medical team;
- When the coffin is being transported, the staff sitting in the cabin should not wear personal protection equipment. The parents surrounding the coffin placed on the plateau do not need personal protection equipment, except the pall bearers who should wear thick gloves;
- Identification of tombs of Ebola or Marburg patients is strictly recommended in accordance with local customs.

The health workers, members of the family and the funeral team should follow the basic measures against infection in medical community when they handle a patient who died from Ebola or Marburg. They include the use of personal protection equipment, following the hands hygiene rules as well as usual precautions for contact with blood, body fluids and the injected equipment, and particularly splash on surfaces.

Manipulation of the dead body should ideally be conducted in a "care and treatment room" (this room can be the room of the patient at the hospital or the autopsy room, if an autopsy was carried out on the patient).

The team in charge of the burial should be composed of at least three persons wearing a personal protection equipment (two to manipulate the dead body and one to carry the disinfection solution sprayer), if the dead body is exceptionally heavy, there may be need for an additional number of people. At the outskirts of the field of action, one person, dresses normally, observes, coordinates and directs the team.

6.6 Psychosocial Care and Support

6.6.1 Objective Psychosocial Care and Support Sub-committee

The main objective of the Psychosocial Care and Support Sub-committee is to ensure that psychosocial support is provided to victims of Ebola and to their family, the nursing staff and the community in which they live.

6.6.2 Mandate of the Psychosocial Care and Support Sub-committee

The mandate of the Psychosocial Care and Support Sub-committee is to:

- Offer psychological care and support to victims of Ebola;
- Provide psychosocial support to families (food, discussions, condolences, visits, coffins, provisions, care and support for orphans, equipment);
- Provide psychosocial support to health workers;
- Offer compensation to families of the victims for the equipment destroyed;
- Where necessary, find and put in place a mechanism for catering for orphans;
- Prevent stigmatization and facilitate the social reinsertion of convalescent patients and families of the victims.

6.6.3 Activities of the Psychosocial Care and Support Sub-committee:

- Assessing the psychological problems associated with the epidemic facing patients, their family and the community in which they live;
- Defining strategies for providing psychological care and support to victims and ensuring their implementation by the different health structures and in the community;
- Provide technical support for preventing psychological attacks of victims and treat cases already suffering from psychosocial diseases.

To that end, the Sub-committee should:

- Detect and define in their entirety the psychological problems associated with the epidemic;
- Propose to the coordination measures for individual and collective psychological care and support, the development and implementation of appropriate preventive or curative intervention measures for the victim population;
- Ensure the efficient functioning and effective organization of the consultations, discussions and other psychological activities in the field;
- Conceive and assess the psychoeducation programmes;
- Organize on-the-job psychological training of health personnel and members of the community in relation with the epidemic; define strategies for providing psychological care and support to victims of Ebola or Marburg in case of epidemic and ensure their implementation by the different actors intervening in the management of the epidemic;
- Provide technical psychological support in the management of epidemics, disasters and other emergencies: organize and coordinate all psychological activities of any community organization in the field;
- Promote research in psychology and clinical psychopathology on the organization of care and control of the disease;
- Participate in the psychological prevention of diseases and management of natural disasters;

- Ensure correct application of the rules of psychic hygiene in community.

6.6.4 Collaboration of the Psychosocial Care and Support Sub-committee with other sub-committees
The team should support, through psychological discussions:

- the Surveillance Sub-committee to facilitate the investigations in the different districts and/or in villages hostile to the control of EVD;
- the Hygiene and Sanitation Sub-commmittee to facilitate, through psychological preparation of the public and/or family members of the victims, the disinfection of homes and safe burials;
- the Laboratory and Research Sub-committee for the psychological preparation of the contact carriers and suspicious cases in the sampling, so that they do not show any resistance;
- the Communication Sub-committee for the sensitization of the population, using psychological means and techniques.

6.6.5 Psychosocial survey

- Conceive and conduct psychosocial surveys on high-risk behaviours in the community;
- Conceive and develop mini-projects for promoting psychic care at the level of the basic problem unit;
- Ensure the correct application of the psychic hygiene rules in the community during the epidemic.

6.7 Logistics and safety

6.7.1 Objective of the Logistics and Safety Sub-committee

The main objective of the Logistics and Safety Sub-committee is to provide logistical support to the field operations and ensure the safety of the intervention teams.

6.7.2 Mandate of the Logistics and Safety Sub-committee

Generally, the Logistics and Safety Sub-committee depends directly on the coordination committee and mobilization of resources.

The Logistics and Safety Sub-committee is responsible for:

- The management of material resources for the need of the control activities
- The transport of the teams and necessary equipment
- The conservation and transport of the different samples to the laboratory
- The management of the accounting system and movement of human resources
- The management of security in the zone of operations
- The coordination of the actions and logistical needs with the other sub-committees
- The administrative monitoring of the different funding schemes.

6.7.3 Activities of the Logistics and Safety Sub-committee

1. Telecommunications
Installation of telecommunication facilities for communicating with the teams present in the outbreak area (VHF radio) and with the national and international authorities (telephone, Internet).

2. Installation and administration of the field office

At the level of the outbreak area:

- Set up functional offices for activities of the staff and meetings of committees;
- Organize the accounting of the operations (small purchases, payment of daily allowances and salaries, etc.);
- Ensure the supply of office equipment (computers, printers, photocopying machines, GPS);
- Establish an inventory of available local (material and human) resources;
- Ensure the renewal of the necessary products /order resources on time.

3. Transport and movement of personnel

- Management of vehicles and means of transport for the need of the control activities of the teams: surveillance, social mobilization, funerals…;
- Coordinate the movements of the mobile teams (surveillance, social mobilization, funerals);
- Apply a regular shift plan for the national and international personnel;
- Coordinate international travels of the international personnel.

4. Support for programmes and supply

- Ensure the supply and transport of the personal protection equipment (gowns, masks, goggles, boots and other equipment);
- Ensure the supply of personal protection clothing and disinfection equipment to the infection control teams and those responsible for safe funerals;
- Facilitate the management of biomedical waste and isolation areas in coordination with the case management sub-committee.

5. Stewardship, safety and protection

- Depending on the circumstances, meet the food needs of the patients and intervention teams;
- Ensure the safety of the venues and staff participating in the control activities;
- Communicate the safety instructions to the personnel before their arrival in the field;
- Where necessary, train the personnel in basic logistics.

6.8 Media and communication

6.8.1 Objective of the Media and Communication Sub-committee

The main objective of the Media and Communication Sub-committee is to promote efficient communication with the media.

6.8.2 Mandate of the Media and Communication Sub-committee

In our modern world, the press is keenly interested in the management of epidemics, notably in the case of outbreaks of Ebola or Marburg virus diseases. The zoonotic dimension and uncertainties on the modes of transmission from bats to wild animals exacerbate the fears of a virus that cannot be stopped, especially among wildlife (monkeys, forest duikers, chimpanzees, gorillas, frugivore bats), which is an important source of protein for populations in forest areas. The authorities are burdened with pressing demands. In the face of the contamination of the main source of protein (wildlife), there is a need to provide a substitution source of protein or define disease-free areas where wild animals can be hunted in safety and security.

The mandate for communication is as follows:

1. Developing a joint communication plan between the ministry of health, and those of livestock and environment (in charge of wildlife) in order to relay coherent and full messages on Ebola or Marburg; in case the ministry of defence intervenes with the army service of the armies, it is also important to involve it in the development of the joint plan;
2. Targeting partnership with the media and communication of effective messages for the population (the press a partner of the response to the epidemic);
3. Contributing to mobilize the necessary resources for developing research projects in collaboration with the national and international press;
4. Training journalists to better communicate on Ebola or Marburg;
5. Training communicators of the government and institutions concerned to better communicate in crisis situations, including Ebola or Marburg.

The establishment of efficient communication with the media is a very important element of the management of Ebola or Marburg epidemics. Based on the guidelines of the communication crisis in WHO, five practices guide the effectiveness of the Media and Communication Sub-committee:

- Establishing a trust relationship with the media is the basis of any efficient communication system;
- Quickly informing the population through the media;
- Being transparent about the information you share with the media. This transparency sometimes has its limits, for example when the information concerns the private life of patients. In this case, ethical considerations do not permit us to share all the information with the media;
- Respecting all the interrogations of the public, they are often diverse but always legitimate;
- Planning the communication activities.

6.8.3 Activities of the Media and Communication Sub-committee

The following activities should be considered during the development of the joint plan of action:

1. Collect information on daily basis from the coordination committee, including the latest updates, and formulate messages for the press to be communicated by the spokespersons of the main ministries involved (Health, Livestock, Environment, Defence);
2. Establish a channel of development and rapid authorization of press materials by interested ministries, so that the dissemination is done without delay;
3. Organize a joint rapid, regular and transparent communication to the national and international press;
4. Organize joint press points to communicate to communicate the latest developments (an initial press point is very important to announce the subsequent operations, especially in the area of social mobilization);
5. Write and distribute regularly joint information bulletins or joint notes for the press, including on the web;
6. Identify the most efficient media to join the greater part of the in population both the cities and rural areas and engage them to pass on the main messages concerning the prevention (limit practices that favour transmission) and surveillance (report the rumours and suspicious cases);
7. Organize an information session with journalists to provide them with detailed information on the current situation and general information on Ebola and Marburg;
8. Take photos and images of the work of the epidemic control teams to better document the activities and put these photos and images at the disposal of the media to better publicise the control activities in the field.

6.9 Management of the environment (surveillance of wildlife and mining)

6.9.1 Enhanced surveillance of wildlife

Experience has taught us that Ebola epidemics in wildlife preceded those in humans. During Ebola outbreaks, it is important to intensify the programmes for health surveillance of wildlife and develop an operational collaboration between animal health and public health in order to ensure early warning of Ebola epidemics in humans.

As soon as rumours start circulating about mortality in the animal population, services of national parks (or veterinary services) should verify them and take samples on carcasses of animals found dead, using protective equipment. The samples should be sent to a competent laboratory for analysis.

As soon as the cases are confirmed in animals, animal health services should immediately alert public health services, so that they set in motion programmes for preventing human epidemic.

In this context, the prevention messages should especially be disseminated among the society of hunters and among forest populations. These key messages can be the following:

- Do not touch animals found dead in the forest;
- Do not touch gorillas and chimpanzees found dead in the forest;
- Communicate the information on animals found dead in the forest to the national parks service;
- Do not hunt in hunting areas where animals have already been found dead;
- Avoid contact with blood of animals when cutting up carcasses at home, in the forest or in markets, by wearing gloves or using plastic;
- Do not eat raw meat or intestines, make sure the meat is well cooked (simmered) before consuming it.

6.9.2 Enhanced surveillance of mining

During the last outbreaks of Marburg virus haemorrhagic fever, the index cases were miners who were working in mines inhabited by populations of thousands of infected bats. Work in the mines exposed the miners to a high infectious risk.

Often, the miners do not use personal protection equipment/or they wear just boots and gloves. It is probable that the risk was associated with regular exposure to bats in the confined space of the mines.

Surveillance of cases of haemorrhagic fever is, therefore, particularly important in regions of Africa where mines are infected by colonies of bats. Mining operators should ensure the safety of miners in order to reduce contamination.

Sensitization of miners on the risk of Marburg: ventilation of the mine, wearing of mask, helmet, gloves and boots.

6.10 Research project management and ethical aspects

6.10.1 Objective of the Research Project Management and Ethical Aspects Sub-committee

The main objective of the Research Project Management and Ethical Aspects Sub-committee is to put in place a system for critical review of research projects proposed by the different national or international teams. The review helps to assess, depending on the information on the ongoing epidemic, the relevance of the objectives of the projects and also verify the ethical approach to the research projects proposed.

6.10.2 Mandate of the Research Project Management and Ethical Aspects Sub-committee

During Ebola or Marburg epidemics, research projects may interest several areas: clinical research, therapeutic tests, vaccinal tests, physiopathology, epidemiology, laboratory tests, ecology, anthropology and social science.

The Research Project Management and Ethical Aspects Sub-committee is in charge of the following:

- Identifying key research themes;
- Informing the intervention teams about the need to systematically submit all their research projects for critical review;
- Collecting research projects and conducting a critical review with the help of national and international experts;
- Submitting all the research protocols to the national ethics committee;
- Informing those responsible for research projects about the final decision of the research management sub-committee and the decision of the ethics committee;
- Giving directions concerning ethical issues relating to measures like isolation of patients, quarantine, control at borders, sanitary cordon and reduction of social contacts;
- Giving directions on the role and obligations of the nursing staff during an Ebola or Marburg outbreak (moral, professional, contractual and legal obligations).

6.10.3 Activities of the Research Project Management Sub-committee

One of the questions to be asked: is there an ethics committee in the country?
- if there is no ethics committee, should the ministry of health be requested to urgently create one, by soliciting the support of experts from public health training institutions or the faculty of medicine in the country?
- if it is not possible to have an ethics committee, what should be done?

Thus, the role of the committee will be to:

- ✓ Draft protocols for studies to be conducted in the field;
- ✓ Submit them to the coordination of the management of the epidemic for validation;
- ✓ Submit them to the ethics committee if there is one in the country, or to the experts committee for approval;
- ✓ Mobilize resources for the conduct of the studies;
- ✓ Ensure the monitoring and supervision of the different studies conducted in the field;
- ✓ Publish these studies in the different media.

Chapter 7
AFTER OUTBREAK: WHAT SHOULD BE DONE WHEN THE EBOLA OR MARBURG EPIDEMIC IS OVER?

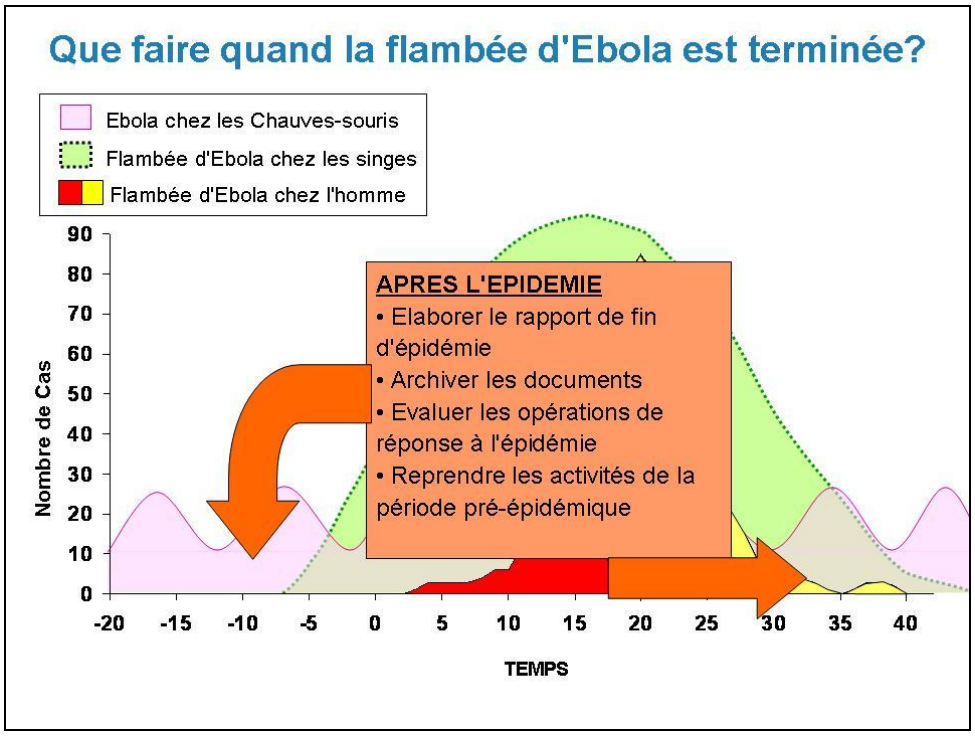


Figure 8. Diagramme de la période après the epidemic

What should be done when the Epola epidemic is over?

- Ebola in bats
- Ebola outbreak in monkeys
- Ebola outbreak in humans

Number of cases

AFTER THE EPIDEMIC

- Prepare the end-of-epidemic report
- File the documents
- Assess the epidemic response operations
- Resume the activities of the pre-epidemic period

TIME

7 After outbreak: what should be done when the Ebola or Marburg epidemic is over?

The government declares the end of the epidemic in collaboration with WHO on the proposal of the International Technical and Scientific Committee (ITSC).

It is incumbent on the Surveillance, Epidemiology and Laboratory Sub-committee to determine the date of the end of the epidemic, which is twice the maximal incubation period for Ebola or Marburg (42 days) after the last infectious contact with a confirmed or probable case and submit it to the ITSC.

7.1 Prepare the end-of-epidemic report

- Objective of the report: Describe the activities carried out during the epidemic as well as the constraints and difficulties encountered.
- Importance of preparing an end-of-epidemic report: document the epidemic and lessons learnt during the epidemic.
- The end-of-epidemic report is to be prepared by the general coordination committee and should comprise, among other things, the technical report and the administrative and financial report.

- ✓ Prepare the end-of-epidemic report (Annex 5)
- ✓ Adopt the report during a workshop
- ✓ Disseminate the report (recipients)
- ✓ Publish the report in international reviews (e.g., WER, MMWR)
- ✓ Complete the epidemics register of the district (Annex 6).

7.2 File the documents on the epidemic

- Assemble all the reports, photos and other documents relating to the management of the epidemic
- Store all the documents at a place accessible to all for their future use.

7.3 Assess the management of the epidemic

- The objective of the assessment is to draw lessons that will help improve future management of other EVD and MVM epidemics;
- The assessment should be conducted by a team composed of nationals and technical partners.

- ✓ Adopt the method for the assessment
- ✓ Conduct the assessment
- ✓ Prepare the report of the assessment (Annex 5)
- ✓ Take stock of the psychosocial state of survivors of the epidemic
- ✓ Organize the restitution of the results of the assessment
- ✓ Disseminate the report (recipients).

7.4 Resume activities of the pre-epidemic period

7.4.1 Put in place a surveillance system for viral haemorrhagic fevers

Stage 1: Intensify the routine surveillance of all viral haemorrhagic fevers;

Stage 2: Put in place a community based surveillance system;

Stage 3: Put in place a system for the collection, packaging, storage and transportation of samples for the laboratory;

Stage 4: Put in place (or revitalize) the epidemic management committees and rapid response teams.

7.4.2 Measures for controlling the infection in hospital community

Stage 5: Apply the basic measures against the infection in hospital community;

Stage 6: Constitute stocks of personal protection clothing and other equipment required for conducting epidemiological investigations at the district, provincial and national levels.

7.4.3 Health promotion programme

Stage 7: Improve behaviours by putting in place a health promotion programme;

7.4.4 Collaboration with health services of mines (Marburg) and health services of wildlife (Ebola)

Stage 8: Establish or intensify collaboration ties between human health services and those of mines (Marburg);

Stage 9: Establish or intensify collaboration ties between human health services and those of mines wildlife (Ebola);

7.4.5 Pre-alert: what should be done if animal samples are tested positive for Ebola or Marburg

Stage 10: Inform the veterinary services and public health authorities;

Stage 11: Conduct an intensive prevention campaign.

Chapter 8
ANNEXES

8 Annexes

8.1 Annexes relating to general information on Ebola and Marburg

8.1.1 Annex 1. WHO Ebola *Aide-mémoire*

http://www.who.int/mediacentre/factsheets/fs103/fr/index.html

8.1.2 Annex 2. WHO Marburg *Aide-mémoire*

http://www.who.int/mediacentre/factsheets/fs_marburg/fr/index.html

8.2 Annexes relating to the coordination committee

8.2.1 Annex 3. Composition of the national coordination committee on prevention and control activities

The composition of the national coordination committee on epidemic prevention and control activities is as follows:

1. Ministry of health

Other ministries:

2. Ministry of interior and decentralization, interior and security
3. Ministry of decentralization and land-use planning
4. Ministry of primary, secondary and vocational education
5. Ministry of higher and university education
6. Ministry of defence and ex-servicemen
7. Ministry of communication and media
8. Ministry of culture and arts
9. Ministry of social affairs, humanitarian actions and national solidarity
10. Ministry of economy and trade
11. Ministry of environment, conservation of nature and tourism
12. Ministry of agriculture
13. Ministry of budget
14. Ministry of finance
15. Ministry of rural development
16. International partners: WHO, MSF, CDC, UNICEF, USAID, FAO, IEO
17. Private sector.

8.2.2 Annex 4. Composition of the rapid intervention team

The rapid intervention team should comprise:

1. An epidemiologist or public health official (responsible for disease control, for example)
2. A laboratory technician or technologist
3. A clinical practitioner
4. An environmental health official
5. A veterinary or wildlife officer
6. An infection control officer
7. A communication officer and/or an anthropologist and/or a psychologist

8.2.3 Annex 5. Format of the assessment report on the management of the epidemic

_____
_____
Title/Description (disease/ailment, subject of the survey)

_____ _____ _____
Period Place (Village, Neighbourhood, District, Province)

Executive summary: _____
_____
_____

I. Introduction:
• Context
• Reasons for the survey (importance in public health, threshold reached, etc.)
• Investigation and preparation for the epidemic.

II. Methods:
• Investigation dates
• Investigation site(s) (care establishments, villages, other)
• Case search (indicate what has been done about case search, e. g. examination of medical registers, proximity survey, alert from other care establishment, other)
• Laboratory samples taken
• Description of the response and the intervention (specify dates)
• Processing of the data.

III. Results:
• Date and place of the first case detected (or index case)
• Date and particulars of the care establishment where the first case was seen by the health system
• Results of the supplementary case search
• Laboratory and results analyses
• Description of the main characteristics of the analysis of results according to the time, place and individual characteristics
• Detailed results according to time (PPE graph), place (map) and individual characteristics (tables), and computer files
• Results of the response and proof of its impact.

IV. lf-assessment of the promptness and quality of the preparation, detection, investigation and response to the epidemic:

Preparation for the epidemic

Indicator	**Yes**	**No**
Were the medicines and supplies available immediately after the outbreak of the epidemic?		
Were the treatment protocols available to the health workers?		
Did the district health emergency management committee meet regularly as part of the preparation for epidemics?		

Detection of the epidemic

Indicator	Date 1	Date 2	Interval
Interval between the appearance of the index case (or appearance of a group of unusual cases within the community) [date 1] and arrival of the first case at care establishment [date 2] (objective: <3 days)			
Interval between the time the first case was seen at the care establishment (or date on which the epidemic threshold was exceeded at the care establishment) [date 1] and notification to the health team of the district [date 2] (objective: within 24 hours)			
Cumulative interval between the appearance of the index case (or the appearance of a group of unusual cases within the community) [date 1] and notification to the district [date 2] (objective: <7 days)			

Investigation of the epidemic

Indicator	Yes	No
Were the forms/lists of cases filled?		
Were samples taken for the laboratory (where necessary)?		

Indicator	Date 1	Date 2	Interval
Interval between the notification to the district [date 1] and investigation in the field [date 2] (objective: within 48 hours)			
Interval between the sending of samples to the laboratory [date 1] and receipt of the results by the district [date 2] (objective: 3 - 7 days, depending on the type of analysis)			

Response to the epidemic

Indicator	Date 1	Date 2	Interval
Interval between notification of the epidemic to the district [date 1] and the concrete response from the district [date 2] (objective: within 48 hours after notification)			

Evaluation and feedback

Indicator	Date 1	Date 2	Interval
Interval between the end of the epidemic [date 1] and finalization of the report on the epidemic and transmission of the forms/lists of cases to the national level [date 2] (objective: 2 weeks)			

Indicator	Yes	No

Did the committee on management of health emergencies meet to examine the results of the investigation?		
Did the care establishments and the population receive a feedback?		

V. Assessment of the other aspects of the response:

VI. Interpretations, discussion and conclusions:

VII. Recommended public health actions:
Comment on them at the different levels: community, care establishments, district, partners, province and national level

Chairman of the District Committee on health emergencies:

_____ _____
Name Signature

Chief District Medical Officer:

_____ _____
Name Signature

Date of the report: _____

8.2.4 Annex 6. Register of epidemics

1. Epidemiological number of the case: Country Code (XXX) - Province or Department Code (XXX) - District or Health Zone Code (XXX) – Year of notification Code (XX) – Chronological number of the case (XXXX)
2. Laboratory identification number: Year Code (XX) Country Code (XXX) Origin District Code (XXX) Number of sample (XXXXX)
3. Surname: Name
4. Other names: pre- and post names
5. Epidemiological classification of the case: confirmed/probable/suspicious/No case
6. Date of notification: dd/mm/yy
7. Date of birth of the case: dd/mm/yy

8. Age of the case in years: ### (in case the date of birth is not known)
9. Sex: M/F or 1/2
10. Name of head of family: /_____/
11. Name of village: /_____/
12. Health area: /_____/
13. Health district or Health zone: /_____/
14. Nationality: /_____/
15. Country of residence: /_____/
16. Ethnic group: /_____/
17. Main profession: /_____/
18. Secondary profession: /_____/
19. Remark on the profession: /_____/
20. Village disease appeared: /_____/
21. Health district or Health zone at the outset of the disease: /_____/
22. Province or Department at the outset of the disease: /_____/
23. Date the symptoms started: /_____/
24. Presence of fever: Yes/No
25. If Yes, temperature on admission: ##, #
26. Date of outset of fever: dd/mm/yy
27. Presence of vomiting: Yes/No
28. Presence of diarrhoea: Yes/No
29. Presence of muscular or joint pains: Yes/No
30. Presence of fatigue: Yes/No
31. Presence of abdominal pains: Yes/No
32. Presence of headache: Yes/No
33. Presence of conjunctivitis Yes/No
34. Presence of skin rashes: Yes/No
35. Presence of pain in throat: Yes/No
36. Presence of coughing: Yes/No
37. Presence of swallowing difficulty: Yes/No
38. Presence of breathing difficulty: Yes/No
39. Presence of hiccup: Yes/No
40. Presence of anorexia: Yes/No
41. Presence unexplained bleeding: Yes/No
42. Presence of gum bleeding: Yes/No
43. Presence of bleeding at the injection site: Yes/No
44. Presence of vaginal bleeding: Yes/No
45. Presence of epistaxis: Yes/No
46. Presence de petechiae: Yes/No
47. Presence of conjunctiva bleeding: Yes/No
48. Presence of melena: Yes/No
49. Presence of hematemesis: Yes/No
50. Presence of haematuria: Yes/No
51. Presence of CIVD/shock: Yes/No
52. Presence of another haemorrhage: Yes/No
53. Date of case notification: dd/mm/yy
54. State on detection:

55. Hospitalized: Yes/No
56. Date of first hospitalization: dd/mm/yy
57. Name of first health centre: /_____/
58. Date of first hospitalization: dd/mm/yy
59. Name of second health centre: /_____/
60. Name of Health district /Health zone: /_____/
61. Isolated on admission: Yes/No
62. Currently in isolation: Yes/No
63. Date discharged from isolation: dd/mm/yy
64. Date discharged from hospital: dd/mm/yy
65. Current state of patient: Alive/Deceased/Lost to follow up
66. If deceased, date of death: dd/mm/yy
67. Health district/Health zone of death: /_____/
68. Village of death: /_____/
69. Village of burial: /_____/
70. Health district? Health zone of burial: /_____/
71. Contact with animals: Yes/No
72. If Yes, place of exposure to animals: /_____/
73. Date of exposure to animals: dd/mm/yy
74. Contact with a suspicious case: Yes/No
75. Name of suspicious case(s): /_____/
76. Circumstances of contacts: /_____/
77. Places of these contacts: /_____/
78. Care at the traditional healer's: Yes/No
79. Place of traditional healer: /_____/
80. Date of treatment at the traditional healer's: dd/mm/yy
81. Travel in the preceding months: Yes/No
82. Place of travel: /_____/
83. Date of travel: dd/mm/yy
84. Final outcome: Alive/ Deceased/Lost to follow up
85. Type 1st sampling: blood/saliva/biopsy/sperm
86. Sampling date: dd/mm/yy
87. Date of receipt of samples at laboratory: dd/mm/yy
88. Date of sending samples to the Coordination committee: dd/mm/yy
89. Laboratory results: Ebola Ag – Ebola PCR – Ebola IgM – Ebola IgG
90. Interpretation of laboratory results: /_____/
91. Sample 2 type : dd/mm/yy
92. Date of receipt of sample 2 at laboratory : dd/mm/yy
93. Date of sending samples to the Coordination committee 2: dd/mm/yy
94. Laboratory results 2: Ebola Ag – Ebola PCR – Ebola IgM – Ebola IgG
95. Interpretation of laboratory results 2: /_____/
96. Sample type 3: blood/saliva/biopsy/sperm
97. Sample date 3: dd/mm/yy
98. Date of receipt at laboratory 3: dd/mm/yy
99. Date of sending samples to the Coordination committee 3: dd/mm/yy
100. Laboratory results 3: Ebola Ag – Ebola PCR – Ebola IgM – Ebola IgG
101. Interpretation of laboratory results 3: /_____/
102. Final laboratory result: positive/negative/indeterminate

103. Epidemiological comment: /_____/
104. Final classification: Confirmed/Probable/No case

8.3 Annexes relating to surveillance and epidemiology

8.3.1 Annex 7A. Current definition of viral haemorrhagic fever case for routine surveillance:

Suspicious Ebola or Marburg case for routine **surveillance:**
Any person suffering from high fever who does not respond to any treatment of the normal causes of fever in the region and who presents at least one of the following signs: bleeding diarrhoea, gingival bleeding, dermal haemorrhage (purpura), conjunctive injection and presence of blood in the urine.

Confirmed Ebola or Marburg case for routine surveillance:
Case confirmed by the laboratory (positive test for IgM, RT-PCR positive or isolation of the virus).

Remark: During an epidemic, these case definitions are likely to be modified to adapt to the local event.

8.3.2 Annex 7B. Current definition of cases of Ebola or Marburg virus disease during the epidemic

a) Case definition to be used by mobile teams or health posts and centres

SUSPICIOUS CASE:
Any person, alive or deceased, presenting or having presented sudden high temperature, and who has been in contact with:
- a suspicious, probable or confirmed case of Ebola or Marburg
- a dead or sick animal (for Ebola)
- a mine (for Marburg)

OR: any person presenting sudden high fever and at least three of the following symptoms:

- headache
- anorexia / loss of appetite
- intense fatigue
- muscular or joint pains
- difficulty in breathing
- vomiting
- diarrhoea
- stomach pains
- difficulty in swallowing
- hiccup

OR: any person presenting unexplained bleeding

OR: any person dying suddenly and whose death is unexplained.

Action to take when a suspicious case has been identified:
- report the case to the surveillance team
- after express accord, collect a biological sample
- fill in a case notification form
- make a list of the contacts of the suspicious case

If the subject is alive, you must explain to the patient and his family the need to go to the hospital for appropriate medical care. After obtaining the consent of the patient or his family, it is necessary to organize his transport. If the subject is deceased, you must explain to the family the need to conduct a safe burial. With prior consent, you must *coordinate* with the burial team the organization of the funeral.

b) Case definition to be used only by hospitals and the surveillance team

PROBABTHE CASE:
Any suspicious case that cannot be biologically confirmed, but which the surveillance sub-committee feels, after assessment during a case classification meeting, that there is proof of epidemiological link with a confirmed case.

Note: As long as there are, for a particular case, possibilities of biological confirmation, the suspicious case cannot be classified as probable. It shall remain suspicious until the laboratory results are available to help reclassify it as a "**confirmed**" case or "**No case**".

CONFIRMED CASE:
Any suspicious case with a positive laboratory result. Cases confirmed in the laboratory should be positive either for the antigen of the virus, or for the viral RNA detected by reverse transcription followed by polymerase chain reaction (RT- PCR), either for the IgM antibodies directed against Marburg or Ebola.

NO CASE: Any suspicious case with a negative laboratory result. The "No cases" are free of specific antibodies, RNA and specific detectable antigens.

8.3.3 Annex 7C. Current definition of VHF cases during community-based surveillance

This definition of Ebola or Marburg virus haemorrhagic fever "emergency case" was developed to be used by the community and community health promoters. It can be used for community-based surveillance in the pre-epidemic period and during the epidemic.

Emergency case**:**
Any person presenting sudden high temperature who does not respond to any treatment for normal fever causes in the region
OR any person having presented a bleeding or bleeding diarrhoea or a haematuria
OR any person who died suddenly.

Action to be taken:
If a warning case (alive or dead) is identified:
Report it to a surveillance team or the nearest health centre.

8.3.4 Annex 8. Form for investigation and notification of Ebola or Marburg cases

Case identification number: _____
Date received: ___ /___ /___

Date of detection of the case ___/___/___
Case reported by *(tick and specify:*
□ Mobile team, No _____ □ Health centre _____
□ Hospital _____ □ Other: _____
Form completed by (Surname and first name) _____

Information transmitted by (Surname and first name) _____
Relation with patient _____

Identity of patient Surname _____
Name _____Postname(s) _____First name(s)_____
Son/daughter of (name of father/mother)
_____
Date of birth ___/___/___ Age (years)_____ Sex □ M □ F
Usual residence: Family head (Surname and first name) _____
Village/District of residence _____ District _____
Home GPS address: Latitude _____ Longitude _____
Nationality: _____ Ethnic group: _____

Profession of patient *(tick as appropriate and add details if necessary)*
□ Farmer □ Housewife □ Child □ Hunter/Bush meat seller
□ Health personnel, specify: Health structure _____Qualification _____
□ Miner/Gold washer _____ starting date of mining activities: _____
□ Pupil/Student□ Other (specify) _____

Status of patient
Status of patient on detection □ Alive □ Deceased
if deceased, date of death ___/___/___
Place of death: □ Community, name of village/neigbourhood _____ District _____
□ Hospital, name and service _____District _____
Place of burial, name of village/neighbourhood _____ District _____

History of disease
Starting date of symptoms ___/___/___
Name of village where patient fell sick _____ District _____
Did the patient travel while sick □ Yes □ No □ NSP
If Yes, indicate the list, mentioning the villages, health structures and districts:
Village _____ Health structure _____ District _____
Village _____ Health structure _____ District _____
Village _____ Health structure _____ District _____

Clinic
Does the patient present or did he present one of the following symptoms *(tick as appropriate)*
Did the patient have temperature**?** □ Yes □ No □ NSP
If Yes, date temperature started: ___/___/___

Does the patient present or did he present one of the following symptoms *(tick as appropriate and add details if necessary)*:

- headache □ Yes □ No □ NSP
- diarrhoea □ Yes □ No □ NSP
- abdominal pains □ Yes □ No □ NSP
- vomiting □ Yes □ No □ NSP

- intense fatigue ☐ Yes ☐ No ☐ NSP
- anorexia ☐ Yes ☐ No ☐ NSP
- muscular pains ☐ Yes ☐ No ☐ NSP
- difficulty in swallowing ☐ Yes ☐ No ☐ NSP
- difficulty in breathing ☐ Yes ☐ No ☐ NSP
- intense coughing ☐ Yes ☐ No ☐ NSP
- rashes ☐ Yes ☐ No ☐ NSP
- bleeding at injection points ☐ Yes ☐ No ☐ NSP
- gum bleeding (gingivorragia) ☐ Yes ☐ No ☐ NSP
- eye bleeding (conjunctiva injection) ☐ Yes ☐ No ☐ NSP
- black or bloody stools (melena) ☐ Yes ☐ No ☐ NSP
- blood in vomit (hematemesis) ☐ Yes ☐ No ☐ NSP
- nose bleeding (epistaxis) ☐ Yes ☐ No ☐ NSP
- vaginal bleeding other than menses ☐ Yes ☐ No ☐ NSP

Risks of exposure

- Was patient in contact with a **suspicious case** during the past three weeks before the outset of symptoms? ☐ Yes ☐ No ☐ NSP

If Yes, specify: Name _____ First name _____

At the time of contact, was the suspicious case ☐ alive or ☐ deceased, date of death ___/___/___

Date of last contact with the case ___/___/___

- Was the patient **hospitalized** or did he visit a hospitalized relative during the past three weeks before the outset of symptoms? ☐ Yes ☐ No ☐ NSP

If Yes, where _____Between (dates) ___/___/___ - ___/___/___

- Did patient visit /consult a medicine man**/traditional healer** during the past three weeks before the outset of symptoms? ☐ Yes ☐ No ☐ NSP

Si Yes, Name: _____ Village _____ District _____

When and where did the visit take place? Place _____ Date: ___/___/___

Did the patient receive traditional treatment? ☐ Yes ☐ No ☐ NSP

if Yes, explain the type of treatment: _____

- Did the patient attend a **funeral** during the three weeks preceding the outset of symptoms? ☐ Yes ☐ No ☐ NSP

if Yes, Name and First name of the deceased: _____

- Was the patient in contact with a wild **animal** during the three weeks preceding the outset of symptoms? ☐ Yes ☐ No ☐ NSP

If Yes, Type of animal _____ Location _____ Date ___/___/___

- Did the patient work in or visit a **mine/cave inhabited by colonies of bats** during the three weeks preceding the outset of symptoms? ☐ Yes ☐ No ☐ NSP

If Yes, Name of the mine _____ Location _____ Date ___/___/___

- Did the patient **travel** during the three weeks preceding the outset of symptoms?

□ Yes □ No □ NSP

If Yes, specify the place _____ and the dates ___/___/___ to ___/___/___

Sampling

Question for the investigating team: after providing a clear and complete information to the patient (or to his family), did you obtain the latter's express and/or informed consent to collect samples?

□ Yes □ No □ NSP

- Sample taken? □ Yes □ No □ NSP

If Yes, Date ___/___/___ □ Blood □ Urine □ Saliva □ Biopsy □ Stools

Transfer of patient to the hospital

To be completed ONLY by the mobile teams and health centres

Was patient transferred to the hospital? □ Yes □ No

Updating information provided by the isolation service

To be completed ONLY by the hospital or surveillance bureau

Was patient hospitalized in isolation ward? □ Yes □ No

If Yes, Name of the hospital _____ Date of hospitalization ___/___/___

Member(s) of family attending to patient, Surname and First Name _____

Date discharged ___/___/___ OR Date of death ___/___/___

Data from the laboratory

The sample tested was taken on: □ Patient □ Convalescent □ After death

Date taken ___/___/___ Date results received ___/___/___ ID Lab _____

Type of sample
□ Blood on dry tube □ Blood on anti-coagulants
□ Adenopathy □ Stool / Urine
□ Saliva □ Biopsy
□ Other, specify _____

Results	Detection of antigen	□ pos	□ neg	□ NA	Date ___/___/___
	IgM anti-body testing	□ pos	□ neg	□ NA	Date ___/___/___
	IgG anti-body testing	□ pos	□ neg	□ NA	Date ___/___/___
	RT- PCR	□ pos	□ neg	□ NA	Date ___/___/___
	Virus culture	□ pos	□ neg	□ NA	Date ___/___/___
	Immunohistochemistry	□ pos	□ neg	□ NA	Date ___/___/___
	Immunofluorescence	□ pos	□ neg	□ NA	Date ___/___/___

Issue (to be verified four weeks after date of outset of symptoms)

□ Alive □ Deceased

If deceased, Date of death ___/___/___

Final classification of case *(tick as appropriate)*

□ **Confirmed** □ **Probable** □ **No case** □ **Indeterminate**

8.3.5 Annex 9A. Current definition of contact carriers of Ebola or Marburg cases

Contact carrier from an Ebola or Marburg case:

Any person who has been in contact with an Ebola or Marburg case within the 21 days preceding the outset of symptoms according to at least one of the following modalities:

- slept in the same area as the case
- had direct physical contact with the case (alive or deceased) during his illness
- had direct physical contact with the (deceased) case during the funeral
- had direct contact with the blood or body fluids of the case during his illness
- had direct contact with the clothing or linen of the patient
- was breastfed by a case.

Contact carrier from a dead or sick animal carrier:

Any person who has been in contact with a dead or sick animal within 21 days preceding the outset of symptoms according to at least one of the following modalities:

- had direct physical contact with the animal
- had direct contact with the blood or body fluids of the animal
- cut up the animal
- ate raw bush meat.

Contact carrier from a laboratory:

Any person who worked in a laboratory within the 21 days preceding the outset of symptoms according to at least one of the following modalities:

- had direct contact with samples of patients suspected of Ebola or Marburg
- had direct contact with samples of animals suspected of Ebola or Marburg

Important Note: During an epidemic, all these definitions are likely to be amended to adapt to a local event.

The other risk factors of infection include: contact with a hospital establishment where Ebola or Marburg cases have been treated, injection or vaccination within the 21 days preceding the outset of symptoms.

8.3.6 Annex 9B: Form for registering contacts

Information on case								
Epid Num	**First name**	**Name and Postname**	**Name of family head**	**Address**	**Town/village**	**Health zone**	**Date of outset of disease**	**Place where case was identified**

Information on contacts													
N	**First Name**	**Name and Postname**	**Sex**	**Age**	**Relation with case**	**Date of last contact with case**	**Contact type***	**Name of family head**	**Address**	**Town/Village**	**Health zone**	**Telephone number**	**Health personnel (Y/N)** ***If Yes, Structure?***

*Types of contact:

1 = touched bodily fluids of case (blood, vomit, saliva, urine, stool)

2 = had direct contact with the dead body of case (alive or deceased)

3 = touched or cleaned the clothing, linen, or plates of case

4 = slept or ate in the same house as case

List of contact prepared by: Name: _____ Title: _____ Telephone: _____

8.3.7 Annex 9C: Contact monitoring sheet

Contact monitoring venue: Village / Town / District _____Province_____Country _____

Subjects on the list are contacts of the following cases

Name	First Name	Family Head	Age	Sex	ID CASE	Last contact date	1st visit date	To be monitored until	Monitoring day **																					
									1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

8.3.8 Annex 10: Protocol of classification of suspicious Ebola or Marburg cases

Progress in the establishment of mobile laboratories for biological confirmation of Ebola and Marburg virus infections, using molecular biology and serum test, helps us to implement a suspicious case classification in order to better process our data during epidemics and, thereby, avoid several back and forth on the data, often leading to interminable discussions and a certain confusion among our partners. This protocol, associated with case definitions, will enable field epidemiologists to have a uniform view on how to conduct the case classification on the basis of universal epidemiological principles.
Thus, this protocol comprises two tools to facilitate the classification of suspicious cases:

1. Classification of suspicious cases based on laboratory results
2. Classification of suspicious cases based on the epidemiology for indeterminate or doubtful laboratory cases.

I. Classification of suspicious cases based on laboratory results

This classification is the first major stage in the determination of the biologically confirmed cases. It is inevitable and determined by the great successes obtained by current researches on these diseases. The presence of mobile laboratories in the field helps to ensure a sorting of cases and, consequently, a better control as well as better management of the epidemic.
Hence, any suspicious case should necessarily be investigated by taking samples for the different laboratory tests, and these tests will lead to three cases, namely:

1) All suspicious cases tested PCR positive will be classified as "**confirmed cases"**. The final laboratory classification is changed to "**confirmed cases**".

Note: This classification will concern only suspicious cases, according to the definitions featuring in Annex 7B.

2) As for suspicious cases tested PCR negative, they should follow the following protocol:
    - If the suspicious case has had at most three days of symptoms, the case will still be classified as "**suspicious case**" for future biological investigations
    - If the suspicious case has had symptoms between three and ten days, or if the specimen was on the day of death, the case is classified "**No case**" and excluded from the list of cases
    - If the suspicious case has had more than 10 days of symptoms, also take into account the results of the IgM:
        a) If the IgM is negative, the case is classified "**No case**" and excluded from the list of cases
        b) If the IgM is positive, the case is classified as **"confirmed case"**.

Note: Any contact carrier (see Annex 9A) presenting symptoms must be declared as suspicious, which requires that the protocol should be repeated.

2) If it is not possible to conduct a PCR or IgM test, the case remains suspicious and is resent for epidemiological classification that should decide whether to classify it as probable or No case, or even indeterminate.

Note: Any inconclusive or doubtful laboratory result must be repeated.

II. Classification of suspicious cases based on epidemiology

This classification is a very important stage in the management of the epidemic, which should be done on weekly basis depending on the number of and availability of the laboratory results and the

magnitude of the epidemic. This will indeed help to make the final classification of each suspicious case Ebola or Marburg.
The classification will concern only cases still classified as "**suspicious cases"** after classification based on the laboratory results (see previous point). It requires obtaining further epidemiological information on the case: clinical data, data on the different contacts, duly completed case investigation form or well kept and up-to-date register.
It should be done during a classification meeting by the surveillance team, with the support of the case management team, for the clinical monitoring and laboratory aspects.
Each suspicious case should be examined individually, by reviewing its investigation sheet, laboratory results, its contacts, its clinical monitoring, its outcome for the final classification. In case the doubt persisted, the team would be advised to rely on epidemiological common sense.
In the final classification, the suspicious cases will be classified as "**confirmed case**", "**probable case**", "**No case**" or "**indeterminate case**".

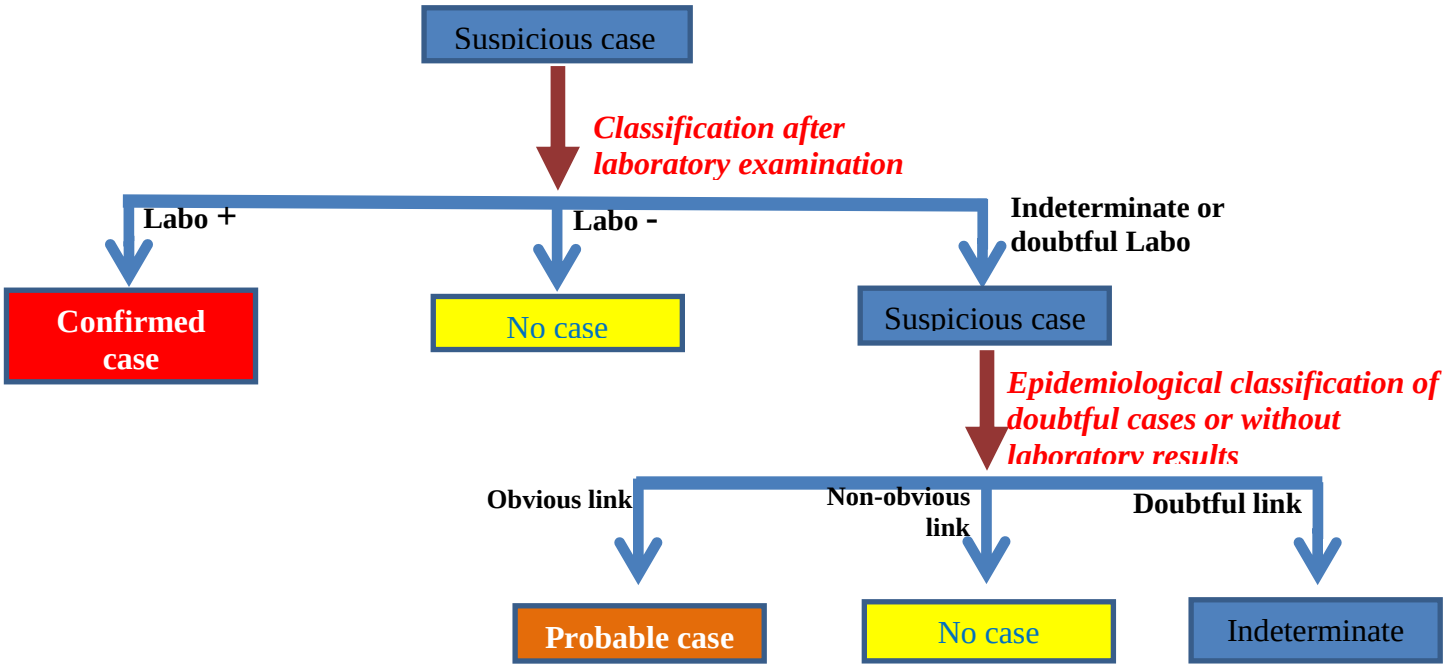


Figure 9: Classification tree of suspicious cases of Ebola or Marburg epidemic

8.4 Annexes relating to the laboratory

8.4.1 Annex 11. Procedures for collecting samples from patients suspected to be suffering from Marburg or Ebola virus viral haemorrhagic fever

Any diagnosis of suspicious cases of viral haemorrhagic fever according to the case definition should be confirmed if possible by the laboratory test by respecting the procedures for sampling, conservation and transport described below:

A. Sampling

1. Precautions

1.1. Take personal protection measures, including wearing of gloves, masks, gowns, protective goggles;
1.2. Respect the sampling technique depending on the nature of the sample.

2. Instructions for each rule

2.1. Take personal protection measures, including wearing of gloves, masks, gowns, protective goggles;
2.2. Patient contact with the staff that is not indispensable should be reduced to the minimum;
2.3. Use gowns, gloves, surgical masks, protective goggles to protect the eyes, and caps;
2.4. After each contact with the patient or his excrements or secretions, systematically rinse hands with a disinfectant and wash them with water and soap.

3. Serum sample

3.1. Sampling with needle or syringe or crayo-tube

1. Adopt aseptic procedures
2. Take the serum preferably with gloved hands, disinfect the sampling place
3. As soon as the veins become rigid, inject a vein and collect 5 - 10 ml of blood
4. Untie the band and remove the needle, taking care to ensure the haemostasis
5. Take the Vacutainer sample tube
6. Disinfect the stopper of the tube
7. Insert a needle through the stopper and decant the blood from the syringe to the tube
8. Label the tube containing the serum (serial, name and date of sampling);
9. Keep in refrigerator or freezer pending shipping (as soon as possible).

3.2. Sampling with a needle mounted on Vacutainer tube

- Adopt aseptic procedures;
- With gloved hands, disinfect the place to be sampled;
- Tie a band at the place to be sampled;
- As soon as the veins become rigid, place the needle on the holder (vacutainer holder) and place the Vacutainer tube inside up to the level of the circle at 1 cm at least from the bottom of the holder (vacutainer holder);
- When you are sure of having injected the vein, push the vacutainer to the bottom of the handle and collect 5 - 10 ml of blood;
- If blood does not flow into the tube, it means the needle is not in the right. Hence, remove the tube to the level of the circle. Then remove the needle and start the operation all over;
- In case the blood has been collected, remove the band;
- Remove the vacutainer tube containing the blood;
- Finally, remove the needle, taking care to ensure the haemostasis
- Place the tube containing the blood in a horizontal position to ensure coagulation and radiation of the clot;
- Label the tube (serial, name and date of sampling) and place in a case tube holder;
- Place the tube in order in the box intended for the transport,

- Keep in refrigerator or freezer pending shipping (as soon as possible) to first-level reference laboratory for centrifugation **(only to be done in the reference laboratories or by qualified technicians and using sampling equipment according to the modalities in the Annex).**

Precautions for the person

Give a serial number and complete three information sheets, two of which will accompany the specimen and the third filed.
All the instruments and other materials used for taking samples from a patient suffering from viral haemorrhagic fever shall be disinfected.
Metallic instrument should be sterilized by flaming; three other materials shall be soaked in a hypochlorite or formaldehyde solution before being washed with soap and water and put in a steam pressure cooker or plunged in boiling water for 20 minutes.
Do not forget that the disposable equipment is recommended.

B. Directives on the conservation of samples

- Before dispatching them, the samples will be conserved in the freezer or refrigerator, at 4°C to –20°C and handled with the usual care for a contagious biological product;
- It is possible to send samples intended for serological analyses in dry ice or under refrigeration if the period of transportation does not exceed three days;
- The samples intended for cultures should be maintained at –20°C and shipped in dry ice packaging.

Precautions: Never freeze whole blood.

C. Transport of samples

The packaged and well conserved samples shall be sent to the first-level reference laboratory by using every means to ensure maximum rapidity. A message will be sent by radio or any other communication means to the provincial, central and national authorities and the reference laboratory to inform them about the arrival of the samples.

DS/ZS ⇒ PROVINCIAL LAB ⇒ NATIONAL LAB ⇒ REGIONAL/GLOBAL LAB

Note: Use the shortest channel.

8.4.2 Annex 12. Triple packaging of samples

- Place the recipient (Rec.1) directly containing the sample or the closed and sealed tube in the metallic container with screwed cover (Rec. 2).

- Fill the empty spaces at the bottom and on the sides and on the top with an absorbing material and solidly screw on the cover.
- Place the metallic recipient in the outside carton box (Rec.3). In the absence of a carton box, a tin will be used.
- Place in the tin or outside carton a correctly completed accompanying notice. The notice will also mention the following information about the patient: surname, first name, post name, age, sex, date of outbreak, initial diagnosis and address (health zone, locality), date of sampling, nature of sample, number of the specimen.
- Ensure that the package is air tight.

Figure 10: Triple packaging

8.4.3 Annex 13. List WHO collaborating centres for diagnosis of Ebola or Marburg VHF.

WHO Collaborating Centre for Reference and Research on Viral Haemorrhagic Fevers and Arboviruses
National Institute for Communicable Diseases
Private Bag X4
Sandringham 2131
South Africa
Tel: +27 (0) 11 386 6382
Fax: +27 (0) 11 882 37 41
E-mail: januszp@nicd.ac.za

Centre International de Recherches médicales de Franceville
BP 769
Franceville
Gabon
Tel: +241 (07) 85 06 13
Fax: +241 67 70 95
E-mail: Eric.Leroy@ird.fr

Kenya Medical Research Institute (KEMRI)
P. O. Box 54628
Nairobi
Kenya
Tel: +254 (02) 2722541 Ext. 3391
Mobile: +254 (07) 22 759492
E-mail: RSang@kemri.org
E-mail 2: Rsang@wrp-nbo.org

Uganda Virology Research Institute
Plot 52-59 Nakiwogo Road / PO Box 49
Entebbe
Uganda

Bus: +256 (41) 320 387
Mobile: +256 (75) 650 251
E-mail: arbovir@infocom.co.ug

Centre collaborateur de l'OMS pour les Arbovirus et les Virus de Fièvres hémorragiques
Institut Pasteur de Dakar
BP 220
Dakar
Senegal
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8.5 Annexes relating to health

8.5.1 Annex 14. COMBI and responses to outbreaks in Africa.

COMBI is a planning and implementation framework that helps to incorporate behavioural and social communication interventions into public health programmes. This tool integrates lessons drawn from five decades of communication in public health and marketing of the private sector.
The COMBI method relies on the knowledge, understanding and perception that people have of the recommended behaviour. It supposes lending an attentive ear to people and their understanding of the behaviour proposed as well as real and perceived factors, likely to impede or facilitate the adoption of the behaviour. The use of the COMBI method will help you to react more quickly and appropriately in case of an outbreak by enabling you to: understand quickly the difficulties associated with the control of the outbreak from the point of view of the communities exposed; ensure that people (patients, high-risk groups and others) take the appropriate measures during an outbreak; encourage people to support activities aimed at controlling the outbreak; and make more efficient use of available human and financial resources.
The main objective of COMBI is to obtain some behavioural results, and each COMBI plan must be based on this imperative. The typical response to a crisis most often consists in producing messages, pamphlets, posters, T-shirts, radio or televised announcements, without seeking to determine whether these materials are adapted to the expected behavioural response and without really undertaking the requisite prior research. COMBI relies on two major guiding principles to investigate an outbreak and plan the interventions: fixing the preliminary behavioural results before producing materials like posters, brochures or radio messages; and conducting a quick market survey to fine tune the expected behavioural results and determine the optimal way of winning the interest of people for the recommended behaviours. The expected behavioural results should be examined, refined and amended to reflect the results of the market survey. It may be necessary to repeat the process several times before obtaining satisfaction.

Below are the seven stages of the COMBI strategic planning:

- ✓ Stage 1: Formulate your preliminary behavioural objectives
- ✓ Stage 2: Conduct a quick market survey to define the preliminary behavioural objectives
- ✓ Stage 3: Refine the behavioural objectives, state the communicational objectives
- ✓ Stage 4: Conceive an integrated strategy
- ✓ Stage 5: Develop the implementation plans and a budget
- ✓ Stage 6: Ensure the implementation and monitoring of the interventions
- ✓ Stage 7: Make an assessment of the situation once the outbreak is over.

The following case study will help us to clearly understand the importance of the implementation of this approach in resolving problems during previous epidemics.

Application of the COMBI method in the fight against Ebola virus haemorrhagic fever in Yambio, South Sudan.

Introduction

It required some time to determine how an urban dweller was infected by the Ebola virus in South Sudan in April 2004. Under the effect of the civil war and the relatively high population density, game around Yambio was less abundant. A little after the end of the outbreak, Armin Prinz, medical anthropologist, confirmed that a 23 year old radio technician, who went hunting with a gun he manufactured himself along the border with the Democratic Republic of Congo and Sudan shot two baboons. As per the custom of the Zandes, he probably consumed the meat raw or just grilled. Two weeks later, he became feverish, and later had skin rashes, accompanied by vomiting and blood in his stool. He was initially admitted in hospital and later sent home, where he eventually died. His father, who washed the body developed the same symptoms and died. His mother, sister and uncle also fell sick. The mother and the sister recovered, but the uncle died. The hospital staff who treated the first patient, unaware that he was highly infectious, were also infected by the virus and they in turn contaminated their family. Ebola is a highly infectious virus, which is quickly transmitted by direct contact with blood, secretions, organs and other body liquids of infected persons. If the behaviour required for halting the spread of the virus is simple, it has a high social and cultural cost. Normal social practices that unite families and communities, such as caring for the sick and burying the dead have become the most effective modes of transmission of the disease. There is currently no treatment or specific vaccine against the disease and public health measures recommended are strict isolation, with caring for infected persons in isolation, and active surveillance, which consists in searching for persons who may have been in contact with the infected person and visiting them each day during the period of incubation of the virus (21 days) to see whether they show symptoms and, eventually, isolate them and provide them with palliative care. Social mobilization and communication interventions are necessary for informing the affected communities about the nature of the disease and measures for curbing the outbreak, what they can do to protect themselves and also protect their family and their community. It is important to convince them to take the appropriate measures.

Response to endemic outbreaks

South Sudan has experienced epidemics and outbreaks of many more or less current diseases. When rumours started circulating about the spread of a mysterious infection in a community in the south of the country and, a few days later, when members of the hospital staff started falling sick, the WHO early warning rapid intervention system was activated to detect, confirm and fight suspected outbreaks within 24 - 48 hours. Researches were carried out and response activities deployed. The District Commissioner quickly set up a crisis management committee to direct the response, with the help of four technical sub-committees responsible for: case management, surveillance, social mobilization, and logistics and security. The crisis management committee included heads of health and education department, religious leaders, heads of local public authorities and representatives of organizations (WHO, UNICEF, Centers for Disease Control and Prevention of the United States of America, and *MSF*). The social mobilization sub-committee coordinated the work of 21 teachers, pastors and volunteers who had already participated in community mobilization for polio and measles control campaigns. They had a vehicle equipped with a loudspeaker system, which enables them to publicly address the local communities, but it was difficult for them to answer questions from members of the communities and were at times met with hostility. Posters were distributed to health centres while letters and information documents

were sent to all religious and public leaders, soliciting their support. There were, however, real problems, underscoring the fact that an outbreak is a dynamic phenomenon, which requires constant attention and permanent adaptation of the activities and messages in response to the concerns of the community.

Market survey

Social mobilization activities were initiated immediately after the outbreak and, in June 2004, external support was provided to the local committee through the WHO Global Alert and Action Network in case of an epidemic. The first stage consisted in listening to peoples' views, what they felt and understood about Ebola outbreak and control activities, and what they were doing and not doing (and especially why) to protect themselves during the crisis. Quick interviews with key informers and group discussions were organized with the social mobilization workers, health personnel and other members of the response teams, including surveillance agents and people in markets and churches. At the same time, data were collected on the daily life of people – what they were doing and with whom were they are in contact – in order to choose the places and appropriate channels of communication and sources of credible, authoritative and reputable information, which could best convey the messages and promote collective action. Observation-base search was conducted to know how persons in charge of social mobilization carried out their activities and what support could be provided to them. The reaction of local authorities and activities of the social mobilization team helped to ensure strong sensitization on the outbreak. The efforts made to convince people and persuade them to take the necessary precautions were thwarted by a number of obstacles. First of all, in view of the absence of communication infrastructure, notably radio, newspapers and telephone, it has been extremely difficult to circulate the information. Secondly, the people were not convinced about the responsibility of the Ebola virus, for this outbreak affected less people than previous outbreaks. And, thirdly, people feared the isolation unit, and they hid their disease from the surveillance teams, refusing that members of their family die alone and be deprived of a suitable burial. Finally, there were rumours that they could not see their deceased relatives, since skin and blood samples are taken from them and sold. Some families, wrongly believing that such practices would protect them from the disease, refused to leave their home between 17:00 and 07:00, which "cost" them a great deal.

Key behaviours

One of the priorities was to define a maximum of three forms of preventive behaviour aimed at protecting people and their family. It was relatively easy to make a long list of practices to be avoided, but it was difficult to set priorities and present behaviours as positive actions. Key behaviours to be adopted were agreed upon at the end of consultations between technical staff and staff in charge of communication, and social mobilization messages were developed on that basis. People had to contact the Ebola control team within the 24 hours following the appearance of the symptoms.

The spread of the disease could indeed be rapidly stopped through early detection and diagnosis, and appropriate treatment. Patients were also encouraged to remain in their homes and refrain from attending gatherings and community meetings. Persons caring for them should protect themselves and avoid any direct contact with their body fluids, and the other members of the family, particularly children, should be kept away from the patients. The tradition that consists in sleeping near the deceased and touching his body was proscribed during the crisis. Members of the community were also encouraged to regularly wash their hands and ensure that they consume only well cooked food. They were advised not to shake the hands of patients or share utensils with them and collect dead animals from the forest.

A many-sided integrated mobilization and communication strategy

WHO's COMBI framework served as a planning tool for adapting and intensifying existing interventions while conceiving new ones. Villages likely to host Ebola cases were targeted and other activities were conceived for a wider public. The success of the strategy depended on the persons in change of social mobilization: it was an already committed team of pastors, teachers and community development agents, who travelled on daily basis to talk with people at home, in markets and restaurants, and churches. The objective was to help them to better dialogue with the local communities and encourage the people to reflect on how the recommended (individual and collective) behaviour could check the spread of Ebola and end the outbreak. They were assured that, without their efforts, the crisis could go on. The impact of the social mobilization team increased when survivals of the Ebola outbreak joined it to share their experiences with members of the community. The communication materials and messages, without being the point of departure of the strategy, were selected and developed for specific purposes, on the basis of the market survey, and they were associated with other activities. The expected effect was not only "education" or "sensitization", but the community action.

All the COMBI communication interventions: Sensitizing the public: mobilizing policy-makers and administrative structures:

The support provided by the administration of the committee to the authorities and religious leaders was intensified when the Commissioner requested them to strive to put an end to the worrying rumours.

The religious authorities were requested to remind their members about the key behaviours in their usual sermons and to tell them that they would be informed by the health authorities as soon as the crisis ended so that they could resume their normal practices. The social mobilization agents conceived a table of visits to all churches and they addressed many assemblies, speaking about the outbreak, ongoing control measures, the importance of remaining vigilant and acting collectively, and the need for early notification and diagnosis. They also insisted on the specific risk facing people who catered for patients.

Community mobilization

Meetings were organized with the chiefs and local communities, notably traditional leaders, in areas where there could be many potential cases. People were encouraged to ask questions, and these sessions were lively. Survivors of Ebola also spoke and answered questions. Where possible a door-to-door mobilization was conducted after the meetings. Information materials were given to the agents in charge of mobilization to distribute them whenever they had the opportunity, which gave them the confidence to approach people and as well as reason to solicit their participation. Markets were the preferred places for talking to the public, distributing the fliers and holding discussions with the agents in charge of the mobilization. Teachers were initiated to the measures for combating Ebola and posters were distributed to them for their schools.

Personal sale: mobilizing local networks and spokespersons

The social mobilization agents were trained in basic verbal and non-verbal communication techniques, and they learnt how to respond to difficult questions and how to speak in public. Initially, the microphone remained in the van so that members of the community could not ask questions; then the microphone was brought out. At a time, the credibility of the agents in charge of mobilization was put in doubt because, while dialoguing with the community, they made their purchases; this practice was stopped, and they concentrated on their work. The agents were also trained by the health personnel, to whom they could ask the questions that did not feature on the

question-answer sheets that were distributed to them, but that were being asked by the members of the community. They were also shown the isolation wards (from outside), so that they could directly observe the structure and the process, and assure members of the community. Special T-shirts were distributed to them for the population to know that they were associated with the action deployed and that they were part of the Ebola control team. This enhanced their credibility among the communities and boosted their self-confidence and their pride to accomplish this task. A pamphlet on the basic questions and rumours in circulation was produced in the local language and distributed. A picture painted by an artist showed the isolation ward, showing that the fence was quite low so that families could see the patients and speak to them without touching them. There were also photographs and testimonies of persons who had survived Ebola after their treatment in isolation, and who strongly recommended to families and people to protect each other during crisis. The local Bishop took upon himself to advice families who had lost many relatives, showing empathy and allowing the families to express and share their grief, without asking indiscreet questions or asking them for blood samples.

Promotional and publicity materials

Banners were placed in local markets, health centres and churches to remind people about the importance of remaining vigilant during the crisis. Agents in charge of social mobilization made announcements in the evening, when people had returned from the farm.

All the materials were of the same colour so that people could easily associate them with the control programme. The colour selected was the colour of hope, presaging a positive event.

Lessons

One of the main lessons drawn from the crisis that affected Sudan in 2004 is that the effectiveness of the social mobilization, communication and outbreak control strategies relies on quality listening. The communication is not only limited to transmitting messages; it is a process expect to produce results (curbing the outbreak), which encourages dialogue between all actors associated with the response to the outbreak, starting with affected members of the community. An attentive listening can improve relations, restore confidence and enhance transparency. The real challenge, however, is the reaction to the information and knowledge acquired from this listening or their transformation into appropriate actions.

8.5.2 Annex 15. Medical anthropology and responses to outbreaks of Ebola and Marburg in Africa

During Ebola and Marburg epidemics occurring in Africa, anthropologists have been associated with international responses in different fields of activity: during epidemiological surveys and surveillance activities; by supporting care and treatment of patients and families, and assisting with the organization of safe funeral rituals; in the dialogue with traditional leaders; and in the orientation of the sensitization and social mobilization activities.

In public health in general, and during epidemic control operations in particular, there is always coexistence of two opposed poles, which are of variable importance depending on the circumstances: an authoritarian coercion pole and an empathic pole. The coercion pole tends to consider only viruses and organs, individuals or anonymous populations, whose view is of little importance. The empathic pole highlights the specificities of the persons and populations, striving to get the greatest number of persons to enjoy privileges usually reserved for families and friends and relations.

Medical anthropology contributes to the success of the epidemic control operations in several fields:

- improving knowledge of the transmission chains of the disease;
- determining the behaviours of local populations in their psychological, social and cultural diversity and proposing appropriate interventions;
- dealing with rumours and terrors caused by Ebola and Marburg epidemics;
- humanizing the interventions, striking a balance between authoritative establishment of health measures and empathic approaches.

A) Improving the knowledge of chains of transmission of the disease

For 11 out of the 17 Ebola epidemics identified by WHO, the reconstitution of the epidemiological channels is clear. The following stages were documented by chronological order: epizotic disease in gorillas or chimpanzees causing high mortality / a team of hunters killing a contaminated animal or collecting the carcass of an infected animal / some days later, a member of the team falls sick, often the one who transported or cut up the game / contamination of the companion of the patient in close contact with infected body fluids / contamination of persons who are physically and psychologically closest to the patients, not put off by the management of the vomiting, diarrhoeas and bleeding (sisters, mothers, spouses, family and friend care providers, medical personnel, religious leaders and traditional healers) / contamination of new persons, directly by the care providers or through accidental exposure to contaminated medical equipment / nosocomial proliferation of the infection / contamination of dead body washer(s) and persons who came to handle and touch the dead body to express their grief / etc.

The chains of transmission of the disease cannot be reconstituted with precision without ethnographic knowledge of peoples' behaviour, both on ordinary days and during ceremonies; at home and at work; in the farm, in the forest or in the "city"; in the home of the traditional healer, the pastor or the biomedical care provider.

Three months after the end of the Ebola epidemic of Yambio in Sudan in 2004, an anthropologist and specialist of the Azande helped to find its origin which had remained mysterious: a baboon found dead in the forest during a hunting expedition on the other side of the border in the Democratic Republic of Congo (DRC) by a bank employee living in Sudan. This information was capital for understanding the origin of this Ebola epidemic and shut the door to sceptical, mystical or political interpretations on its origin.

During the 2007 Ebola epidemic in DRC, an anthropo-epidemiological investigation helped to describe a model with transmission of the virus from the bat directly to man, without passing through non-human primates. Indeed, the area of emergence was situated near one of these great African rivers regularly crossed by huge migrations of frugivore bats. One single gunshot can kill more than ten bats during their diurnal feeding stopovers on an island, in a forest gallery rich with fruits, notably near former colonial oil palm plantations abandoned or partially fallow. In 2007, a few weeks before the emergence of the virus, during an important seasonal migration of bats, the human population in the environs had at their disposal abundant meat, which may have given the Ebola virus the possibility of moving from animal to man.

However, it should be stressed that in six Ebola epidemics out of 17, no man/wild animal contact was registered. Similarly, concerning the Marburg virus, human/bat contact of the index case

(European traveller, native miner) was found in only seven out of nine epidemics. During the 2004-2005 epidemic in Angola, which killed 329 persons, no animal was found to be at the origin of the human contamination.

Do these uncertainties about the origin of the epidemics reflect inadequacies of the epidemiological investigations, or enigmas on the natural cycle of the Ebola virus? Since the discovery of the Ebola and Marburg viruses, the knowledge has made progress, but with still vast areas on uncertainty unknown concerning vaccine, treatment, virus reservoir, inter-species transmission, virulence acquisition, contamination and different morbidity of the persons exposed to the same strain of virus, unapparent infections, etc.

The anthropologist therefore contributes to give a psychological and social sense to the chains of transmission of the disease and the history of the disease, case by case, through knowledge of the individuals and companies concerned, behaviours, mentalities and local customs, licit and illicit, said and unsaid.

B) Analyse the behaviours of the local populations in their sociocultural diversities and propose appropriate interventions.

The human factors responsible for the spread of the Ebola or Marburg virus could include:

- hunting during the epidemic, notably of primates;
- consumption of animals found dead ;
- social funeral rite imposing intensive manipulations of dead bodies;
- inadequate training of nursing staff in microbiological hygiene;
- unavailability of gloves and disinfectants in health centres;
- negligence in the organization of hospital hygiene against the backdrop of lack of resources and materials;
- poor observance of the populations and/or questioning and/or refusal and/or unsuitability of the health prescriptions;
- denial of the virological model for the benefit of theories involving both a divine will and actions of non-human beings and persons endowed with supernatural powers or criminal investigations in the laboratory;
- the vindictive feelings of victims as regards the evaporation of considerable financial resources mobilized for the epidemic, from donors to themselves.

In this context, the role of the anthropologist is to look beyond this, break ethnocentrisms, exceed the social distance, study the culture of both those receiving care and the care providers, to get the latter to understand (which does not mean approve) the point of view of the other and imagine living their experience. In an epidemic situation, the anthropologist is a “cultural translator”, a “spokesperson” of the victims and the population, but also the care providers, notably the junior staff (Red Cross volunteers, community health workers, among others), whom we forget to listen to and remunerate. Quite often, he/she reveals emotions and latent anguish of the medico-social personnel, verbalized or not, which thwart the action.

The role of the anthropologist is also to establish dialogue with religious and traditional leaders, notably those who deny the existence of the virus and its modes of transmission. It involves

assessing the dangerous nature of their practices (use of multiple-use injectable materials, scarifications, imposition of hands, purgatives, emetic, etc.), sensitizing them on the risks incurred by them and their adepts. Whatever their conviction, experience has shown that they willingly accept donations of disinfectants and gloves and that they rapidly learn to use them for their own protection. According to the local context, at the request of the interested parties and customary and institutional authorities, it is advisable to solicit the collaboration of traditional leaders in providing psychological and social support to their patients. As in the case of other opinion leaders, it is important to associate them with the mobilization and social sensitization. This last point is delicate to manage, for without discernment, there is a risk of ensuring the promotion of imposters and supporting those who deny scientific explanations.

Anthropologist should quickly decode the local material and symbolic rules of the contamination (daily hygiene, salutations, treatment of fluids and waste, uses and representations of blood, rules on contact with patients, funeral practices, etc.). He has to understand how this “new” disease and its various symptoms find their place in local medical thinking systems. He/she should quickly identify the different systems for care and treatment of the disease and the misfortune, notably those that are available and active locally: familial, popular, technical, public and private biomedical, ethnic, religious, para-scientific, mystical, etc. Finally, he/she should recognize their actors, notably opinion leaders, religious leaders, traditional leaders, associations and NGOs.

These local disease management systems propose not only remedies, but also intelligible explanatory models to the greatest number of people about the causality of the misfortune. They help to give meaning to individual and social misfortune. Supernatural or evil attacks, breaking prohibitions, non-respect of the social, ecological or religious order, or even theories of a conspiracy are always invoked, with all the associated adequate rituals and remedies. Each school of thought wants to demonstrate, through the epidemic, proof of the soundness of its theories and practices.

The credibility of models mentioned is enhanced by the frequent dysfunctions, or even the carelessness of the political, administrative and health authorities. Besides, a good number of scientists do not know how to question their models or integrate human factors into their reasoning.

Anthropology, a “cousin” of clinical and social psychology, helps to understand individual and collective behaviours, considered irrational, absurd from the point of view of biomedical rationality, not only in Africa, but also in other continents, for example, in France in Dombes in 2007 (avian flu in wild birds).

Indeed, the epidemiological, statistical and genetic explanations do not answer the first question of the individual and the society: why now, why me and not the other person? What is the relationship between the different events that affect me, my friends and my enemies?

Even with treatments and vaccines and all the more without, the biomedical model is only an explanatory model among others, paving the way for any psychological, social, economic and political use of the tragedy, conscious and unconscious, what is said and not, honest or dishonest. The management of the tragedy, biological or not, and also a disaster, is always a competition of knowledge and power between the authorities of a universe based on the existence of viruses, germs and other molecules and the authorities of world based on inherited or acquired mystical

powers, supernatural beings, “witches-murderers” and divine interventions. It is an ideological and religious confrontation, between science and “para-science”.

During epidemics of Ebola virus or Marburg VHF, many explanatory models coexistent, but with each time specificities based, not on the type of supernatural explanation given, but on the partisan interests they serve: inter-linage settlement of scores, between young and old, with in-laws, between neighbourhoods and/or villages, between tribes, faiths and religions, between natives and foreigners, between local officials and national authorities, between Africans and “Westerners”, between political forces and economic forces, etc.

The sociopolitical analysis of the causality models available shows that they help, consciously and/or unconsciously, to defend social orders, partisan interests, whether at the level of the affected family, villages, towns and regions, or regional, national and international political and economic powers.

The presence of anthropologists helps to better anticipate the effects of the proposed measures for controlling the epidemic: it avoids being surprised by social and political, individual and collective uses of the tragedy, notably in terms of stigmatization of the individuals populations affected and/or deemed responsible for the spread of the epidemic.

The risks of diverting the work of anthropologists by the powers in place are considerable. Resorting to anthropologists should not be a superficial attempt at listening and having dialogue with the communities, concealing the real basic problems constituted by precariousness and poverty.

Immediate return is often expected from anthropologists, but they are not given enough time to conduct their surveys. They are immediately engaged in an operational practice, for example the organization of health education sessions, forgetting to take into account local specificities. When their observations lead them to question the methods and management of resources engaged in the operations to control the epidemic, or even reveal the dysfunctions of the national and/or international institutions, they have difficulty getting the authorities to accept their analyses.

C) Dealing with rumours and “terrors” caused by Ebola or Marburg epidemics

Ebola and Marburg are highly contagious diseases which are deadly for 25 - 90% of patients. Epidemics are generally localized in terms of space and unpredicted. They undermine human solidarity because of the danger posed to close relatives and those providing care for affected persons. Death occurs after a short, painful illness, with impressive symptoms (fever, diarrhoea, vomiting and especially exteriorization of blood).

The disease is terrifying for people from all walks of life. Public health interventions such as isolation of patients or safe care can compel families to hide the patients, sometimes abandon them, or patients to hide at home or run away. A good number of health workers, at times impoverished by arrears of unpaid salaries, terrified by the death of colleagues, abandon the hospitals. The local epidemic control teams are powerless to act, so long as the national and international material and human resources (ministry of health, Red Cross, WHO, MSF, etc.) have not arrived.

The response to Ebola or Marburg epidemics is based on drastic health measures which can interfere with individual and collective liberties: creating isolation wards, banning unprotected burials, banning the consumption of the main source of protein (bush meat), and restricting gatherings and travel... The isolation of patients in safe places, when you want to avoid nosocomial contaminations, both of those offered care and care providers, is complex and expensive to organize. Safe burials, organized without taking into account customary funeral rites, often in the absence of the family, at times in anonymous tombs, or even mass graves, provoke the anger of the population.

Political and administrative constraints, notably regarding mobilization of funds, rivalries between persons, the different national or international institutions, nongovernmental organizations, research teams, laboratories, complicate the organization of the response to the epidemic. When the latter is put in place, dysfunctions persist, against the backdrop of scientific uncertainties, difficulties in communicating with poor local populations, antagonistic political and economic interests. Furthermore, the local context of the places of emergence of the virus is always dominated by economic, health and medical under-development, including, in some countries, aftermath of armed conflicts.

Without mobilization and sensitization adapted to the populations concerned, the respect of the health measures is poor: when you want to infringe a ban, which is not understood or considered non relevant, arbitrary, or even discriminatory, the peripheral byways are many.

The usual “spontaneous” non-verbal communication gestures – shaking hands, touching the interlocutor, sharing drinks and food, travelling in the same vehicle – are most often banned. The safety instructions imposed by the risk of transmission of the virus urge the intervening teams to limit the contacts, to maintain a physical and psychological contact with the population, which further increases the social and cultural distances.

Also, doubt may emerge, voluntarily or involuntarily, sustained by some people, both on the existence of the virus and on the actual intentions of the health care workers. The latter are then mistaken for politicians who show up only during election campaigns, religious leaders, traders, loggers and miners, and even repressive armed forces. During each epidemic, the intervention teams are confronted – at least – with poor observance of their prescriptions, but also with the defiance of the population, with manifestations of verbal hostility, or even physical attacks. They are accused of indulging in human experiments, evil manipulations, notably with taking of blood or removal of tissues from dead bodies, during laboratory tests and burials. Yet, blood in sub-Saharan Africa, as recalled in may works on the anthropology of AIDS, is a major vital fluid, object, more symbolic than physical, of the desire of human and non-human evil doers, and witches. Its acquisition is considered as necessary for accession to wealth or maintaining great notables and politicians in power.

It is then impossible for actors of the response to the epidemics to resolve these problems with the usual concepts. The coercion tools are not functioning and there are no trans-cultural communication tools for an empathic intervention.

It is for these various reasons that WHO decided - and succeeded in convincing its international and national partners – to systematically add medical anthropologists to the first international intervention teams during Ebola and Marburg epidemics.

D) Humanizing the interventions, finding a balance between the forced establishment of health measures and empathic approaches based on sensitization and mobilization of the individual and the society.

One of the important contributions of anthropology is to seek to favour approaches based on sensitization and mobilization of the individual and the society, taking into account the knowledge and practices of users and striving to obtain a real informed consent. To be efficient, the coercion measures should be supported by the interested persons, failing which they will not be applicable nor applied. Without having the monopoly, in all stages from the reflection to action, the anthropologist sees to the respect of the rights of the individual and his family, often relegated to second place in the name of urgency.

The Ebola or Marburg epidemic: it is imperative to isolate patients in a safe medicalized structure. When the patient or his family refuses the hospitalization or where this health structure does not exist, it is necessary to win the confidence of the patients and their family, by organizing at home the establishment of measures for controlling or reducing intra-family transmission, by giving them the instructions and adequate material resources (gloves, masks, disinfectant products, treatments) (Annex 17).

When an isolation structure is put in place, it is important to ensure its transparency and it is not only preventing people from looking through the opaque external fences. Communication with the outside (family visits, telephone, radio, and others) should be facilitated. The families should be perfectly informed about improvements in the health status of patients. Details of the organization of the isolation structure and care and treatment should be communicated to the public, so as to remove doubt on risks of nosocomial infections and the quality of care.

If the medical team observes that the patient is going to die, it should first of all inform the family and then anticipate the funeral rites that should be reinvented in a manner that should not lead to further contaminations, whether as a result of contacts with the dead body or gathering of the family and the population. If the mortality is important, the structures for managing dead bodies may be quickly overwhelmed, with burials organized in the absence of the family in anonymous tombs, which renders difficult the mourning and fosters outbursts of violence, which risks compromising the operations for controlling the epidemic.

There is also need to anticipate the post-traumatic symptoms of surviving patients, their families and the local medico-social personnel. The latter suffer twin punishment, first of all, regarding the virus, they are often stigmatized after the epidemic, accused of illicit profits and especially treated as witches.

The anthropologist, therefore, plays an active role at all times and levels of the sensitization and social mobilization, whether by helping adapt the modes of communication and messages in the local context or by taking into consideration the opinions of the recipients, notably neglected populations, for example women and native minorities.

Note: An additional contribution from the anthropologist is to assist the Behavioural and Social Interventions Sub-committee to develop the different communication materials (hard copies, audio, video), notably by getting information from the computerized data bases (scientific articles, drawings, posters, photos and videos in real situation).

It should be noted that an important additional contribution from the medical anthropologist was the production of anthropological videos, relating notably to safe and humanized funeral rites, which were disseminated both during epidemics for the social mobilization and in the framework of the permanent vocational training between epidemics.

8.6 Annexes relating to care and treatment of patients

8.6.1 Annex 16. *Aide-mémoire* on the basic measures against the infection in hospital setting

http://www.who.int/csr/resources/publications/EPR_AM2_FR3.pdf

8.6.2 Annex 17. *Aide-mémoire* for a risk-free management of waste produced by health care

http://www.who.int/mediacentre/factsheets/fs253/fr/

8.6.3 Annex 18A. Safe care techniques for care and treatment of Ebola or Marburg patients

http://www.who.int/csr/bioriskreduction/filovirus_infection_control/en/index.html

8.6.4 Annex 18B. Models of design of isolation facilities in case of outbreaks of Ebola or Marburg

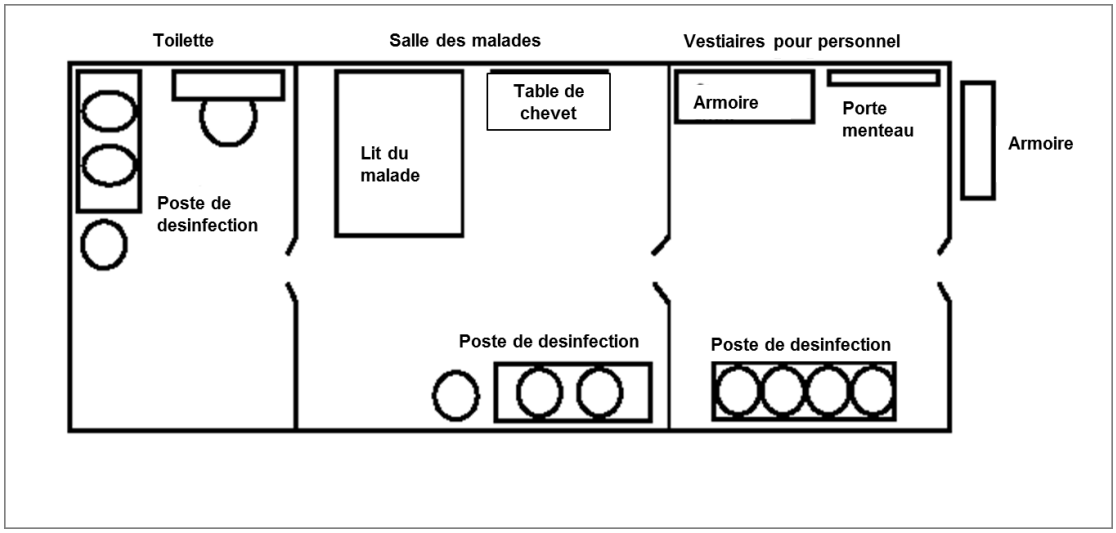

Figure 11: Model for isolation of a single case

Toilets **Patients Ward** **Dressing Rooms for Staff**

Disinfection Room **Patient's Bed** **Bedside Table** **Wardrobe** **Coat Hangers** **Wardrobe**

Disinfection Room **Disinfection Room**

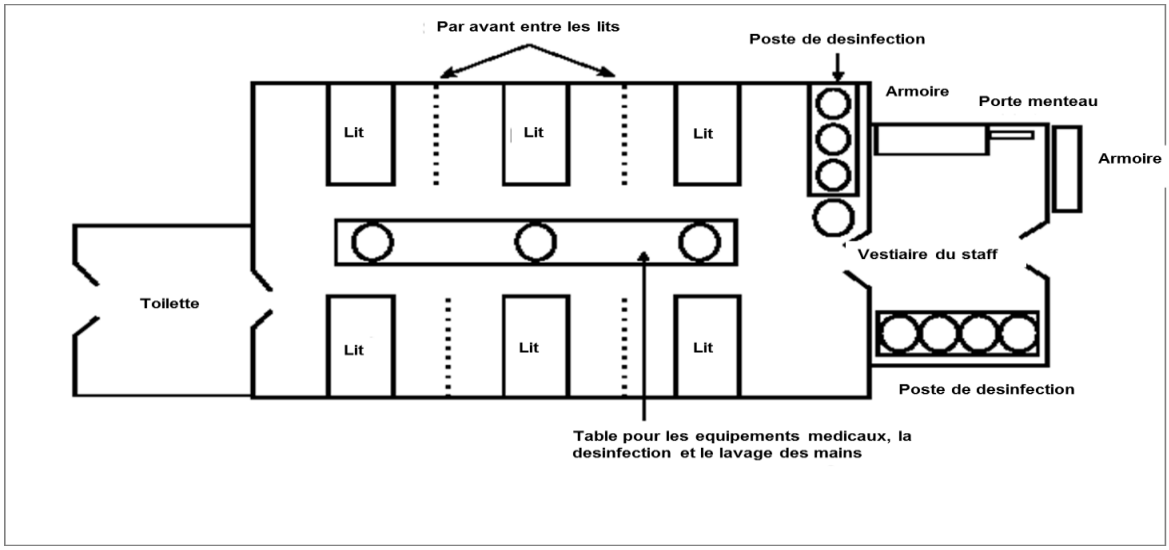

Figure 12: Model for isolation of several patients

Partition between beds **Disinfection Room**

Wardrobe **Coat Hangers** **Wardrobe**

Bed **Bed** **Bed**

Staff Dressing Room

Bed **Bed** **Bed**

Disinfection Room

Table for medical equipment, disinfection and washing of hands

8.6.5 Annex 19. Strategy for reducing biological risks in home setting

1. Introduction

The strategy for "reducing risks of transmission of filoviruses for patients treated at home" was developed during the Ebola epidemic at Kelle in 2003, and it was successfully used during subsequent epidemics.

The objective of this strategy is to reduce as much as possible the transmission of Ebola or Marburg within families that refuse that their suspicious patients be hospitalized. The strategy does not guarantee total protection of members of the family and is certainly not the best choice to offer care to patients. However, it should always be proposed to families who could be tempted to stop any communication with the medical teams, or who could hide or move their patients and thus displace the epidemic underground.

The strategy for reducing risks of transmission at home should be instituted only in two cases:

1. If the patient (or his family, in case of disability of the patient) categorically refuses to be treated by the isolation service of the hospital;
2. If access to a hospital isolation service.

It should be seen as a means of communication with the families so that they later accept that the patient be cared for in a hospital isolation service is not possible.

The strategy is based on the supply of PPE to the families (gloves, gowns, masks, buckets, chlorinated water) and on the training of members of the family who will be responsible to care for

the patients at home. In the house, the patients are under the surveillance of a care attendant (chosen by the family) trained in the basic techniques of disinfection and in the use of PPE, and having basic information on the virus.

2. Explanation of the protocol families or the community

Ebola and Marburg are transmitted:

- If you touch dead animals or if you eat bush meat
- If you touch the patient
- If you enter into contact with the blood, vomit or stool and urine of the patient
- If you receive droplets from a patient when he is speaking, coughing or vomiting.

All direct contacts with sick patients are dangerous and should be avoided. It is preferable to treat patients at the hospital, for the following reasons:

- The chances of survival of the patient are better when the care and treatment is provided by specialized physicians, trained to avoid the transmission of Ebola and Marburg;
- The contamination of parents and persons responsible for providing care at home is avoided.

If the patient cannot be transported to the hospital, the following information should help reduce the risk of transmission of the disease to other members of the family and the community. The information will not help to completely eliminate the risk of transmission at home but to significantly reduce it.

To reduce the risk of transmission, it is important to adopt the methods based on the following general recommendations:

- Kill the Ebola and Marburg viruses by using household bleach;
- Wear gloves or use towels imbibed with household bleach to avoid direct contact with the blood, vomit or stool and urine of the patient;
- Wear a mask or use a dry towel to protect your nose and mouth from droplets emitted by the patient;
- Avoid contacts with fluids by standing behind or on the side of the patient when providing care.

3. Protocol for reducing risks of transmission at home

Use only by the person responsible for providing care.

The household bleach used for the preparation should have a minimum concentration of 2.5%.

Care and cleaning:

1. Choose only one person to provide care to the patient; this person is also responsible for preparing the household bleach solution;
2. To prepare the household bleach, put 1 quantity of household bleach and dilute it with 5 quantities of water (fill a cup with the bleach, pour it into a bucket, then add 5 times the content of the same cup filled with water);
3. The preparation of household bleach is no longer effective after one day. A new solution has to be prepared every morning;
4. To clean the bleeding, vomit, stools and urine:
   - ✓ pour the household bleach preparation on the blood, etc.;
   - ✓ completely soak a big towel in the household bleach preparation;
   - ✓ use the towel soaked in the household bleach to clean the blood;
   - ✓ put the soiled towel in a bucket and pour the household bleach preparation on it;

- ✓ soak the soiled towels in a bucket filled with the household bleach preparation for one hour. After soaking for one hour, the towels can be washed with soap and, after drying used again.

5. Never put the household bleach or preparation in the mouth or eyes of the patient;
6. The community should build a separate latrine which will be used only by the patient;
7. When the household bleach has been used and is soiled, it should be poured into the patient's latrine;
8. Always stand behind or on the side of the patient; as much as possible, never face the patient;
9. Use the towels soaked in household bleach to carry or move the patient.

After the death of the patient:

10. Use towels soaked in household bleach to place the dead body in the coffin or the tomb;
11. Clean the room of the patient with household bleach;
12. Burn or bury all the objects that cannot be cleaned and destroy especially the mattress on which the patient slept.

You should always wash hands with a preparation of household bleach after touching the patient, or after touching vomit, bleeding, stool, urine, etc. If your hands are irritated by the household bleach, you should stop using this water and another person must provide care to the patient.

All the members of the community should wash their hands with clean water and soap before eating. The same water should not use by two people. Use clean water for each person.

8.6.6 Annex 20. Protocol for reintegrating patients on returning to their family and their community

To ensure successful reintegration, in-depth discussions should be held with the families and community leaders as part of preparations for the return of survivors to the community. This return constitutes a strong signal: if the treatment is complied with, it increases the chances of cure and stops the eventual spread of the disease within families or the community.

1. Leave the unit providing clinical care to Ebola or Marburg patients

The physician responsible for the care unit should examine the patient in order to declare him convalescent and fit to be discharged. This means that the convalescent is no longer infectious for other persons and that his transfer to the house or the main hospital can be done in safety and security. A medical certificate may accompany the exit from the unit to certify that the patient does not constitute a danger for his family and his neighbours.

Before the patient leaves the care unit:

- The cleaning team will clean and disinfect all the personal effects of the patient;
- The blankets and bed sheets SHOULD NOT be taken away by the patients. The care unit will supply new items to the patients if the items used belong to them;
- The family of the patient should provide the convalescent with clothes to be worn on the day he leaves the care unit. The other clothes will be cleaned and given to the patients on the subsequent day;
- On leaving the unit, the patients should follow the prescriptions of the physician.

2. When the patient returns home

After he has been cured, the patient can feel tired for a period of one to two months. It is important that the patient:

- takes a lot of rest
- eats varied food (e.g. bread, vegetables, fruits, meat, beans)
- drinks a lot of water to rehydrate.

If the patient falls sick, particularly if he has fever, he should quickly visit a health centre to undergo a medical examination and receive treatment.

Warning: If the patient is a male, he should be informed that his sperm can still be infecting for three months after leaving the hospital and that there is a possibility of transmitting the Ebola or Marburg virus during sexual intercourse. During this period, the patient should either abstain from having sex or protect all his sexual relations by wearing a condom. The medical team should provide him with sufficient condoms. This warning should feature on the discharge medical certificate.

This return could be accompanied with donations to the (food, beddings, clothes, lamps, machetes), which will compensate the loss of their personal effects destroyed during the disinfection and offer them a basis to start a new life. Before being put in place, this strategy should be assessed with care since these donations risk stigmatizing the convalescent by creating covetousness.

The stigmatization of patients who survived Ebola and Marburg viruses was quite often documented in the field. It is necessary to conduct intensive public education campaigns to reduce it. To deal with this stigmatization, we will refer to Annex 22 of this document.

8.6.7 Annex 21. Protocol for safe burial of Ebola or Marburg victims

There is a major risk of transmission when a patient dies of VHF for, the dead body remains contagious several days after the death. The family and members of the community are also exposed to the risk if the burial rites imply manipulation and cleaning of the body.

a) Safely prepare the dead bodies

The burial must take place as early as possible after preparation of remains at the hospital. The hospital staff should:

- Prepare the body with care in order to avoid the risk of transmission;
- Strive to respect the cultural practices and religious beliefs of the family, so long as they do not result in a risk of transmission. Let the family understand that certain practices, that entail a risk of transmission should be abandoned;
- Advise the family and the community about actions to take in order to protect themselves against the disease. If the body is prepared without information nor support to the family and the community, the members of the community would not be willing to bring other relatives to the hospital for fear of not receiving the dead body once the patient has died;
- Find an influential member of the family and get him to ensure that dangerous practices like touching and washing the dead body are avoided.

To prepare the body at the hospital:

1. Wear protective clothing as recommended for members of staff of the isolation area; wear a second pair of thick rubber gloves;

2. Disinfect the body by spraying household bleach at 10% on the body and adjacent regions;

3. Put the body in a body bag, which should be tightly closed. Spray with household bleach at 10%.

4. If there is no body bag, wrap the body in two thick cotton materials, which will be soaked with household bleach diluted at 10%. Then wrap the body in plastic (plastic kitchen table cloth), which will be attached with a plastic adhesive tape. Spray with household bleach diluted at 10%. Place the body in a coffin, where appropriate;

5. Transport the body to the burial place as quickly as possible. Designate a health worker or a member of staff of the establishment to accompany the remains in order to be sure all safety precautions are observed.

b) Safely transport the body.

The control measures of the infection for VHFs should remain in force during the transportation of the body to the burial site.

1. Take the shortest route possible for safety reasons and also to limit any possibility of transmission through accidental contact;

2. Any member of the hospital staff who touched or handled the body during the transportation should wear the same protective clothes as those worn in the isolation area.
If he has no contact with the body, the driver of the vehicle does not need to wear protective clothes;

3. Take a closed recipient or a spray containing household bleach at 10% in case of accidental contact with the body or infectious body fluids. Also use it to clean liquids spilled in the vehicle.

c) Prepare the burial site

1. The tomb must be at least 2 metres deep;

2. Explain to the family that it is not possible to see the body and help it to understand why the burial ceremony should be reserved to the family alone.

d) Disinfect the vehicle after transporting the body

1. The members of staff who will disinfect the vehicle should wear protective clothes;

2. Wash the interior of the vehicle where the body was placed with a household bleach solution at 10%;

3. Leave to act for 10 minutes;

4. Rinse abundantly with clean water and let it dry.

Be careful: rinse well as household bleach is corrosive.

8.7 Annexes relating to logistics

8.7.1 Annex 22. Regulatory list of personal protective clothing and other consumables

1. Personal protective clothing

- A working dress or a used dress to be worn over (shirt and trousers) no long skirt;
- A pair of disposable surgical gloves;
- Rubber boots;
- Shoe protectors, if the floor risks being soiled;
- An overall or an outside dress (surgical overall or single-use long sleeves overall with cuffs);
- A plastic apron that covers the two layers of clothing;
- A second pair of light gloves or thick gloves. The wearing of the second pair of gloves is an additional safety measure when providing care to patients and during the manipulation of contaminated material;
- A HEPA (High Efficiency Particulate Air Respirator) mask or other biosafety mask (if these are not available, use a surgical mask);
- A cotton cap or hat;
- Anti-mist protective goggles or noncorrective glasses.

2. Other equipment and consumables

- Heat gun for taking temperature
- Sprays
- Overalls
- Overshoe in polyethylene
- Demister spray
- Adhesive tape
- Body bags
- Water tanks with taps
- Chlorinization trays
- Disinfectants.

8.7.2 Annex 23. Necessary logistics control list during Ebola or Marburg epidemics

ARO LOGISTICS		Logistics needs assessment form		
GENERAL INFORMATION				
Name: Position: Contacts (telephone, e-mail): Survey date:				
Country: Department/Region/Province: Centre/Zone/District/Region:				
Official/usual name of camp Number of areas (approx.) Total population GPS contact details Main economic activities (agriculture/trading/mining, etc.)		< 5years		
Type of site				
1. Village	2. Camps/ colony	3. Town	4. Neighbourhood	5. Other
1. Christian No. of churches		2. Muslim	3. Other Specify No. of places of worship	
Contacts of references (Main contacts)				
Contact and position at WHO:				
Contact at Ministry of Health:				
Other influential local personalities: (Political/religious)				
Map available:				
Detailed map of region: Source of map		Yes	No	Scale:
Climate/meteorological conditions:				
Period	Type of weather	Average temperature	Comments	

Logistics needs assessment form - Page 2/8

Cash & liquid assets			
Banking system	ATMs	Exchange bureaux	Available Foreign Exchange
Remarks:			
Mode of transport			

	Air	Road	Train	Ship	River Boat	Other
Capital > Province						
Province > District						
District > Operational Place/Zone						

Local means of transport (rental, lending, Ministry of Health, other)							
	Car	Motorcycle	Ship	Truck	Van	Plane/helicopter	Animals
Rental							
Lending							
Purchase							
MOSS Yes/No							

(In the remarks, please quote a figure (quantity of various means available, type, approximate cost, etc.)						
Fuel available locally						
Diesel	Kerosene	Petrol	Wood	Coal	Charcoal	Other

Logistics needs assessment form - Page 3/8

Remarks on costs :								
>Car/ Pick-up/Truck/Motorcycle…….. = USD per hour/day/week/month *>Boat..... = USD per hour/day/week/month* *>Aircraft/Helicopter..... = USD per hour/day* *>Animals ..... = USD per day/week*								
4x4 Vehicle recommended	Yes				No			
Landing areas for air transport								
	Landing strips - aircraft				Landing strips - helicopter			
Nature / description								
Size and dimensions								
Orientation (GPS details)								
Qualitative estimation of the state of the strips	Good	Correct	Bad	Unusable	Good	Correct	Bad	Unusable
Air traffic authorities on area								
Personnel available								
Operational strips hours/days								
IFS/ILS								
Fuel for aircraft available locally	Yes		No		Yes		No	
Safety of the landing strips (population, animals, etc.)								
Comments:								

III. TELECOMMUNICATION SYSTEMS		
Telephone network operators	Land line / Mobile / Both	
Itinerant services for mobile phones and Blackberry:	Yes	No
Local purchase of Sim card:	Yes	No
Local purchase of credits (by unit):	Yes	No
Availability of local internet network:	Yes	No
Radio networks (VHF.UHF (for NU users):	Yes	No
Availability of HF networks (for NU users):	Yes	No
General recommendations:		
IV. SECURITY		

General situation	Good	Correct	Bad	
Presence of armed people	Yes		No	
Military activities	Yes		No	
Hostility of the population	Yes		No	
Surrounding threats	Yes		No	
If you answered "Yes" to one of several questions, please briefly explain the reason(s) in the space below:				

V. LOCAL AUTHORITIES AND PARTNERS			
Local health authorities			
Name of contact	Position	Telephone No.	E-mail
United Nations agencies present in the sector:			
Agency	Person to be contacted	Telephone No.	E-mail
NGOS and other partners present in the sector & their field of work:			
Name of contact	Position	Telephone No.	E-mail
Local authorities:			
Name of contact	Position	Telephone No.	E-mail
VI. ACCOMMODATION AND LIVING CONDITIONS			
Hotel	House	Camping	Other

Room, hotel					
Price (average, in USD)		Comfort and hygiene		Security	
	Good	Correct	Bad	Good	Bad
Possibility to have an office		Yes		No	
		Yes		No	
Internet connection available		Type: Wi-Fi Ethernet			

Houses (on rent)					
Rent (average, in USD		Comfort and hygiene		Security	
	Good	Correct	Bad	Good	Bad
Possibility of renting an office		Yes		No	
Energy (Local power system)					

Logistics needs assessment form - Page 6/8

Voltage	110-125V	220-230V	50HZ	60HZ
Type of socket				
Europe (A)	UK (B)	USA (C)	Australia/NZ (D)	India/Pakistan (E)
Type A : Some sockets accept several types of male plug	A	B C D E		
Power availability				
24/24	Some hours/day	No	Generator	
Local supply and food market				
Food				
Available	Limited	Sure	Imported	
Access to potable water:	Yes	No		
	System used in town (pipe borne)	Bottle	Other	
Water treatment products on the market	Yes	No		
Local Type	HTH	NaDCC	Tablets	Household bleach	Other
Availability of construction materials	Yes	No		
Type of materials (bricks/wood/cement/etc.)				
Health structure in place				
Description; (if possible, attach a sketch)				

Isolation service in place					
Present	Yes	No	Possibility of installation	Yes	No
Description: (if possible attach a sketch)			Justification		
What are the local funeral practices?					
Levels of personal precautions taken during funerals:					
Appropriate	Basic (incomplete)		Notion (not in place)	None	
Do the care personnel have access to personal protection equipment (PPE)?			Yes	No	
Mortuary	In good state		In poor state	Non-existent	
Needs rapid assessment for improvement?	Yes		No		
Nearest hospital/reference laboratory:					
Name of the institution	Public /Private		Distance (km)	Name of focal point	
VII. COLD CHAIN AND STORAGE OF SUPPLIES					
Storage space available:	Yes		No		
Characteristics					
Area (in m2)	Security		Ventilation	Accessibility	
Cold chain available		Yes	No		
Type of refrigerator/freezer?					
Capacity in litres					
Stock of personal protection equipment (PPE) available?		Yes	No		
Stock of medicines available?		Yes	No		
Stock of medical equipment available?		Yes	No		
Stock of pharmaceutical products available?		Yes	No		
Comments:					

IX. OTHER ASPECTS AND COMMENTS:

8.8 Annex 24. Bibliography - Ebola and Marburg

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http://www.phac-aspc.gc.ca/

Centers for Disease Control and Prevention, Atlanta (United States of America)
http://www.cdc.gov/

Centre International de Recherches Medicales de Franceville, Franceville (Gabon)
http://www.cirmf.org/

European Centre for Disease Prevention and Control (ECDC), Stockholm (Suède)

http://ecdc.europa.eu/en/

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8.9 Annex 24. Annex 1 of the International Health Regulation (IHR)

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