World Health Organization

EBOLA STRATEGY

Ebola and Marburg virus disease epidemics: preparedness, alert, control, and evaluation

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Contents

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List of abbreviations and acronyms

AFRO	WHO Regional Office for Africa
COMBI	Communication for Behavioural Impact
DRC	Democratic Republic of Congo
EMRO	WHO Regional Office for the Eastern Mediterranean
EURO	WHO Regional Office for Europe
EVD	Ebola virus disease
IHR	International Health Regulations
MVD	Marburg virus disease
NFP	National Focal Point
NSAID	non-steroidal anti-inflammatory drug
OIE	World Organisation for Animal Health / Organisation mondiale de la santé animale
PPE	personal protective equipment
PRRS	porcine reproductive and respiratory syndrome
VHF	viral haemorrhagic fever
WHO	World Health Organization

Chapter 1 – Introduction

1. Introduction

1.1 Purpose of the document and target audience

Ebola or Marburg haemorrhagic fever outbreaks constitute a major public health issue in Sub-Saharan Africa. Of the 2 870 Marburg and Ebola cases documented between June 1967 and June 2011, 270 (9%) were health-care workers. In order to provide health-care workers in risk areas with a working tool to combat Ebola Virus Disease (EVD) or Marburg Virus Disease (MVD) effectively, the WHO Regional Office for Africa (AFRO), the WHO Regional Office for the Eastern Mediterranean (EMRO), WHO Headquarters and their partners have produced this document: Ebola and Marburg virus disease epidemics: Preparedness, alert, control and evaluation.

The main target audience of this document are district-level health-care workers (doctors, nurses, and paramedics), as well as intermediate- and central-level health-care workers responsible for epidemic control, and International Health Regulations (IHR) National Focal Points (NFPs).

The objective of this document is to describe preparedness, prevention, and control measures that have been implemented successfully during previous epidemics. These measures must be implemented during the following four phases:

(1) Pre-epidemic preparedness

(2) Alert (identify, investigate, evaluate risks)

(3) Outbreak response and containment operations

(4) Post-epidemic evaluation.

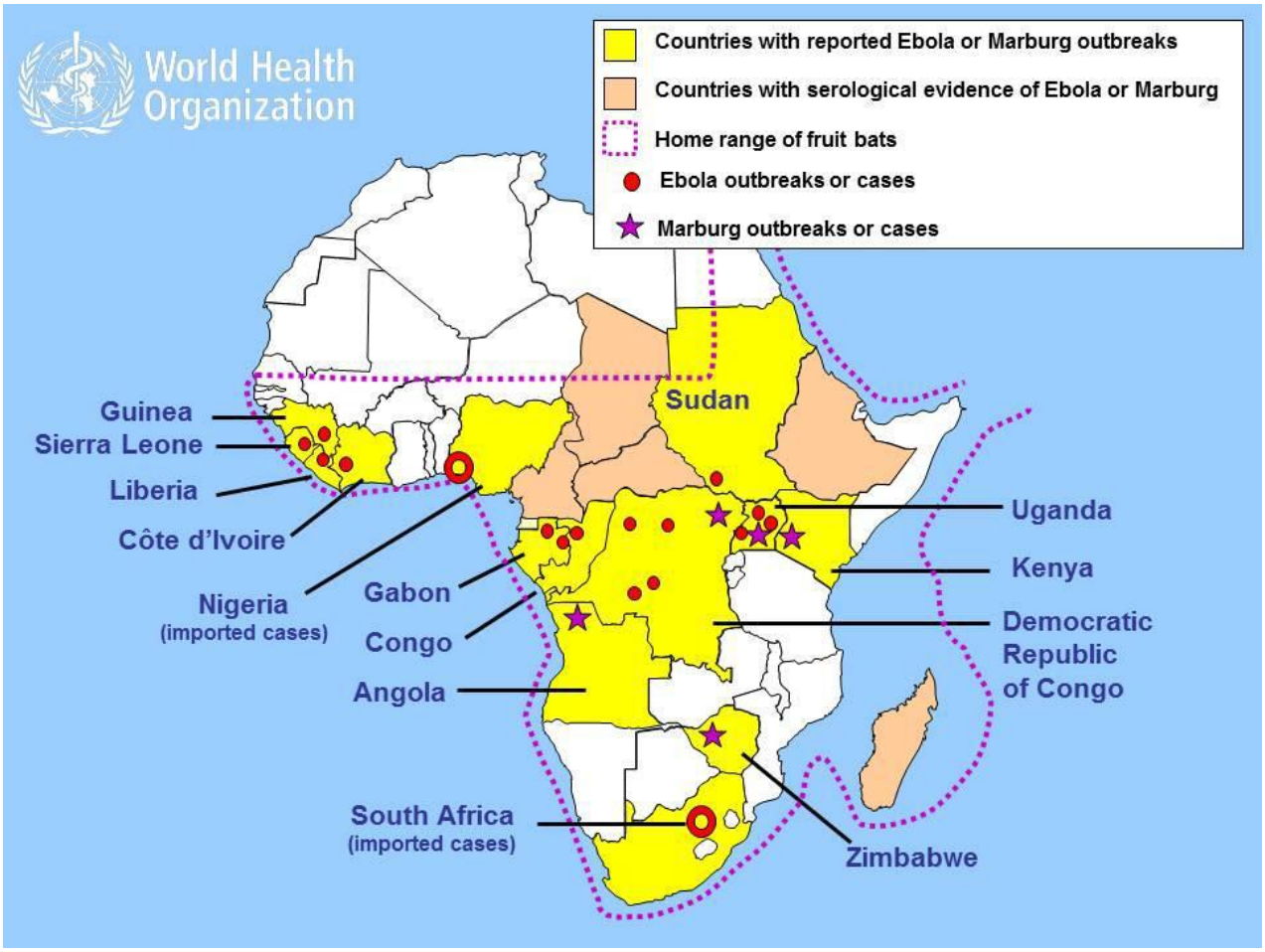
1.2 Background

The Marburg virus and Ebola virus genera belong to the Filoviridae family (filovirus). The Ebola virus is comprised of five distinct species: Bundibugyo, Côte d'Ivoire, Reston, Sudan, and Zaïre. There is only one Marburg virus species. The Marburg virus and Ebola Zaïre, Sudan, and Bundibugyo subtypes have been associated with large viral haemorrhagic fever (VHF) outbreaks characterized by high person-to-person transmission and a case fatality rate ranging from 25%–90%, whereas Côte d'Ivoire and Reston subspecies have not been associated with VHF outbreaks in humans to date.

Since its discovery in 1976, EVD has mostly occurred in Sub-Saharan Africa (Annex 1). The first cases of EVD were detected in the Democratic Republic of Congo (DRC) and Sudan (1976) and EVD epidemics have since occurred in DRC (1977, 1995, 2007, 2008, 2012), Sudan (1979, 2004), Gabon (1994, 1996, 2001, 2002), Uganda (2000, 2007, 2011, 2012), Republic of the Congo (2001, 2002, 2003, 2005), Guinea (2014), Liberia (2014), Sierra Leone (2014) and Nigeria (2014, following the entry of infected traveller from Liberia) (Figure 1). In 1994, Côte d'Ivoire reported one case of Ebola Côte d'Ivoire in a laboratory technician who was infected when performing an autopsy on an infected chimpanzee. No secondary transmission occurred and the patient survived the infection.

MVD also occurs in Africa (Annex 2). Beginning in 1967, the first cases of MVD were reported in Uganda. Additional reports of isolated cases and MVD epidemics have been reported in Zimbabwe (1975), Kenya (1980, 1987), DRC (1994, 1998-2000), Angola (2005), and Uganda (2007). South Africa reported Marburg epidemics (1975) and Ebola epidemics (1996) following the entry of infected patients from Zimbabwe and Gabon, respectively. Outside Africa, in 1967, the importation of infected green monkeys (Cercopithecus aethiops) from Uganda resulted in MVD outbreaks in Germany and Yugoslavia, causing 32 fatalities. In 2008, the Netherlands and the United States of America (USA) reported one case of imported Marburg each. The two patients – tourists – had visited a cave in the forest of Maramagambo in south-eastern Uganda.

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



Transmission

In Africa, fruit bats of the family Pteropodidae are considered natural hosts of filoviruses – the viruses that cause Marburg and Ebola viruses. Fruit bats belonging to the genus Rousettus are considered potential hosts of the Marburg virus, and bats belonging to the genera Hypsignathus, Epomops, and Myonycteris are considered possible hosts of the Ebola virus. However, Ebola and Marburg have also been found in other bat species. The geographic distribution of Ebola and Marburg viruses probably corresponds to that of fruit bats of the family Pteropodidae. Consequently, Ebola and Marburg viruses are considered endemic throughout Sub-Saharan Africa (Figure 1).

In Africa, the infection of human cases with Ebola virus disease has occurred through the handling of infected chimpanzees, gorillas, monkeys, bats of the species Hypsignathus and Epomops, forest antelopes, and porcupines (Figure 2). Most primary (index) cases (cases) of Marburg infection occurred following an extended stay in or near mines or caves inhabited by bats of the Rousettus species.

Figure 2. Hypothesis of Ebola virus transmission at the human-animal interface

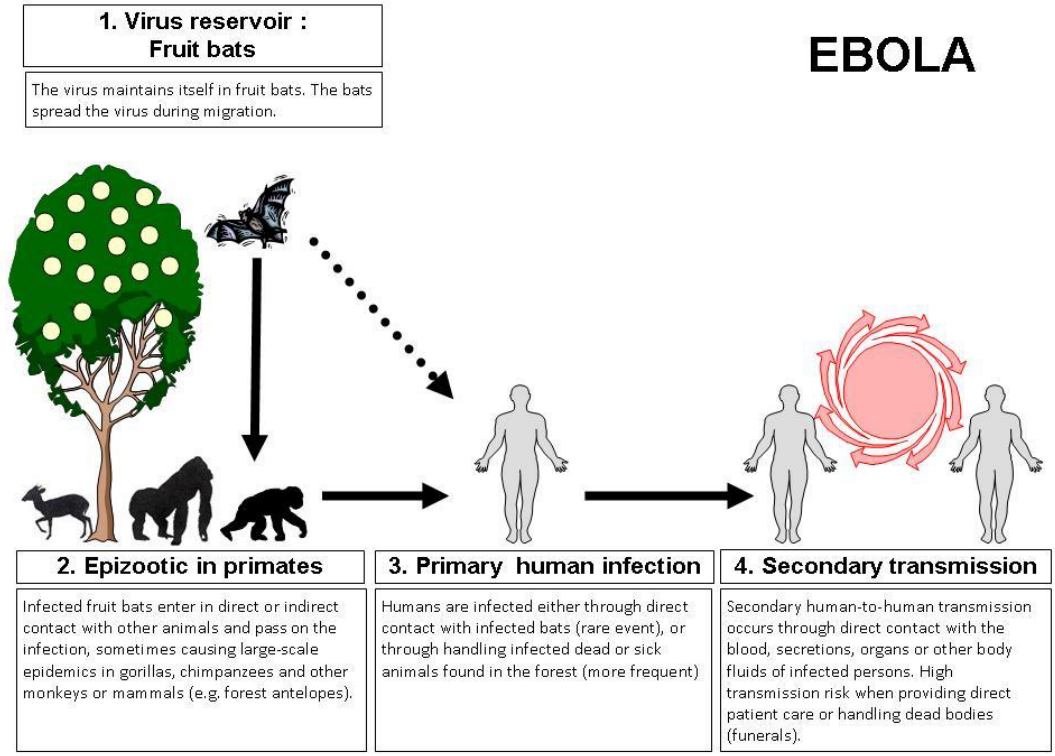
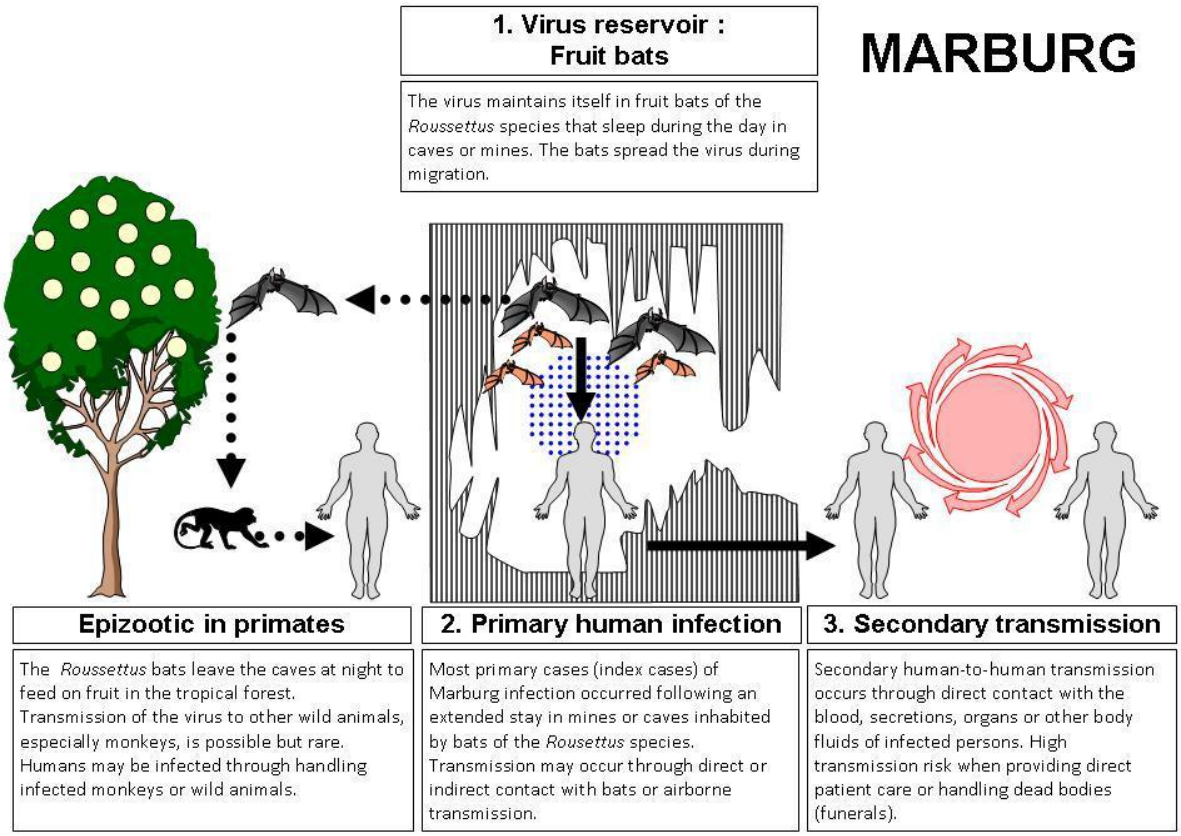


Figure 3. Hypothesis of Marburg virus transmission at the human-animal interface



Person-to-person transmission of Ebola and Marburg virus occurs through direct contact with the blood, secretions, organs, or other body fluids of infected persons, putting health-care workers and the community at risk. Burial ceremonies in which relatives and friends have direct contact with the body of the deceased person also play a significant role in the transmission of the virus. Health-care workers have been infected while treating Ebola and Marburg patients, through close contact without correct infection control precautions and inadequate barrier nursing procedures. To date, approximately 9% of Ebola or Marburg victims have been health-care workers.

Box 1. Health workers the principal victims

Health workers who treated Ebola or Marburg patients without using basic precautions isolation techniques have become infected. To date, about 10% of those infected with Ebola or Marburg viruses have been health workers.

Transmission of the Ebola virus from one person to another occurs through direct contact with blood or bodily fluids. It is not always possible to readily identify patients with Ebola virus disease, as the initial symptoms can be nonspecific. Therefore, health workers need to take standard precautions when coming into contact with patients, whatever their diagnosis, in all professional interactions, at all times (Annex 15).

In the presence of a suspected or confirmed case of Ebola virus infection, front-line health workers must take additional infection prevention and control measures to avoid any exposure to the patient's blood or bodily fluids, and avoid any direct contact with the potentially contaminated environment (Annex 17).

During EVD and MVD outbreaks, only strict compliance with biosafety guidelines (i.e. appropriate laboratory practices, infection control precautions, barrier nursing procedures, use of personal protective equipment by health-care workers handling patients, disinfection of contaminated objects and areas, safe burials, etc.) can prevent the epidemic from spreading and reduce the number of victims.

In order to control outbreaks effectively, it is important to develop comprehensive social mobilization campaigns that include feasible, culturally-appropriate, and technically sound interventions for the affected populations. These sensitive and essential measures identify behaviours that may put people at risk and are crucial in supporting the adoption of practices that can help prevent infection or reduce transmission within the community. During outbreaks, social mobilization programmes help affected populations understand and comply with control measures, which may seem to patients and family members to be austere, such as isolating sick people.

Severely ill patients must be given symptomatic treatment and intensive care. There is no specific treatment or vaccine for either Ebola or Marburg. Several candidate vaccines are being developed, but it will be several years until they are available for utilization by outbreak response teams working in the field. Similarly, several candidate drugs show promise but their safety and efficacy in humans is not yet known.

Filoviruses are highly infectious agents and certain precautions must be applied when handling them. Laboratory tests on the active virus – experimental inoculation of animals, cell cultures or specimen – present an extreme biohazard risk and WHO recommends that such tests be conducted in biosafety level 4 (BSL4; highly infectious/maximum containment) laboratories only. Conversely, the laboratory may conduct tests on inactivated specimens (virucides, gamma rays, formaldehyde, heat, etc.) in order to confirm the diagnosis through detection of viral RNA or virus-specific antibodies.

Box 2. The need to take into account pig farms

In 2008-09, the Ebola Reston virus was isolated in pigs in the Philippines following an outbreak of Porcine Reproductive and Respiratory Syndrome (PRRS). At the same time, experimental inoculation of laboratory animals showed that pigs are susceptible to infection with the Ebola Zaïre virus, which can reproduce and spread among them. Pig farms in outbreak areas must thus be considered potential sites of virus amplification and the attendant risk must be managed.

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

- conduct a risk assessment to determine if there are pig farms within proximity to the outbreak;

- implement control measures to prevent pig-to-human transmission, including strengthening the food production system;

- contain confirmed Ebola infection in pig populations;

- apply appropriate biosafety measures in order to prevent bats from introducing the Ebola virus into pig populations.

Chapter 1 – INTRODUCTION – Key messages

- Human-to-human Ebola and Marburg transmission occurs through blood, body fluids, and contaminated objects.
- Strict compliance with biosafety guidelines is required to prevent epidemic spread and reduce the number of victims.

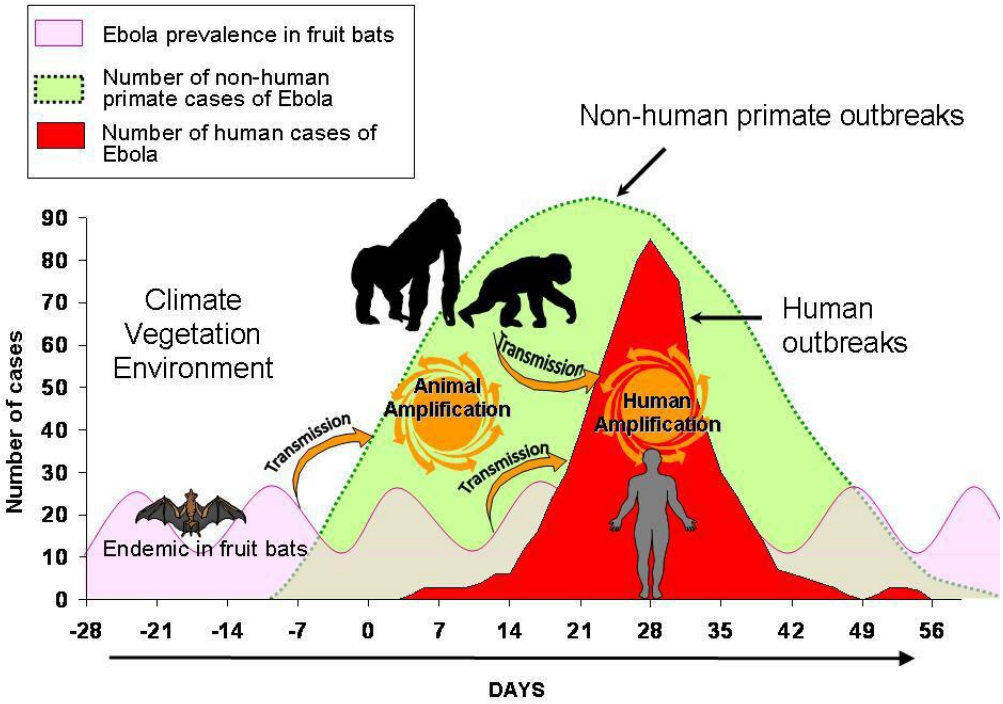
Chapter 2 – General strategy

2. General strategy

The objective of this document is to describe preparedness, prevention, and control measures that have been implemented successfully during previous epidemics. These measures must be implemented during the following four phases: Ebola and Marburg viruses infect fruit bats of the Pteropodidae family; prevalence (percentage of animals carrying the virus) varies with the season and the composition of the populations (proportion of non-immune young animals susceptible to contamination by adults with chronic infections) (Figure4).

In the tropical forest, fruit bats carrying the virus enter in direct or indirect contact with other animals and pass on the infection, sometimes causing large-scale epidemics in chimpanzees, gorillas, and other primates (Figure 4). The Ebola virus may be transmitted to humans either through direct contact with infected bats or through handling infected chimpanzees, gorillas, monkeys, forest antelopes, and porcupines found sick or dead in the forest. The Marburg virus may be transmitted to humans during extended stays in caves or mines inhabited by large colonies of fruit bats.

Figure 4. Ebola: Epidemic curves in humans and animals at the human-animal interface



The circulation of the Ebola and Marburg viruses among bats and monkeys precedes human outbreaks. Therefore, the strategy for prevention and control of epidemics comprises the following four phases:

(1) Pre-epidemic preparedness

(2) Alert (detect, investigate, evaluate risks)

(3) Outbreak response and containment operations

(4) Post-epidemic evaluation.

2.1 Before: pre-epidemic phase

During the pre-epidemic phase, the public health services must set up a surveillance system to identify viral haemorrhagic fever (VHF) cases. However, surveillance for human cases of suspected VHF is not enough.

Animal outbreaks of Ebola usually precede human cases, but they are not always detected. Collaboration with wildlife mortality surveillance systems is thus essential to the rapid alert of public health authorities. The strategy uses animal mortality surveillance as an early warning system to trigger the implementation of a prevention programme aimed at reducing the risk of human outbreaks.

Also during the pre-epidemic phase, standard infection control precautions must be reinforced in all health-care settings. These measures reduce the risk of pathogen transmission from known or unknown sources. Standard precautions are the minimum level of infection control required in the treatment and care of all patients in order to avoid direct contact with blood and/or body fluids. These are applicable to Marburg and Ebola and other blood- or body fluid-borne infectious diseases (such as AIDS, hepatitis B, and hepatitis C) during patient care.

The pre-epidemic phase should also be used to prepare the public on potential risk behaviours for Ebola and Marburg virus disease and promote standard infection prevention and control precautions e.g. hand washing. Subject to the availability of funds, health authorities can conduct health education activities targeting relevant groups within the community such as hunters, community

2.2 Alert: suspected Ebola or Marburg

If the surveillance system reports suspected Ebola or Marburg cases, a team must be sent to the site immediately – equipped with the necessary personal protective equipment – to investigate the rumour, evaluate the risk of an outbreak, collect specimens and send them to a national reference laboratory, and implement initial control measures until the laboratory results are received.

2.3 During: epidemic phase

Once the Ebola or Marburg outbreak is confirmed, response teams must implement a multisectoral outbreak control strategy involving:

(a) Coordination of prevention and control activities and resource mobilization

(b) Creation of a surveillance system for active Ebola or Marburg case finding, surveillance of contacts for a period of 21 days after their last known exposure, and referral to the isolation ward if they become ill

(c) Promotion of a social and behavioural interventions programme aimed at informing the public and promoting the adoption of practices for reducing community transmission

(d) Clinical management of Ebola and Marburg patients in the affected area, observing the following five rules:

- Respect for the dignity and rights of the patients and their family
- Establishment of an isolation area and implementation of barrier nursing precautions
- Organization of safe transport of the patient from their home to the ward
- Performance of safe burials, respecting funeral customs and rites
- Appropriate psychosocial support for health-care workers, patients, their families, and their communities

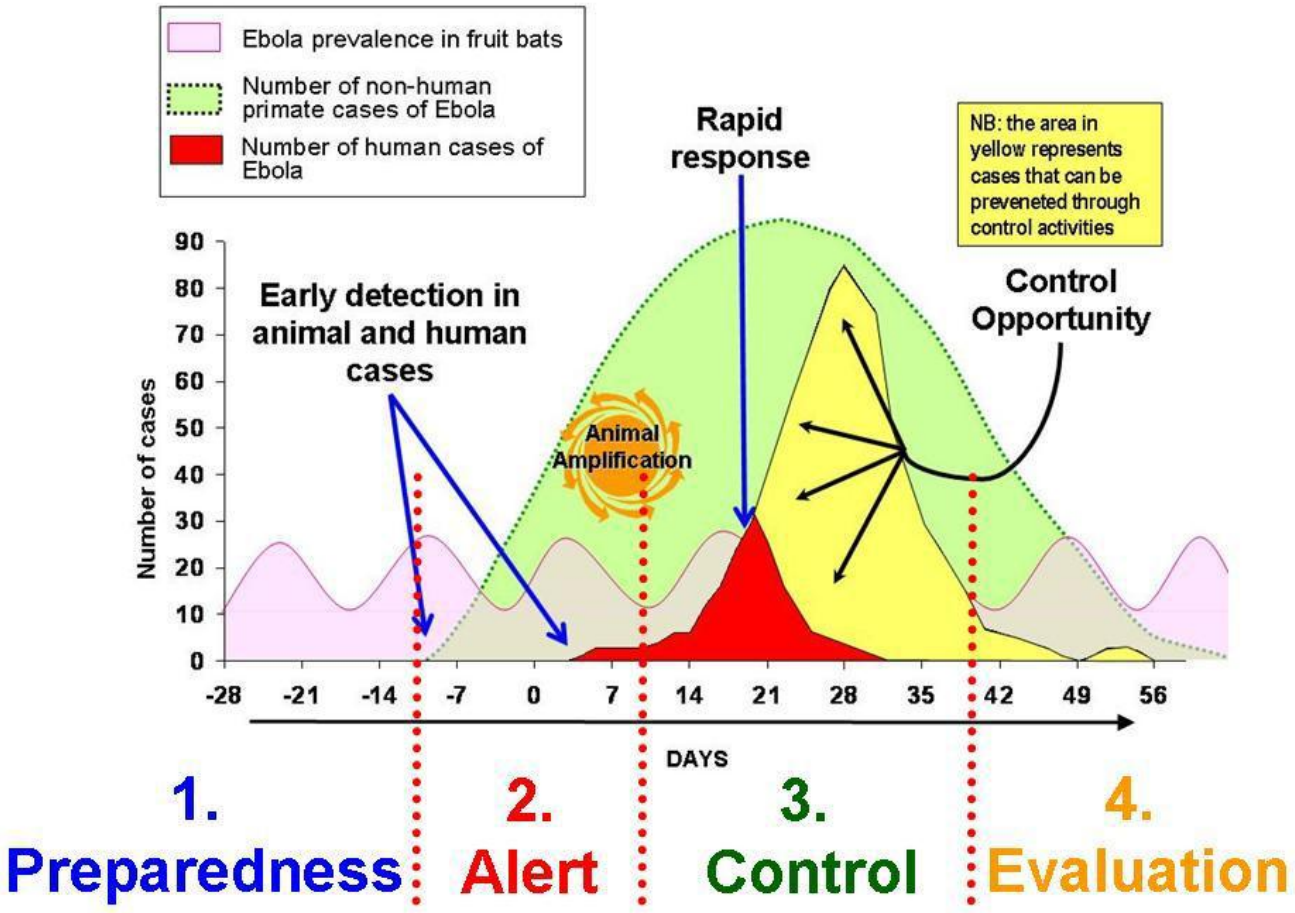
(e) Adopt or strengthen infection control precautions in the affected area and beyond.

2.4 After: Post-epidemic phase

Once the epidemic is over, resume surveillance activities to the pre-epidemic phase. Use the official announcement at the end of the epidemic to thank stakeholders and partners and to extend solidarity and compassion to the affected populations. Remember to conduct an evaluation of the outbreak management and to produce an end-of-epidemic report. All records of the outbreak, which may serve as reference documents for countries and the international community, must be kept.

Figure 5 illustrates the four main phases of the recommended intervention strategy.

Figure 5. Strategy for the prevention and control of Ebola or Marburg epidemics

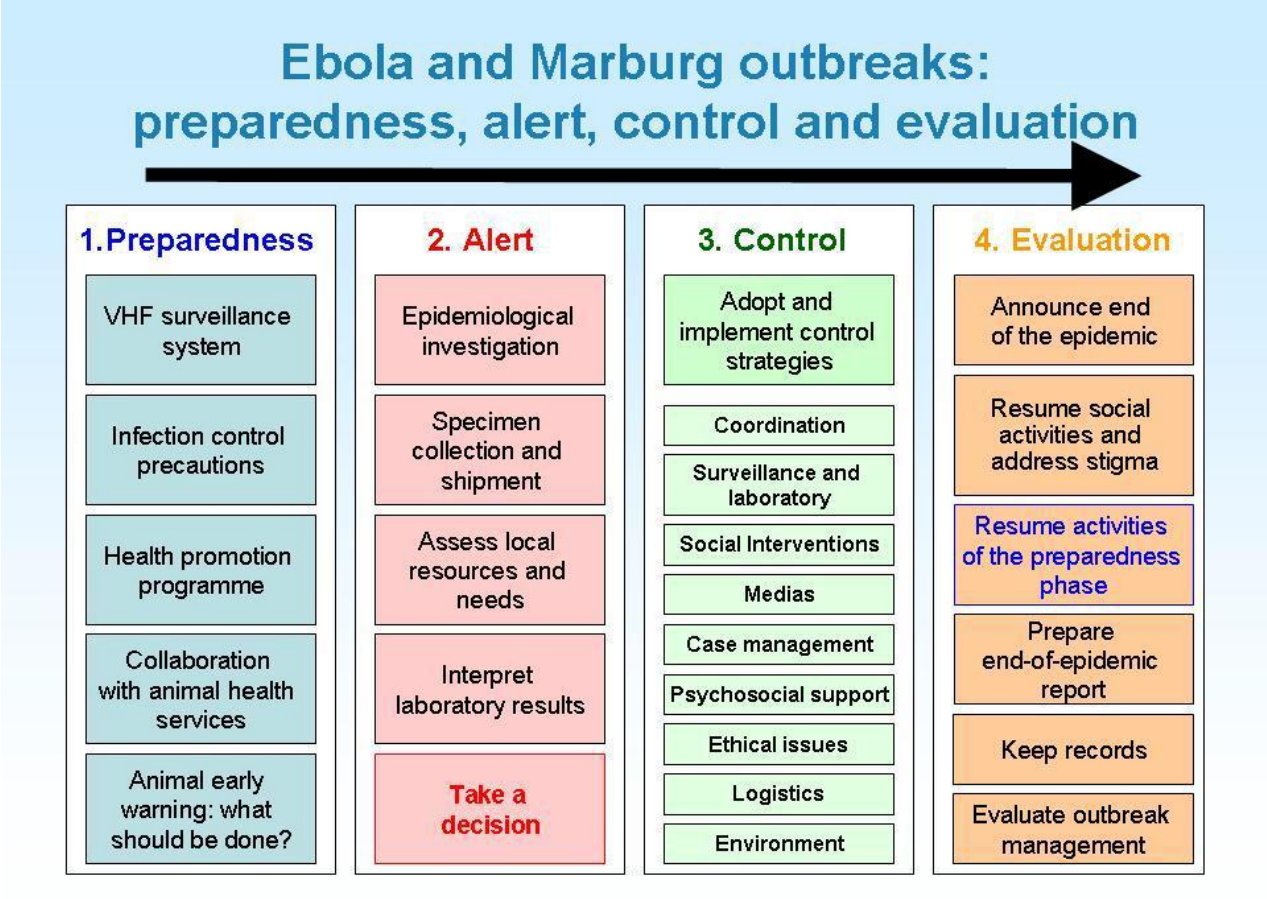


2.5 Use of the document

This document is not intended to be a prescriptive methodology. It is designed to facilitate action planning at the district level by describing a series of recommended activities for each of the following phases (Figure 6):

(1) Pre-epidemic preparedness
(2) Alert (detection, investigation, risk evaluation)
(3) Outbreak response and containment operations
(4) Post-epidemic evaluation.

Figure 6. Ebola and Marburg outbreaks: Preparedness, alert, control and evaluation



Chapter 2 – GENERAL STRATEGY – Key messages

- This document is designed to facilitate the planning of prevention and control activities at the district level for each of the following phases:

1) pre-epidemic preparedness;

2) alert (detection, investigation, and risk assessment);

3) outbreak response and containment operations;

4) post-epidemic evaluation.

- A multidisciplinary coordinated approach is required to prevent and control the disease.

Chapter 3 – Before: What should be done in the pre-epidemic phase?

3. Before: What should be done in the pre-epidemic phase?

3.1 Establishment of a viral haemorrhagic fever surveillance system

3.1.1 Stage 1. Step up routine surveillance for all viral haemorrhagic fevers

- Obtain provincial or national standard case definitions as set forth in the Technical Guidelines for Integrated Disease Surveillance and Response (IDS) (Annex 3A).
- Disseminate case definitions in health-care facilities.
- Use the standard case definition for routine surveillance.
- Systematically search for possible suspected viral haemorrhagic fever (VHF) cases during supervisory visits.
- Immediately report any case that fits the case definition.
- Train/retrain staff in VHF surveillance.
- Raise the awareness among district health-care workers of surveillance capacity requirements as described in the International Health Regulations (Annex 34).

3.1.2 Stage 2. Implement community-based surveillance

- Explain and make known the early warning system in the community.
- Identify resource persons (community health-care workers, Red Cross volunteers, religious leaders, traditional midwives, traditional healers, village chiefs, etc.) and train them in community-based surveillance.
- Organize regular health promotion activities in communities, especially those in risk areas and those engaged in risk activities (hunters, mineworkers, et. al).
- Disseminate simplified case definitions for community use.
- Engage resource persons to report any suspicion or rumour to health-care facilities or health-care workers and apply basic hygiene practices.
- Provide feedback to resource persons about the status of reported rumours.

3.1.3 Stage 3. Create a system for the collection, packaging, storage, and shipment of specimens

- Make sure sample collection materials and personal protective equipment (PPE) are available in the at-risk districts.
- Be aware of and apply the guidelines for the collection, packaging, storage, and shipment of specimens collected from suspected VHF cases (Annex 6).
- Make sure adequate boxes and receptacles are available for triple packaging of specimens collected from suspected VHF cases (Annex 7).
- Make sure the exact address for the national reference laboratory/ies is available.

- Be aware of the shipping routes for specimens to national reference laboratories.
- Collaborate with the national reference laboratory/ies

Please note: the national reference laboratory is responsible for forwarding specimens to international laboratories that are WHO collaborating centres for Ebola or Marburg virus disease (Annex 8).

3.1.4 Stage 4. Establish/strengthen epidemic management committees and rapid response teams

- Develop or revise the competencies of epidemic management committees and rapid response teams.
- Appoint members of the epidemic management committees and rapid response teams
- Make sure epidemic management committees and rapid response teams are multisectoral in nature.
- Ensure the epidemic management committees and rapid response teams are functioning.
- Hold regular meetings to review the epidemiological situation and take stock of medicines, equipment, and other supplies needed.

3.2 Infection control precautions in health-care settings

3.2.1 Stage 5. Implement standard infection control precautions in health-care settings

- Disseminate the aide memoire on standard precautions in health-care facilities (Annex 13).
- Train health-care workers on standard infection control precautions in health-care facilities.
- Post copies of standard infection control precautions in health-care facilities.
- Implement standard infection control precautions in health-care facilities.
- Make sure that basic hospital-acquired infection control materials (gloves, masks, gowns) and hygiene supplies (soap, alcohol, etc.) are available in health-care facilities.
- Implement the fact sheet on safe management of waste from health-care activities (Annex 14).

3.2.2 Stage 6. Stockpile personal protective equipment and other supplies needed for epidemiological investigation at the district, provincial, and national levels

- Build, manage, and maintain, in proper storage conditions, a minimum supply of PPEs, disinfectants, and other materials needed to apply standard infection control precautions equivalent to three module A (Annex 30) and one module B (Annex 31) of the PPE Kit in the WHO catalogue.
- Build, manage, and maintain, in proper storage conditions, a minimum supply of sample collection and shipment material.
- Update the list of cold chain facilities, the waste management system, the telecommunications network, and available vehicles in working order in the district health units. Consider repairing defective equipment.
- Keep a backup supply of fuel.

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3.3 Health promotion programme

3.3.1 Stage 7. Improve health-related behaviours among at-risk and vulnerable groups

- Promote and strengthen standard infection prevention and control practices within the community; e.g. hand washing, food safety, etc.
- Collaborate with surveillance teams to promote early detection and reporting among at-risk and vulnerable groups.
- Work with the national/provisional authorities to identify risk groups and risk behaviour(s) and encourage the adoption of risk reduction practices that prevent infection or reduce community transmission. Adapt them to the local context.
- Develop and disseminate health promotion material as part of a health promotion strategy that targets specific risk reduction actions.
- Raise public awareness of Ebola and Marburg virus disease, especially among risk groups such as hunters, miners, traditional midwives and healers, religious communities, health-care workers, opinion makers, etc.

3.4 Collaborate with mine health services (Marburg) and wildlife health services (Ebola)

3.4.1 Stage 8. Build or strengthen collaborative links between human health services and health services in mines (Marburg)

- Establish a framework for collaboration.
- Hold regular on-site meetings with mine surveillance officers.
- Inform miners about Marburg disease, risk behaviours, and individual infection control measures.
- Conduct surveillance of illness in miners in risk areas to facilitate detection of the introduction of the Marburg virus.
- If mine health services report an outbreak among miners or suspected VHF cases, the local health authorities must be on alert and assist them in their investigations (i.e. epidemiological surveying, sample collection, shipment of specimens to the national reference laboratory, etc.).

3.4.2 Stage 9. Build or strengthen collaborative links between human health services and wildlife health services (Ebola)

- Establish a framework for collaboration between sectors.
- Hold regular on-site meetings with wildlife surveillance officers.
- Inform water and forest officers and hunters about Ebola disease, risk behaviour, and individual infection control measures.
- Conduct surveillance to facilitate detection of the introduction of EVD and illness among hunters in risk areas.
- Ask wildlife officers in national parks and reserves to strengthen surveillance for causes of wild animal mortality (especially in gorillas, chimpanzees, and monkeys).

3.5 Pre-alert: What should be done if the specimen taken from animals tests positive for Ebola or Marburg?

3.5.1 Stage 10. Notify veterinary services and public health authorities

- If the specimen taken from animals tests positive for Ebola or Marburg, both the veterinary services and the public health authorities must be notified immediately.

3.5.2 Stage 11. Conduct a comprehensive awareness-raising, social mobilization campaign focusing on promoting specific risk reduction and health protection behaviours

- As soon as the alert about confirmed animal cases is issued, the Ministry of Health should organize its response teams.
- The response teams should prepare an awareness-raising and behaviourally-focused social mobilization campaign to prevent introduction of the virus into the human population and its spread.
- The prevention campaign should:

- inform the public about the disease, risk behaviours, and individual and community infection control measures;

- launch a comprehensive social mobilization campaign to promote infection control practices; and

- strengthen basic infection control precautions in health-care settings.

3.5.3 Stage 12. Response team

- Response teams must:

- step up surveillance;

- strengthen diagnostic capacities for Ebola and Marburg; and

- strengthen collaboration between human and animal health services.

Chapter 4 – Alert: What should be done when Ebola or Marburg is suspected?

4. Alert: What should be done when Ebola or Marburg is suspected?

When the surveillance system detects suspected human cases of viral haemorrhagic fever (VHF), a team should be sent to the site without delay to investigate, confirm, or discard the rumour and take initial control measures as required.

4.1 Investigating suspected Ebola or Marburg

4.1.1 Stage 1. Epidemiological investigation

1. Mobilize the members of the national rapid response team. This is a multidisciplinary team, which should include an epidemiologist, a clinician, a laboratory specialist, a logistics coordinator, and other necessary experts (infection control expert, anthropologist, social mobilization specialist, geographer, veterinarian, etc.)

2. Define the competencies of each member of the investigation team. A definition of tasks to be accomplished by each team member gives them a precise idea of what needs to be done once in the field and what each of them needs to accomplish during their specific mission.

3. Collect investigation equipment (personal protective equipment (PPE), sampling devices, equipment for the shipment of specimens, investigation forms, case definition, disease/s fact sheets). Use a checklist of materials and equipment needed in the field. Forgetting essential materials or equipment can be detrimental to the investigation.

4. Notify the district authorities about the suspected outbreak. Request their authorization and their support for conducting the outbreak investigation.

5. Notify and meet the local authorities and obtain their support. The support of the local authorities in the affected area where the investigation will be conducted is very important. Local authorities should participate in the investigation, for example by sending a local representative to join the team.

6. Organize a field trip. Make sure appropriate means of transport are available. Sufficient quantities of fuel, oil, and other mechanical lubricants must be supplied. The subsistence of members of the investigation team must be taken into account (accommodation, drinking water, food, per diem, etc.)

7. Investigate suspected Ebola or Marburg cases. Collect information from community members, opinion makers, local authorities, health-care personnel, et al.

- Confirm the outbreak.
- Adopt a case definition to use in the local context and create a list/register of all of the cases.
- Fill in an investigation form for each registered case (Annex 4).
- After having provided accurate and clear information to the patient about the disease (including explaining why collecting a blood sample is important) and obtaining their express and/or informed consent, collect blood samples from each case for subsequent diagnostic laboratory confirmation.
- Interact appropriately with local communities, respecting social and cultural customs and hierarchies.
- Obtain critical behavioural, sociocultural, economic, and political information that could either help or hinder continued outbreak investigation activities and implementation of initial control measures (Annex 11).

- Analyse and interpret the information received during the investigation. Analyse the data in terms of time, place, and persons. Describe the routes of transmission over the course of the event. Determine populations who may be at risk of contracting the disease. Identify the possible source of the outbreak. Compare the results of the epidemiological analysis with the known facts.

- Prepare a written report.

8. Evaluate the risk of an Ebola or Marburg outbreak. The team must formulate diagnostic hypotheses to guide the laboratory tests. Hypotheses are needed for: the source of the infection; the cause of the outbreak; routes of transmission; and populations at risk. These hypotheses will be compared with the known facts about Ebola or Marburg. Pay attention to social and cultural practices and events that could transmit or amplify infection that may need specific considerations and interventions; e.g. gatherings such as funerals, mourning rites, etc. In view of the clinical, epidemiological, and sociocultural evidence, the investigation team should evaluate the risk of an Ebola or Marburg epidemic; i.e. confirm a strong suspicion of Ebola or Marburg or discard it.

9. Implement initial control measures. If the risk of an Ebola or Marburg epidemic is confirmed – even prior to laboratory confirmation – the team should propose the immediate implementation of a multisectoral outbreak control strategy and take initial infection prevention and control measures to protect caregivers, patients, and their families. See paragraph 5.1 on the implementation of control strategies. Identify potential barriers to compliance that will need immediate consideration, such as existing treatment-seeking behaviour and engagement with traditional healers to refer suspect cases.

10. Notify WHO of the suspected Ebola or Marburg outbreak and the deployment of an investigation team. The team should provide WHO with regular updates on the situation and indicate, in particular, whether support from a larger team may be required in future.

4.1.2 Stage 2. Collection and shipment of specimens

1. Inform the national reference laboratory of the imminent shipment of specimens so that the necessary arrangements can be made for receiving the specimens. This laboratory may need to forward the specimens to a WHO Collaboration Centre (WHO CC) laboratory equipped to diagnose VHF diseases. In the case of outbreaks of EVD or MVD, the WHO CC laboratory should be contacted as soon as possible.

2. Wear PPE correctly to avoid any risk of contamination when taking specimens. Collect the required specimens in accordance with the procedures described in the guidelines (Annex 6).

3. Store and package the specimens as described in the safety instructions (Annex 7).

4. Contact the national reference laboratory again when the specimens are ready for shipping to make sure it is ready to receive them. Double-check with the laboratory that the address and shipping route are correct.

5. Send the specimens to the national reference laboratory. The specimens must be packaged using triple packaging requirements (Annex 7). Relevant clinical and epidemiological information must be attached to the laboratory request form enclosed with the specimens.

6. 24 hours after shipment, verify the arrival of the specimens at the national reference laboratory.

7. Upon receipt of the specimens, the national reference laboratory must inform the medical team and the authorities from the district, which sent the sample.

4.1.3 Stage 3. Continue active case-finding and follow-up of contacts

- If there is a strong suspicion of an Ebola or Marburg outbreak based on the outcome of the clinical studies and the epidemiological investigation (even though laboratory diagnosis has not yet occurred), the investigation team should actively search for cases and follow up contacts.
- For each suspected, probable, or confirmed case identified, the investigation team must draw up a list of contacts using the definition of "contact person" (Annex 5).

Note: If necessary, the initial case definition may be reviewed on the basis of the diagnostic hypotheses formulated by the investigation team and the clinical and epidemiological data collected.

4.1.4 Stage 4. Evaluation of local resources and logistics requirements

- If the investigation team confirms a strong suspicion of an Ebola or Marburg outbreak and considers that deployment of a larger team will be necessary,
- Then it needs to evaluate local resources and assess logistics requirements (Annex 32).

1. Evaluate existing logistical resources within the community and draw up a list of missing items, which may include and may not be limited to: means of road and river transport, animal-drawn transport, fuel availability, etc.

2. Verify that there are available stocks of equipment (personal protective equipment (PPE), disinfectants, materials for taking and shipping specimens, medicines, and other) and sterilizing equipment within the community and the district.

3. Assess means and routes of communication and note their GPS coordinates (roads, bridges, radio, telephone, landing runways, office supplies, etc.)

4. Gather maps of the affected area either from locally available sources or from relevant government agencies.

5. Assess locally available accommodation, water, electricity, and food for the response teams.

6. Assess local human resources (health-care workers, community health-care workers, Red Cross volunteers, NGOs, external technical support consultants operating in the affected area, et al.)

7. Undertake an initial financial needs assessment of local costs incurred by the response to the epidemic.

8. Visit and assess all health-care settings in the affected area (number of beds, crematorium, cold chain, access to water, electricity, space for setting up an isolation area, storage space) and identify possible modifications to be undertaken. Also, assess health-care seeking behaviour, such as traditional healers and home caregivers.

9. Identify any socio-cultural contexts that may complicate the investigation and response.

10. Evaluate the security situation in the affected area and verify the security phase in operation in the area and the country. The security situation must be re-evaluated regularly.

4.2 Obtaining laboratory results

4.2.1 State 5. Follow-up of specimens and obtaining laboratory results

- If the national reference laboratory is unable to analyse the specimens, they must be sent immediately to a WHO CC for VHF (Annex 8). The laboratory must contact the WHO CC to obtain its agreement, send the specimens in accordance with the international regulations, confirm their receipt, and obtain results rapidly.

- The investigation team must contact the National Reference Laboratory to obtain the results, or the WHO CC for VHF where the specimens were sent. Test results may initially be obtained by telephone to avoid any delay. Copies of the original documents may be sent afterwards by post, courier, fax, or e-mail.

- On receipt, the results must be communicated to the district clinicians and the local and district authorities. The local health authorities are duty-bound to inform patients of the laboratory results. If communication with the patient is not possible, or if the patient is underage, the information shall be communicated to his/her relatives or legal guardians.

4.2.2 Stage 6. Interpretation of laboratory results

- A case is positive or confirmed when the laboratory has demonstrated a recent infection with Ebola or Marburg virus using one of the following techniques:

- antigen detection using the ELISA test;
- detection of IgM antibodies directed against Marburg or Ebola;
- seroconversion or increasing IgG antibody titres in two subsequent specimens collected within a week of each other;
- detection of virus RNA by reverse transcriptase-polymerase chain reaction (RT- PCR) and sequencing;
- detection by immunohistochemical (IHC) staining of the patients' tissue or blood; or
- viral isolation.

4.3 Taking a decision on the basis of laboratory results and the outcome of the investigation

- Once the investigation team receives the laboratory results, there are three possible scenarios:

1. The results are positive for Ebola or Marburg, therefore the epidemic is confirmed.

   - Implement response strategies (see Chapter 5).

   - Notify WHO of the Ebola or Marburg epidemic through communication with the country office or the regional office.

2. The results are negative for Ebola or Marburg, but the laboratory has found a different etiology.

   - Follow standard procedures for preventing and combating the disease.

3. The results are negative for Ebola or Marburg virus and no other etiology has been found.

When the suspicion of Ebola or Marburg is very strong:

   - Pursue the investigation further and send new specimens for laboratory analysis.

When the suspicion of Ebola or Marburg is very weak:

   - Reassess the situation and consider other possible aetiologies.

Chapter 5 – During: What should be done once the epidemic is confirmed?

5. During: What should be done once the epidemic is confirmed?

5.1 Marburg and/or Ebola epidemic control strategy

If the Ebola or Marburg epidemic is confirmed:

- Notify the local, regional, and national authorities immediately;
- Notify the partners (especially those at the local level); and
- Notify WHO of the outbreak.

As soon as the epidemic is confirmed, a multisectoral Marburg and/or Ebola epidemic control strategy must be implemented and should be comprised of the following strategic objectives:

1. Establishment of a committee tasked with coordinating epidemic prevention and control activities and mobilizing resources. The committee is responsible for the overall coordination of operations. It should define the responsibilities of the different teams and information loops for outbreak response operations.

2. Collaborating and working with the media.

3. Setting up of a surveillance system to interrupt transmission routes, including:
   a. Active case-finding and referral to the care unit.
   b. Follow-up of all contact persons over a period of 21 days after the last exposure and referral to a care unit if they become ill.
   c. Monitoring of viral persistence in recovering patients (sperm).
   d. Identification of source(s) of infection (liaison with animal surveillance) and the adoption of strategies to prevent renewed introduction of the virus into the human population (liaison with social mobilization).

4. Establishment of a social mobilization and health education programme to listen to and address public concerns and to promote the rapid adoption of risk reduction and protective actions that reduce community transmission.

5. In the areas affected by the outbreak, ensure that Ebola and Marburg patients are treated in safety and dignity by respecting the following rules:
   a. Create a separate care unit to guarantee proper biosafety procedures and to protect patients' privacy.
   b. Implement barrier nursing guidelines.
   c. Respect the dignity and rights of patients and their families, especially their right to information and confidentiality.
   d. Organize the safe transport of patients from their homes to the hospital/care ward.
   e. Obtain express consent from patients to any hospitalization. If a patient refuses hospitalization, make arrangements for temporary home care to be provided by the patient's family. Provide the family with PPE and train them in how to properly put on, take off, and dispose of the equipment.
   f. Conduct safe burials, respecting funeral ceremonies, to help families with the grieving process.
   g. Offer psychosocial assistance to patients, families, and health-care workers.

6. Beyond the source of the outbreak, strengthen basic infection-control precautions in all health centres in the district affected and in all catchment hospitals in order to prevent the emergence of secondary sources of infection.

7. Links with animal health:

a. Monitor the causes of wildlife mortality.

b. Analyse specimens and alert the public health authorities.

c. Supervise slaughtering/butchering of wild animals at home and at the market.

8. Pursuant to the International Health Regulations (2005) (IHR 2005), the Ministry of Health must notify WHO of the event.

9. Pursuant to the IHR (2005), WHO must:

a. Notify Member States and the international community.

b. Assess the global health risk.

c. If the global health risk is high, issue recommendations regarding international travel and trade.

Box 1. Coercive measures and fundamental rights of persons

During Ebola and Marburg outbreaks, the systematic use of the following measures should be avoided, as they have proven ineffective, expensive, and counterproductive:

- Restrictions on the freedom of movement of persons and goods between countries or different regions of a country.
- The setting up of sanitary barriers around homes or at the border. Such measures divert resources and hamper the development of a spirit of cooperation between institutions and countries.

Recourse to these coercive measures should only be taken after the health authorities have undertaken an in-depth evaluation of the situation and of the risk/benefit ratio of each measure (proportionality of measures). The fundamental rights of persons warrant particular attention (see Siracusa Principles, Annex 29).

5.2 Coordination and resource mobilization

5.2.1 Objective of the coordination and resource mobilization committee

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

The coordination and resource mobilization committee should be comprised of a variety of partners who will undertake control activities, e.g.:

- Ministry of Health, Family Planning and Social Welfare (chair)
- Ministry of Agriculture, Livestock and Fisheries,
- Ministry of Defence (health services of the armed forces),
- National reference laboratory, which is often under the remit of the research ministry
- International partners, including, but not limited to: WHO, Médecins Sans Frontières (MSF), US CDC, UNICEF, USAID, FAO, OIE, Red Cross/Red Crescent, etc.

The national coordination and resource mobilization committee must draw up a list of all technical partners and donors participating in the management of the epidemic and keep them abreast of developments in the epidemiological situation and outbreak management.

In some countries, the committee may be attached to the national office for disaster risk management.

5.2.2 Competencies of the coordination and resource mobilization committee

The role and responsibilities of the national coordination and resource mobilization committee in coordinating outbreak control activities are described in Box 2.

Box 2. Responsibilities and tasks for the coordination and resource mobilization committee

The coordination and resource mobilization committee is responsible for the following tasks:

1. Adopt Ebola and Marburg epidemic control strategies as recommended by WHO (see paragraph 5.1).

2. Formulate a detailed outbreak response action plan.

3. Define the responsibilities of the different teams (national and international) present in the field.

4. Arrange for resource mobilization, together with partners.

5. Define information pathways for outbreak response activities.

6. Communicate regularly with the national and international press.

7. At the local level and with help from international partners, set up an international technical and scientific committee to coordinate epidemic control measures that will be responsible for organizing the daily activities of field teams.

8. Convene meetings to coordinate and monitor operations

9. Keep the national authorities abreast of developments in outbreak control activities.

10. Arrange for coordination with the authorities in charge of wildlife health surveillance (national parks, veterinary service, etc.).

11. Arrange for coordination with mine administration authorities if, for example, any Marburg cases are reported among miners.

12. Ensure regular field-staff turnover.

13. Avoid the implementation of restrictive measures in accordance with the IHR (2005).

14. Produce an end-of-epidemic report. This technical, administrative, financial, and logistical report should evaluate the economic and social impact of the epidemic and its management and sets forth recommendations to facilitate the management of subsequent epidemics.

5.2.3 Main activities of the coordination and resource mobilization committee

Ebola and Marburg outbreak control strategies are based on robust Ministry of Health leadership reflected, for example, in the establishment (or strengthening) of a national committee to coordinate control activities and mobilize resources.

WHO must coordinate international teams (MSF, Red Cross, GOARN, US CDC, UNICEF, etc.) and serve as a focal point for national and international teams.

The national coordination and resource mobilization committee is normally based in the country's capital and reports directly to the Ministry of Health. The national committee, with the assistance of international partners, must set up a local coordination committee to coordinate the daily activities of response teams in the field.

The structure of the local committee(s) is the same as that of the national committee: it holds daily coordination meetings with the representatives of partners working in the field; coordinates technical and scientific aspects of response operations for national and international teams; and oversees the proper implementation of strategies adopted by the national coordination committee.

Please note: in certain situations, the coordination and resource mobilization committee and the local coordination committee are one and the same institution, reporting directly to the Ministry of Health.

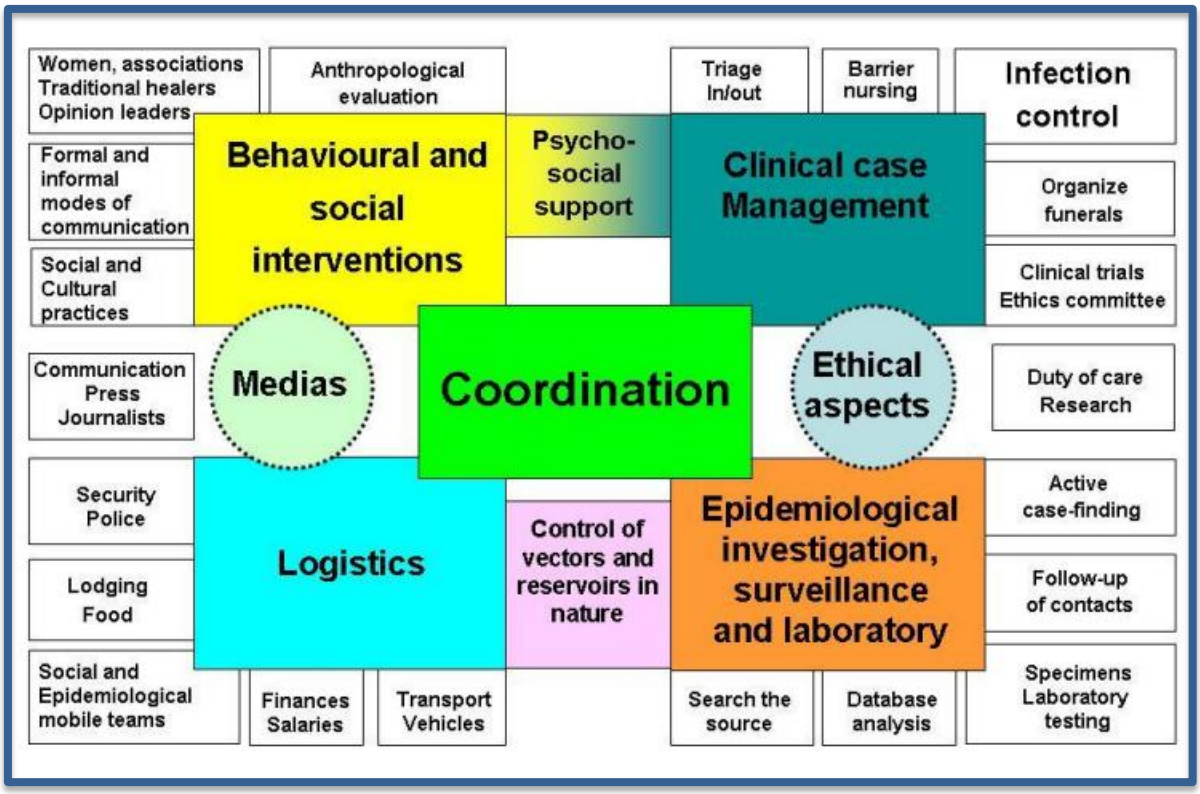
The local coordination committee is split into several subcommittees in line with the fundamental principles of the Ebola or Marburg outbreak control strategy. There are at least seven:

- Subcommittee on epidemiological investigation, surveillance and laboratory testing
- Subcommittee on behavioural and social interventions
- Subcommittee on media and communications/social mobilization
- Subcommittee on the clinical management of patients
- Subcommittee on research projects and ethical aspects
- Subcommittee on logistics and safety
- Subcommittee on vector control and natural reservoirs
- Subcommittee on psychosocial support

Generally, the subcommittees on logistics and safety and on media and communications/social mobilization report directly to the coordination and resource mobilization committee.

Figure 7 illustrates the multidisciplinary strategy of the various subcommittees used in Ebola or Marburg viral haemorrhagic fever (VHF) outbreak control activities.

Figure 7. Organizational structure of the different committees involved in Ebola or Marburg virus disease outbreak control activities



5.3 Coordination and resource mobilization

5.3.1 Objective of the subcommittee on epidemiological investigation, surveillance, and laboratory testing

The main objective of the subcommittee on epidemiological investigation, surveillance, and laboratory testing is to interrupt routes of transmission.

5.3.2 Competencies of the subcommittee on epidemiological investigation, surveillance, and laboratory testing

The subcommittee on epidemiological investigation, surveillance, and laboratory testing is responsible for developing an action plan together with the Ministry of Health, the Ministry of Agriculture/Livestock, the Ministry of the Environment/Natural Resources (in charge of wildlife), the military health services of the Ministry of Defence, and national and international partners.

This subcommittee is tasked with undertaking studies on the epidemiological situation in human and animal populations affected by the Ebola or Marburg outbreak.

It must:

- Set up and train mobile epidemiological surveillance teams and ensure that the training of the team includes essential communication skills and in-depth knowledge about the disease and prevention measures.
- Adopt a case definition adapted to the local context of the epidemic.

- Actively search for cases and investigate each reported case.
- For each suspected, probable, or confirmed case, draw up a list of contacts and monitor them over a period of 21 days.
- Publish daily epidemiological information in the form of a situation report.
- After consultation with the national reference laboratory and partners, deploy a mobile field laboratory, if required.
- Link up and coordinate human and wildlife epidemic surveillance.
- Collect the technical data that is necessary to declare the end of the epidemic.

5.3.3 Activities of the subcommittee on epidemiological investigation, surveillance, and laboratory testing

5.3.3.1. **Creating and training mobile teams:** The first priority should be focused on creating, training, and deploying mobile epidemiological surveillance teams.

5.3.3.2. **Adoption of a case and contact definition:** A case and contact definition must be adopted and then adapted to the local context of the epidemic (Annex 3C).

The case and contact definition must be functional should be adapted according to the clinical and epidemiological evidence collected.

5.3.3.3. **Active case-finding:** After adopting a case and contact definition in accordance with the local epidemiological context, arrangements must be made for active case-finding and each reported case must be investigated. (See Box 3.)

Box 3. Active case-finding

1. **Active case-finding** in health-care settings, including a review of consultation records and interviews with health-care workers, using the case definition (Annex 3c) must be undertaken.

2. Search for cases in the community by talking to local leaders and interviewing families and other key informants.

3. Fill in a standard investigation form for each case investigated (Annex 4).

4. After providing accurate and clear information to the patient, obtaining their express and/or informed consent, and provided biosafety conditions are met, collect biological specimens (blood, saliva, etc.) from each case being investigated.

5. Refer suspected and probable cases discovered in the community to the isolation ward for treatment by the clinical case management team.

6. Establish epidemiological links between cases and describe routes of transmission.

7. Record cases, deaths, and contacts. Generate a detailed database of reported cases and contacts.

8. Organize the most important case data in the form of a list, pending the creation of a digital database. Update the list of cases daily.

9. As part of contact tracking, collect the following information for each contact: name, address, relationship with the patient, date of last contact, type of contact. Enter this information into the database for cases and contacts. (See Section 5.3.3.4 and Box Y.)

5.3.3.4. **Follow-up of contacts:** After having identified and categorized the case, draw up a list of contacts for each suspected, probable, or confirmed case and monitor them over a period of 21 days. (See Box 4.)

Box 4. Activities required for contact tracing

1. Draw up a list of contacts for each detected case, using the definition of contact person (Annex 5)

2. Record contacts in the database under “case contacts”

3. **Monitor all contacts** over a period of 21 days after their latest exposure:

- Conduct a clinical evaluation of contacts if they become ill during that 21-day period (epidemiological and clinical evaluation in order to classify the case using the case definition)

- Refer contacts identified as suspected or probable cases to the isolation ward.

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

5.3.3.5. **Deployment of a mobile field laboratory**

Box 5. Activities required for deploying a mobile field laboratory

1. Following consultation with the national reference laboratory and partners, a team will evaluate options for deploying a mobile field laboratory based on the following criteria:

- number of suspected cases detected per day;

- number of contacts followed up per day;

- need for testing for differential diagnosis (e.g. concurrent Ebola and Shigella epidemics);

- availability of national laboratory resources;

- availability of (a) mobile laboratory/ies and human resources at the regional or international levels; and

- cost incurred by deployment of (a) mobile laboratory/ies.

2. If it is found to be necessary, set up a mobile field laboratory for the quick and differential diagnosis of Ebola and Marburg; this mobile laboratory will assist with the triage and management of patients, especially during large-scale outbreaks.

3. Set up a mobile medical laboratory to monitor patients’ biochemical, haematological, and immunological parameters in order to improve case management.

4. Encourage the collection of blood specimens (inactivated serum) from survivors to set up a blood bank which can be used for research and development to improve epidemiological and clinical knowledge of viral haemorrhagic fevers (VHFs). The national reference laboratory should coordinate this type of activity

5. The national reference laboratory should participate in the deployment of international mobile laboratories, participate actively in field diagnosis, and benefit from technology transfer.

6. Consolidate links between laboratories and WHO CCs for research on VHF and promote a regional approach and international cooperation.

5.3.3.6. **Liaise and coordinate between human and wildlife epidemic surveillance** (see paragraph 5.9.1 Enhanced wildlife surveillance):

1. A framework for **wildlife epidemiological surveillance** should be established in order to receive reports of suspected cases and raise awareness in rural populations of the need to report suspected cases in wildlife (i.e. animals found dead in the forest).

2. Establish and train mobile teams to investigate rumours and suspected cases in wildlife and provide them with supplies (e.g. sampling devices, personal protective equipment (PPE), etc.) for collecting specimens following biosafety protocols.

3. Organize the collection of biological specimens (i.e. blood, liver, and spleen specimens, if a necropsy is performed) for analysis following biosafety protocols.

4. Create and update a detailed database for reported animal cases.

5. Create a procedure and organize a sequence for diagnosis of disease in the wild animal population. To accomplish this, it will be necessary to organize the preparation and transport of specimens to the regional or central laboratory, make available the laboratory biosafety guidelines, and collaborate with technically advanced laboratories for more sophisticated testing.

6. Manage the flow of information regarding laboratory results.

7. Consolidate links with reference laboratories and WHO CCs and promote a regional and international approach.

8. Undertake studies to evaluate the risk of animal infection and formulate recommendations.

The subcommittee on epidemiological investigation, surveillance, and laboratory testing is also responsible for determining the date of the end of the epidemic, which is twice the maximum incubation period for Ebola or Marburg (42 days) since the last infectious contact with a confirmed or probable case (see Chapter 6).

5.4 Behavioural and social interventions

5.4.1 Objective of the behavioural and social interventions subcommittee

The main objective of the social and behavioural interventions subcommittee is to listen to and address community concerns and to rapidly promote the adoption of culturally-sensitive practices that reduce the risk of transmission within the community.

Given that there is no effective treatment or vaccine for Ebola or Marburg viruses, the only way to reduce the risk of human infections during an Ebola or Marburg outbreak is to engage in extensive dialogue and communicate the risk factors and the necessity of prevention measures that help reduce exposure and prevent further transmission of these viruses.

5.4.2 Competencies of the behavioural and social interventions subcommittee

The behavioural and social interventions subcommittee is tasked with:

- Identifying 1-3 specific behavioural interventions that support outbreak control objectives. This should be the foundation around which community dialogue and social mobilization strategies will be based.
- Conducting active listening and dialogue with communities in the affected and surrounding areas about the behaviours that are being promoted to reduce risk and protect local communities, information about the disease and its transmission modes, and outbreak control measures using appropriate channels,

including but not limited to: outreach to and education of village chiefs, use of printed support materials (posters, brochures, etc.) radio messages, and public meetings.

- Identifying at-risk populations, including but not limited to hunters, health-care workers, miners, persons handling the deceased and conducting funerals, traditional healers and midwives, wildlife officers, ecologists, et al, and home care-givers (often women, who are in charge of familial care and funerals), and carrying out specific communication activities with those groups.
- Providing feedback to the subcommittee and the committee on coordination and resource mobilization on community concerns and potential barriers to compliance with control measures.
- Promoting community adherence to the recommended outbreak control measures through a culturally sensitive, strategic mix of communication channels and activities.

5.4.3 Activities of the behavioural and social interventions subcommittee

5.4.3.1**. Among opinion makers** (government, traditional, community, religious, sports, etc.):

- Ask for their support and contribution to adapting control measures within the community settings and to identify potential barriers and solutions.
- Ask for their support to conduct and organize awareness-raising activities to enhance the involvement of all community entities
- Anticipate and mediate potential conflicts of interest within the community
- Request their support to organize and implement psychosocial assistance and support activities
- Mobilize all relevant community structures to promote compliance with prevention programmes and programmes to contain transmission of the disease

5.4.3.2. **In the community**

- Conduct intensive dialogue on the control measures and how it reduces exposure and transmission of the disease at home and in the community. Use trusted and credible people and appropriate channels (education of village chiefs, use of printed support materials – posters, brochures – radio messages, public meetings)
- Understand the views of the population from their sociocultural perspective and respond to their needs and concerns accordingly
- Engage with those in high-risk occupations (hunters, health care workers, nursing staff, miners, persons conducting burials, traditional healers, wildlife officers, ecologists, veterinarians, etc.)
- Identify and activate ways to reach women e.g. through women's organizations, because women are often the ones in charge of home care or funerals in the affected populations.
- Meet with traditional healers to bring awareness to VHF and promote the use of standard precautions
- Encourage community compliance with the recommended outbreak control measures
- Strengthen the capacity of community workers:
    - To promote the implementation of standard precautions when caring for sick people in the home and when handling and disposing of dead animals found in the forest,
    - To promote community participation in epidemiological surveillance at the community level (reporting, alert)

- Promote the organization of safe burials by specialized teams under the supervision of the medical team, respecting funeral ceremonies
- Encourage the community to take suspected viral haemorrhagic fever cases to see a health care worker (surveillance team) without delay.
- Discredit myths through providing responses that are both accurate and that resonate with the community

5.4.3.3. **In health-care facilities**

- Ensure that information concerning the patient is communicated to the family.
- To the extent possible, facilitate safe family visits to the patient.
- Also see Section 5.5 on Media and communications.

For Ebola and Marburg, the following information may be used at the community level

The investigation teams must identify the main transmission risks and experts must choose key information and priority interventions in accordance with local circumstances. This includes risk of:

- wild animal-to-human transmission;
- human-to-human transmission in the community through contact;
- human-to-human transmission in the community during funerals; and
- human-to-human transmission through inappropriate use of injection material.

1. In order to reduce the risk of **wild animal-to-human transmission following contact with wild animals** (e.g. monkeys and other primates, forest antelopes, porcupines, bats, etc.), after handling animal tissue, during slaughtering or butchering, and after consumption of raw meat:

- avoid touching already dead or sick animals in the forest;
- in Ebola- or Marburg-endemic areas, only eat bats and bush meat that have been well-cooked;
- during work, research activities, or tourism in mines or caves inhabited by bat colonies, wear gloves and appropriate PPE (including masks);
- wear gloves and other appropriate protective clothing when handling wild animals or their tissue and during slaughtering procedures;
- wash hands immediately after taking off gloves and other PPE.

2. In order to reduce the risk of **human-to-human transmission in the community through direct or close contact with infected patients**, especially body fluids:

- avoid touching the patient without protection. Any close physical contact with a suspected Ebola or Marburg patient must be avoided;
- avoid touching the patients' body fluids, either on the patient or in their environment;
- wear gloves and appropriate PPE in home-care settings;
- wash hands immediately after taking off gloves or other PPE;
- wash hands with soap each time after visiting sick relatives in hospital or after providing home care;

- report suspected cases detected in the community immediately to the response teams and send the patient to a health-care centre; and
- prohibit the injection of medication at home during outbreaks.

3. In order to reduce the risk of **human-to-human transmission within the community during funerals**, e.g. through direct or close contact with the body of the deceased, especially with body fluids:

- bury deceased Ebola or Marburg patients quickly and safely in the presence of their family or at least a representative and
- avoid touching the body of the deceased without appropriate protection.

4. In order to reduce the risk of **human-to-human transmission through inappropriate use of injection material** (needles, syringes, bottles, etc.):

- use only disposable injection material and
- refer persons requiring injections to a health-care centre for treatment.

5.4.4 Contribution of the Communication for Behavioural Impact methodology

Behavioural and social interventions can be implemented by following the Communication for Behavioural Impact (COMBI) method developed by WHO and its partners. This methodology is aimed at promoting the adoption of specific behaviours that reduce disease risk and protect health (Annex 10).

COMBI uses a systematic process to assess the outbreak control measures in their social, cultural, economic, and political settings to identify what is feasible, culturally appropriate, and technically sound. COMBI then proposes a strategic mix to promote the adoption of outbreak control measures through:

- administrative mobilization/public relations/advocacy and close cooperation with the national/federal, civil, political, military, and traditional authorities;
- interpersonal communication and counselling through dialogue;
- community mobilization through group discussions, meetings, etc.;
- promotion of service provision sites, such as clinics and special referral/information centres; and
- the development of information products and materials, as needed.

5.4.5 Contribution of medical anthropology

The behavioural and social interventions subcommittee should draw upon contributions made by medical anthropology in order to:

- address the widespread fear generated by Ebola or Marburg epidemics;
- identify diverse sociocultural behaviours of local populations and propose appropriate interventions;
- gain a better knowledge of virus transmission routes; and
- put a human face on interventions, striking a balance between compulsory measures and understanding and compassion.

During past Ebola and Marburg outbreak control operations, anthropologists have been part of the international response activities at various levels: epidemiological investigations, surveillance; patient and

family care; organization of burials; awareness-raising and mobilization; and ongoing vocational training (Annex 11).

Their presence has confirmed that the urgency and gravity of an epidemic should not prevent the different stakeholders from listening to the population and taking into account indigenous codes and knowledge of cultural customs, expertise, and beliefs.

The participation of anthropologists has contributed to a better understanding of virus transmission routes and the behaviours of populations. This has shed light on indigenous concepts of infection, disease, and death and helped to respond to crisis situations by ensuring an immediate cultural and psychological translation of discourse and events, especially reactions of defiance or even hostility from local populations. Many people in the affected populations, regardless of whether they are educated or illiterate, may not readily accept medical teams' explanations of the epidemic. Worn out by poverty and sometimes decades of war, they distrust the competency of politicians or national and international experts.

Ethnomedical studies point to the predominant indigenous explanations of misfortune: the disease is caused not only by the virulence of the virus and human behaviour, but also by the "evil" actions of humans and non-human forces.

In the case of Ebola and Marburg epidemics, since there is no treatment or vaccine, the virological model is just one explanation among others, thus giving free rein to deniers of microbiology and avid conspiracy theorists.

It is also important to think about pre- and post-epidemic phases in health districts with substandard public health facilities, especially on the periphery of national parks. In order to prevent the emergence of viruses from the forest, better living conditions and access to health care are vital for populations at the edge of national parks or rural areas. Imposing a ban on hunting, which is often deliberately ignored even by those responsible for policing it, is not effective.

Lastly, anthropological approaches suggests specific recommendations for a more humane approach to victims, whether alive or dead, and their families; that is to say, people must be treated as human beings and with human dignity, not just as bodies or groups of infected persons. This avoids further traumatization of a population that is already terrified and made vulnerable by a misfortune they struggle to understand. It helps to improve a population's compliance with medical and health recommendations when these are appropriately adapted to the local, cultural context.

In a situation where emergency operations leave little room for the individual, where the health measures imposed may add poverty due to the loss of a loved one, when analysing whether their proposals are appropriate and feasible and thus acceptable to the local population, medical teams must always ask themselves: Would these health measures be acceptable if the medical teams were in the place of the population affected, or if their loved ones were at risk?

It is important to remember that, in addition to instruction manuals and guidelines from various public health institutions, medical anthropology helps to devise measures tailored to local circumstances that juggle health constraints and local needs, whether these be ecological, economic, political, cultural, psychological, historical, or religious in nature.

Note: An additional contribution of medical anthropology has been the production of ethnographical videos on safe funeral rites, which have been disseminated during epidemics for the purpose of social mobilization and in the context of ongoing vocational training between epidemics (Annex 33).

5.5 Behavioural and social interventions

5.5.1 Objective of the media and communications subcommittee

The main objective of the Media communications subcommittee is to establish effective communication with the media.

5.5.2 Competencies of the media communications subcommittee

The logistics and safety subcommittee and the media communications subcommittee normally report directly to the coordination and resource mobilization committee.

Modern technology and the ability to rapidly disseminate information means, the press closely follows the management of epidemics, especially in the case of outbreaks of Ebola or Marburg virus disease.

There should be a strong link and mechanisms in place to exchange information rapidly between the media and communications subcommittee and the behavioural and social intervention subcommittee. This would allow for appropriate action and follow up on rumours and misinformation and communicating information and stories that explain and personalize outbreak control measures. A strong communications mechanism also helps demonstrate to the public that their local authorities are listening and responding to the concerns of local communities. This, in turn, supports transparency and trust.

Communication-related tasks are the following:

1. Develop a communication plan together with the Ministry of Health, the Ministry of Livestock/Agriculture, and the Ministry of the Environment/Natural Resources (responsible for wildlife) in order to convey coherent and comprehensive messages about Ebola and Marburg. If the Ministry of Defence is responsible for military health services, it must also be invited to participate in the development of the joint plan.

2. Focus on partnerships with the media and on providing effective communication to the public (the press can be a partner in an epidemic response).

3. Contribute to mobilizing resources for research projects by bringing on board the national and international press.

4. Train journalists to improve communication on Ebola and Marburg.

5. Train communicators in government and relevant institutions to enhance communication in crisis situations, including Ebola or Marburg outbreaks

Effective communication with the media is a key element in Ebola or Marburg epidemic management. According to WHO guidelines on outbreak communication (Annex 9), the effectiveness of the media and communications subcommittee is based on five critical best practices:

- **Build trust**: Building a trust-based relationship with the media is the basis for all effective communication and can result in messaging that informs, directs, and calms the public with regard to the outbreak response.
- **Announce early**: Early announcement of outbreaks through the media can contribute positively and effectively to early containment and builds public confidence.
- **Be transparent**: As much as possible, in disclosing important information, it is important to communicate in ways that are transparent, clear, and easily understood. Sometimes, however, transparency has appropriate limitations. For example, when it concerns confidential information about patients, ethical considerations may preclude the disclosure of information to the media.

- **Respect public concerns:** Public concerns will be diverse, but they are legitimate and should be explored and respected, as they can have an impact on how the public responds to an outbreak and how it adopts prevention and control measures.
- **Plan in advance**: Advanced outbreak communication planning should be part of outbreak management planning.

5.5.3 Activities of the media and communications subcommittee

The joint action plan must address the following activities:

1. Collect daily information from the response and coordination committee, including the latest updates, and write press releases to be communicated by the spokespersons of the main ministries concerned (health, livestock/agriculture, environment/natural resources, defence).

2. Set up a process for prompt preparation and release of press materials by relevant ministries in order to ensure quick dissemination.

3. Organize joint, prompt, regular, and transparent communication with the national and international press.

4. Organize shared news outlets to report on the latest developments (a first news outlet for announcing future activities is crucial, especially when it comes to social mobilization).

5. Write and distribute, including via the Internet, regular joint information bulletins or joint press releases.

6. Identify the most effective media to reach the greatest audience in urban and rural areas and get them to publish key messages about prevention (restrict practices that promote transmission) and surveillance (report rumours and suspected cases).

7. Hold a press conference to provide in-depth information to journalists about the current situation and about Ebola and Marburg, in general.

8. Take photos and record video (B-roll footage) of the work of the epidemic management teams in order to document their activities and make these photos and videos available to the media to raise awareness of response activities in the field.

9. Regularly meet with social mobilization, /health promotion, /and anthropologist teams to understand gaps and alter communication messages.

5.6 Clinical case management

5.6.1 Objective of the subcommittee for clinical case management

The main objective of the subcommittee for clinical case management is to ensure that patients are provided with proper care, that infection control guidelines are observed at all health facilities, and that the clinical care medical team organizes the funerals of victims respecting customs to help families with the grieving process.

5.6.2 Competencies of the subcommittee for clinical case management

The subcommittee for clinical case management is tasked with:

- Ensuring compliance with the inpatients' charter (Annex 12).

- Organizing the management of Ebola and Marburg patients and applying the Interim Infection Control Recommendations (Annex 15) in the affected area(s).
- Strengthening or introducing standard precautions in health care (Annex 13) for the management of all other patients in the affected area(s).
- Strengthening or introducing standard precautions in health care at all catchment hospitals outside the affected area(s).
- Organizing the safe transport of patients from their homes to health-care centres and treatment facilities.
- Organizing the burial of victims

5.6.3 Activities of the subcommittee for clinical case management

The management of Ebola or Marburg patients must be in compliance with the inpatients' charter of the respective institution (Annex 12):

- Patient safety in hospital is a fundamental right that must be guaranteed to all hospital patients.
- Nursing care staff must make the quality of reception, treatment, and care a priority.
- Hospital staff must offer psychological support to patients and their families.
- Patients and their families have a right to transparent, clear, understandable, accessible, and reliable information.
- Each medical intervention requires the free and informed consent of the patient. Consent may be given in writing or orally (Annex 26).
- In the framework of biomedical research, consent forms must be written in the national language. If the person is unable to give consent (e.g. if they are underage), then the free and informed consent of a parent or legal guardian is required. If the patient is illiterate, then a third party may act as witness.
- The patient's beliefs and religion must be respected.
- The patient's right to privacy and confidentiality must be upheld.
- Patients and their families must be given the opportunity to participate in health care decisions that affect them.

Treatment is based on:

- Palliative care: rehydration is essential (oral or others depending on circumstances), and should include maintenance of electrolyte balance (for example with a potassium supplement) and kidney and liver function support.
- Symptomatic treatment: pain-killers, antiemetic against vomiting, anxiolytics to combat anxiety, antibiotics, antimalarial remedies.
- Intensive care: use of oxygen.
- In the event of severe bleeding and if intravenous therapy is an option: transfusion of blood or previously-tested blood components (i.e. red blood cells, platelet concentrates, fresh frozen plasma).
- Use of equipment to monitor biochemical and blood values of patients to maintain electrolyte balance.
- Do not use products containing salicylates (i.e. acetylsalicylic acid/aspirin) or other nonsteroidal anti-inflammatory drugs (NSAIDS) as these cause the blood to thin and increase the risk of bleeding.

- At the current state of knowledge, serotherapy is not recommended for the treatment of Ebola or Marburg.
- The outcome of the laboratory diagnostic test for Ebola or Marburg, which is important for classifying suspected cases in the field.

ATTENTION. In case of accidental exposure (needlestick injury, contact with body fluids, etc.):

- Immediately wash with soapy water (use pure water for the eyes)
- Report the incident immediately to a supervisor.
- Monitor the exposed person for a period of 21 days, including overall condition, psychological condition, temperature, etc.

Patients (or their families, if they are unable to do so) must give their express consent to hospitalization. If the patient refuses, home care must be arranged in order to reduce the risk of disease transmission in the home and should include a provision of protective equipment. Home care must be an exception, as it does not offer the same degree of safety and quality of care as a hospital. For a detailed description of home care, see Annex 16. For additional information about forced isolation or confinement, see Section 5.8.

The subcommittee for clinical case management, in cooperation with the psychosocial support team, must develop a protocol for the reintegration of returning patients into their families and their communities (Annex 17). Successful reintegration of Ebola and Marburg survivors requires in-depth dialogue with the families and village chief prior to their return to the community. By agreeing to care arrangements proposed by the medical team, the patient enhances his/her chances of getting better and preventing transmission within their family or the community, which reaffirms the message that patients can successfully return to their communities.

The subcommittee for clinical case management must provide the patient with a medical certificate upon release. The certificate must state that the patient poses no risk to his/her family or neighbours. Male patients must be informed that their sperm may still be contagious for a period of three months and they should only have protected sexual relations during this period. The medical team must provide a sufficient supply of condoms. This warning must be stated on the medical certificate issued on release.

New vaccines and therapies (i.e. antivirals, monoclonal antibodies) against Ebola and Marburg have not yet been released for large-scale use in the field. A strategy involving post-exposure immunization with recombinant vaccines or monoclonal antibodies (e.g. after contact with an Ebola case or exposure to the virus) may be proposed soon, but the research protocols need to be submitted to the ethical research committees of the countries concerned prior to their implementation (see Section 5.8).

Box 3. The right to compassionate and available treatment

Ebola and Marburg outbreaks constitute a public health threat in Central and West Africa. These epidemics have a devastating effect on the health system, as they lead to profound social upheaval among the local inhabitants and are associated with a case fatality rate ranging from 25% to 90%. To date, no vaccine or antiviral treatment has been approved for human use. Care is currently palliative and supportive.

On very rare occasions, accidental inoculation with Ebola or Marburg has occurred among persons working in maximum containment biosafety laboratories in industrialized countries. In 2009 in Germany, a scientist accidentally pricked herself with a needle contaminated with the Ebola virus. In less than 48 hours, an experimental recombinant vaccine developed in Canada was made available for post-exposure treatment. This was the first human use of the vaccine. The decision to use the vaccine was taken following consultations among German and Canadian experts. Since 2007, scientists have shown that the vaccine was highly effective for post-exposure protection of experimentally infected primates. The scientist survived, but it is unclear whether this was due to the vaccine treatment or if she was never infected through the needlestick. Efforts to provide the German scientist with a greater chance of surviving possible infection with a deadly agent like Ebola are commendable and justified.

Making post-exposure treatment available during Ebola and Marburg epidemic control operations in Africa is feasible and would certainly be highly beneficial, especially for health-care workers who are required to provide care to infected patients. From a moral and ethical point of view, it is legitimate to ask that the same efforts be made to make the experimental vaccine available for post-exposure treatment in Africa, as was the case in Germany.

5.6.4 Standard precautions in health care

5.6.4.1 Management of Ebola or Marburg patients in the affected area(s)

In the affected area(s), the subcommittee for clinical case management, which includes infection prevention and control, must ensure the implementation of adequate barrier nursing procedures for the management of Ebola or Marburg patients (Annex 15). This includes:

- establishment of an isolation ward;
- training of health-care workers required to work in the isolation ward;
- supply and verification of personal protective equipment (PPE; masks, gowns, boots, etc.) and special instruments for safe invasive procedures;
- safe transport of patients to the isolation ward;
- decontamination of soiled areas and the transport vehicle;
- safe management of health-care waste (Annex 14);
- examination and triage of patients on admission to the isolation ward;
- drafting and posting of a standard treatment protocol; and
- supplying patients with medication and necessary equipment.

- In the isolation area, the medical team is responsible for the well-being of hospitalized patients (water, food, light, hygiene) and patients should receive medical care and food free of charge.
- Patients should receive regular visits from their doctor(s).
- Family visits to patients. For their own safety, visitors must wear adequate PPE.
- Restrict access to isolation areas in order to:
    - safeguard the patient's privacy and dignity (e.g. prevent intrusion by the media) and
    - prevent contamination of visitors and the spread of the disease.

5.6.4.2 **Management of Ebola or Marburg patients in the affected area(s)**

The subcommittee for clinical case management must promote the implementation of standard precautions in health care (Annex 13) in the management and care of all other patients at all healthcare facilities, both by health-care workers and, as may be requested by the patient, by traditional healers, in the affected area(s).

5.6.4.3 **Outside the affected area(s)**

The subcommittee for clinical case management must ensure the implementation of standard precautions in health care at all catchment hospitals.

5.6.5 Organization of burials by the subcommittee for clinical case management

During Marburg and Ebola epidemics, any unprotected handling of the bodies of infected patients who have died constitutes a biosafety hazard. The management of burials is therefore the responsibility of the clinical case management or medical team, in collaboration with experts in infection prevention and control.

The subcommittee for clinical case management is tasked with constituting an expert team to oversee the safe burial of victims. This team must adhere to the following key principles:

- Verbally convey condolences and sympathy to the victim's family.
- Clearly, but empathetically, explain the procedure for the handling of remains for those who have died from Ebola or Marburg and outline how and why procedures for preparing the body for burial and the actual burial itself will need to differ from standard/local traditions. If a psychologist is available, collaborate with them in communicating with the family of the deceased (see Section 5.7.3).
- Conduct the burial as a funeral ceremony, with respect for the deceased, to help the family in their grieving process.
- During the funeral ceremony, explain to those in attendance what the disinfection protocol and burial standards are in order to prevent direct contact with the blood or body fluids of the deceased and why this is important.
- Ensure that the patient's home is disinfected.

Health-care workers, family members, and the burial team must observe standard precautions in health care when handling an Ebola or Marburg victim. This includes the use of PPE, compliance with hand hygiene guidelines, and standard precautions for contact with infected blood, body fluids and materials, especially splashes on surfaces.

As per the Interim Infection Control Recommendations for Care of Patients with Suspected or Confirmed Filovirus (Ebola, Marburg) Haemorrhagic Fever (Annex 17), the main recommendations are:

- The handling of human remains should be kept to a minimum
- The following recommendations should be adhered to in principle, but may need some adaptation to take account of cultural and religious concerns and should be communicated to the family members of the deceased:
    - Remains should not be washed or embalmed.
    - Only trained personnel should handle remains during the outbreak and following death.
    - Personnel handling remains should wear PPE (gloves, gowns, tyvek suit, surgical masks, and eye protection) and closed shoes that can be disinfected.
    - The remains must be placed in a waterproof body bag or, if no body bag is available, wrapped in a sealed, leakproof cloth or bag and then, if possible, placed inside a coffin. Remains should be buried promptly.
    - Protective equipment should be put on at the site of collection of human remains and worn during the process of collection, placement of the body in a body bag, and placement of body bag into a coffin. The PPE should only be removed once the body is secure in the coffin.
    - During the transport of the coffin, neither the personnel riding in the cab nor relatives accompanying the coffin on the rear cargo area of the vehicle, are required to wear PPE. However, the bearers of the coffin must wear thick gloves.
    - At the family's request, the coffin may be buried in accordance with local beliefs. The family may help carry the coffin to the cemetery under the supervision of the clinical case management or medical team.
    - It is strongly recommended that the graves of Ebola and Marburg victims be identified, in accordance with local customs.

If the patient died while in hospital, the remains should ideally be dealt with in a special care unit (this may be the patient's room in the hospital or the autopsy room, if an autopsy was performed on the patient).

For home interventions, the burial team must have at least three people wearing PPE: two for handling the remains and one for carrying and administering the disinfection spray throughout and around the home. However, if the body is exceptionally heavy, additional people may be needed. On the periphery of the work area, one person, dressed normally, should observe, coordinate, and guide the team in their handling of the deceased.

5.7 Psychological management

5.7.1 Objective of the psychosocial management subcommittee

The main objective of the psychosocial management subcommittee is to ensure the availability of psychosocial support for families of victims, the community, and health-care workers.

5.7.2 Competencies of the psychosocial management subcommittee

The psychosocial management subcommittee is tasked with:

- Providing psychosocial assistance to families, especially by reducing funeral-related stresses.

- Ensuring that the families of victims receive compensation for objects destroyed during disinfection.
- Providing psychosocial support to health-care workers.
- Pre-empting stigma and facilitating the social reintegration of recovering patients and victims' families into their communities.
- If necessary, identifying and creating a mechanism for looking after orphans

5.7.3 Activities of the psychosocial management subcommittee

By their very nature, Ebola or Marburg outbreaks cause anxiety, fear, and even panic. Individuals, families, or entire communities may be affected. People may lose their loved ones, be separated from their families or their community, or witness violence or destruction of goods. Everyone is affected by these events; many people may feel overwhelmed, confused or lost. Some may react mildly, while others may react very strongly.

Some people are particularly vulnerable during outbreaks and may need extra help. This includes people who may be exposed to infection risk (contact persons, families, hunters, health-care workers, et al.), persons who need extra support because of their age (children, the elderly) or who may have a mental or physical disability, or because they belong to groups that may be marginalized or targeted for violence.

During Ebola or Marburg outbreaks, public health activities are crucial, but must be complemented by social and mental health interventions. Social interventions do not typically fall within the expertise of mental health professionals, but they address important issues that have repercussions on mental health. In order to ensure the implementation of appropriate social interventions, healthcare and mental health professionals must cooperate with other community intermediaries, such as teachers, village chiefs, religious leaders, child protection networks, women's groups, social services, the media, community-based organizations, and where appropriate, traditional healers.

Social interventions during the outbreak

- Establish and disseminate an ongoing flow of credible information about: (a) the nature of the disease and the recommended methods for reducing the risk of infection; (b) the availability of medical evaluation and treatment and how and where to obtain them; (c) any other relief efforts (including what each aid organization is doing) and where they are located. Information should be disseminated according to the principles of risk communication: it should be timely (to avoid prejudicial rumours), readily comprehensible (i.e. understandable by 12-year-olds) and emphatic (see Section 5.5 and Annex 11).
- In order to promote their active participation, field officers should be briefed in the area of health and social welfare, particularly regarding issues of fear, grief, disorientation, and the needs of the population.
- If feasible, set up a telephone support system to reduce the isolation of hospitalized patients.
- If the area affected by the epidemic is quarantined, enhance access to communication with absent relatives and friends.
- Reduce funeral-related stress. Burial arrangements must help the family's grieving process (see Section 5.6.5). If at all realistic, local cultural and religious customs should be respected. The bereaved need to have the possibility to conduct ceremonious funerals and – assuming that it is not mutilated or decomposed – see the body to say goodbye. Remember to organize death certificates to avoid unnecessary financial and legal consequences for relatives.

- Once the epidemic is over and assuming the activity is safe and it does not violate infection prevention procedures, encourage the resumption of social activities that may have been interrupted as part of the effort to curb human-to-human transmission (see Section 6.3)

Mental health interventions during the outbreak

- As far as possible, manage acute distress without medication following the principles of psychological first aid (Annex 21): listen; convey compassion; assess needs; ensure basic needs are met; do not force people to talk; provide or mobilize company, preferably from family or close friends; encourage but do not force social support; protect from further harm.

- Psychological first aid is basic, natural support, and can be taught quickly to health-care professionals, non-experts, volunteer carers, and other community resource persons (e.g. teachers, clergy).

- This psychological first aid should be made available in the community and at health-care centres. It should also be made available to grieving relatives. An essential component of this psychological first aid is protection, which is important because feelings of anxiety linked to a disease like Ebola or Marburg may lead people to behave irrationally in ways that put others in jeopardy.

- Manage urgent psychiatric and neurological complaints (e.g. psychoses, severe depression) as soon as possible. Ensure availability of essential psychotropic medication at all levels of the health-care system to guarantee treatment for persons suffering from pre-existing psychiatric disorders. Health-care workers should avoid mass prescription of benzodiazepines to treat acute anxiety. Over-prescription of benzodiazepines is common in health crises and is associated with potential dependence.

- Develop contingency plans for the management of psychotic, difficult-to-control, and contagious patients (e.g. reserve a separate hospital room for such patients).

5.8 Research projects and ethical issues

5.8.1 Objective of the subcommittee on research projects and ethical issues

The subcommittee on research projects and ethical issues operates in two contexts: research and clinical management. The main objectives of the subcommittee are:

In research context

- Make sure that all research protocols proposed by national and international teams have been reviewed for their scientific merit.

- Make sure that the projects have been reviewed by a research ethics committee.

- Help protect patients' rights in clinical research activities.

- Please note that the subcommittee does not review the research protocol itself, but instead must consult the national research ethics committee. If the country does not have a research ethics committee, the evaluation may be undertaken at the regional or international level (Annex 27).

In the clinical management context

- Make sure that the principles of medical ethics (Annex 22) and patients' rights are respected:
    - Information transparency with respect to screening and communication of results
    - Express written or verbal consent
    - Confidentiality of personal data and respect for privacy

- Non-discrimination
- Equal access to care

- Reaffirm that health-care workers in charge of Ebola or Marburg patients have an obligation to deliver care to the patients, subject to certain limitations (see below).
- Make sure that the patient rights are respected when imposing what may be perceived or misunderstood as coercive health measures, in cooperation with the clinical case management team.

5.8.2 Competencies of the subcommittee on research projects and ethical issues

During Ebola or Marburg epidemics, research may be conducted in different areas: clinical research; therapeutic trials; vaccine trials; physiopathology; epidemiology; laboratory tests; ecology; anthropology; and social sciences.

Within the research context, the subcommittee on research projects and ethical issues is tasked with contributing to:

- Identifying key research topics, giving priority to projects that benefit the affected populations directly.
- Informing response teams that all research proposals must be submitted for review of their scientific and ethical merit.
- Drawing up a list of research proposals and submitting them for scrutiny to national and/or international experts.
- Making sure that researchers have submitted all research protocols to the local (institutional or national) ethics committee. If the country does not have an ethics committee, evaluation may be undertaken at the regional or international level.
- Informing the heads of research projects of the final decisions of the subcommittee on research projects and ethical issues and/or the national ethics committee.

Within the clinical management context, the subcommittee is tasked with making sure that:

- Patients' rights are respected.
- Health-care workers fulfil their duty of care.
- The national authorities have provided the necessary means for the implementation of infection control recommendations to care for Ebola or Marburg patients.
- With the assistance of the national ethics committee of the country concerned or any other experts, recommendations have been made on ethical implications of clinical management of patients, e.g.:
    - Placement in isolation
    - Quarantine
    - Border control
    - The creation of a quarantine line and restrictions on community interaction
    - The role and duties of nursing staff during an Ebola or Marburg outbreak, including moral, professional, contractual, and legal obligations.

5.8.3 Activities of ethical research subcommittee

Within the context research

1. Identify a local ethics committee

During an Ebola or Marburg outbreak, one of the first actions of the ethical research subcommittee is to find out where there is a local or national research ethics committee. If there is none, the subcommittee must refer the protocol to a regional (Regional Ethical Committee: AFRO REC) or international ethics committee for review.

2. Writing research protocols

Considering the unpredictable nature of Ebola or Marburg epidemic outbreaks, medical teams wishing to establish research protocols during these outbreaks should prepare general research protocols in advance, particularly as regards clinical research, therapeutic trials, and vaccine trials.

These general research protocols should be written during the pre-epidemic phase. They should then be pre-approved by: the ethics committees of the research institute concerned, the WHO Ethics Committee, and the ethics committees of Central African countries. During the outbreak, they should be adapted to the local context and submitted to the subcommittee on research projects and ethical aspects for final approval prior to their implementation.

3. Importance of pre-epidemic activities

Today, the ethical review of research protocols prior to implementation of a study constitutes an essential requirement for quality research in all countries. Given the importance of ethics committees during Ebola or Marburg outbreaks, these must be set up during the pre-epidemic phase. Training modules for research ethics evaluation are available on the Internet (Annex 28).

The World Health Organization (WHO) and the Council for Health Research for Development (COHRED) have established a global Internet platform (Health Research Web: HRWeb) which provides practical information and tools to assist countries and individuals in managing their national health research systems more effectively and strengthening the role and conduct of research authorities (Annex 27).

Additional information may be found in each country on research governance and policies, national priorities, health research institutions and networks, national ethics committee focal points, and the review committees responsible for national health research.

Within the context of clinical management of patients

1. Rights and duties of health-care workers responsible for Ebola or Marburg patients

With the support of international teams, the national authorities have an obligation to provide health-care workers with the necessary means for implementing infection control recommendations to care for Ebola or Marburg patients (Annex 15). The authorities have an obligation to:

- Train, equip, and protect persons in charge of Ebola or Marburg patients.
- Provide health-care workers with the capacity and knowledge to implement barrier nursing techniques.
- Set forth clear guidelines on the conditions under which health-care workers should operate, what is expected of them, and the inherent risks of the situation.
- Provide for adequate compensation for the services provided by health-care workers; this may be in the form of risk premiums and insurance for them and their families and disability benefits for those who contract the infection.

Provided that health-care workers have training, supplies, equipment, infrastructure, and reasonable support for implementing barrier nursing techniques, they can legitimately be expected to provide care to Ebola and Marburg patients. When that is the case, they have a moral obligation to provide care to Ebola and Marburg patients, even if doing so carries a certain risk.

Doctors' duty of care is closely linked to the duty of health-care systems to fulfil their obligations vis- à-vis the safety of health-care staff (and vice versa). If this is not the case and health-care system caregivers are exposed to considerable risk as a result, the refusal to work is morally justified. In such cases, it is the system, rather than the individual caregiver, that carries the moral responsibility for any complications arising for patients.

Important: If health-care workers believe that working conditions are unsafe, they must draw the attention of the local and national authorities to the situation. Governments and health-care systems have an obligation to make the necessary change, without jeopardizing improving infection control precautions, to ensure that staff can provide care safely.

2. Coercive health measures: what should be done if the patient refuses isolation or treatment?

The management of Ebola or Marburg cases must take place on a voluntary basis. Patients (or their families, if the patient is unable to do so) must give their informed consent and cooperation. Involving patients in the decisions about their treatment shows respect for them, favours their autonomy, and improves the likelihood of their cooperation with the medical team. It is, in fact, very rare for persons who have been well informed about the drawbacks and benefits of treatment for Ebola to refuse care.

Sometimes, although reasonable efforts have been made, patients may not want to receive care in a health centre. If the patient refuses, home care must be organized in order to reduce the risk of transmission in the home or in the community. Home care must be the exception, as it does not offer the same degree of safety and quality care as a hospital (Annex 16). It must be seen as a means of dialogue and communication with relatives in order to encourage them to accept referral to a hospital isolation unit at a later stage.

The forced isolation of patients who agree to home care is futile and inappropriate. So long as the interest of the community is not in danger, home care is always preferable to forced isolation.

Isolation must never be used as a form of either literal or perceived punishment. Patients who refuse treatment and thus put the community at risk must be informed well in advance that their refusal may lead to forced isolation.

The forced isolation of Ebola or Marburg patients must be used only as a last resort.

If, on rare occasions, forced isolation is deemed the only reasonable way to protect the public, implementation of the measure must be based on respect for ethical values and human rights. As enunciated in the Siracusa Principles (Annex 31), this means that these measures must be:

- in conformity with the law;
- in the interest of a legitimate objective;
- strictly necessary in a democratic society;
- applied when there are no less intrusive and restrictive means available; and
- not imposed arbitrarily, unreasonably, or in a discriminatory manner.

5.9 Logistics and safety

5.9.1 Objective of the logistics and safety subcommittee

The main objective of the logistics and safety subcommittee is to provide logistical support for field operations and guarantee the safety of response teams.

5.9.2 Competencies of the logistics and safety subcommittee

The logistics and safety subcommittee reports directly to the coordination and resource mobilization committee.

The logistics and safety subcommittee is responsible for:

- the management of material resources needed in control activities;
- the transport of teams and equipment;
- the shipment of patient specimens;
- bookkeeping and the management of human resource deployment;
- field security management; and
- coordination of activities and logistics requirements in conjunction with other subcommittees and their activities.

5.9.3 Competencies of the logistics and safety subcommittee

Telecommunications

Install a telecommunications system to facilitate communication with field teams (VHF radio) and national and international authorities (telephone, Internet).

Establishment and management of a field office

At the source of the outbreak:

- Set up operational offices for staff activities and committee meetings.
- Organize bookkeeping (minor purchases, payment of per diems and salaries, etc.)
- Order office supplies (computers, printers, photocopier, GPS).
- Draw up an inventory of locally available resources (material and human).
- Order and replenish supplies in a timely manner.

Transport and relocation of staff

- Administer vehicle fleet and other means of transport needed for team response activities, including: surveillance, social mobilization, burials, etc.
- Coordinate the relocation of mobile teams (surveillance, social mobilization, funerals).
- Plan for the rotation of domestic and international staff.
- Coordinate travel arrangements for international staff.

Programme support and supply

- Ensure the supply and transport of personal protective equipment (PPE) (gowns, masks, goggles, boots, etc.)
- Ensure the supply of PPE and disinfectants for infection response teams and safe burial teams.
- Manage health-care waste and isolation units in coordination with the subcommittee for clinical case management of patients.

Administration, safety, and protection

- Depending on the circumstances, provide food for patients and response teams or ensure that such provisions are made by the relevant groups and agencies.
- Guarantee the safety of premises and staff involved in outbreak control activities.
- Brief staff on safety-related matters prior to field deployment. Where necessary, organize staff training in logistics.

5.10 Environmental management

5.10.1 Enhanced wildlife surveillance

Experience has shown that Ebola epidemics in wild animals often precede human outbreaks. During outbreaks, it is thus important to step up wildlife monitoring activities and develop operational cooperation between animal health services and public-health authorities to ensure early warning of possible human Ebola outbreaks.

As soon as there are rumours of animal die-off, national park services (or veterinary services) should take specimens from dead animal carcasses for diagnostic purposes, using protective equipment. The specimens must be sent to a reference laboratory for analysis.

As soon as animal cases are confirmed, animal health services must alert the public health authorities so they can put in place programmes to prevent a human outbreak.

In this context and above all, Ebola prevention messages should be disseminated among hunters and forest dwellers. These key messages may be the following (see Section 5.4.5):

- o not touch animal carcasses found in the forest;
- do not touch monkey, gorilla, or chimpanzee carcasses found in the forest;
- report information about animal carcasses in the forest to the national park services;
- do not hunt in areas where animal carcasses have already been found;
- avoid contact with animal blood when butchering animal carcasses at home, in the forest, or at the market, by wearing waterproof or plastic gloves;
- wash hands immediately after taking off the gloves or other PPE; and
- do not eat raw meat or organs and cook meat well prior to consumption.

5.10.2 Enhanced wildlife of mines

During recent outbreaks of Marburg virus, all index cases were mineworkers working in mines inhabited by thousands of infected bats. Often mineworkers do not use PPE or do not wear the full required PPE and wear only boots and gloves. Work in mines and regular exposure to bats in an enclosed space results in a high infection risk among mineworkers.

Surveillance of haemorrhagic fever cases is thus particularly important in those parts of Africa where mines are infested with bat colonies. Mining companies must ensure mineworkers' safety in order to reduce the risk of contamination.

In this context, the messages for preventing Marburg should be disseminated above all in mining companies and among mineworkers. These key messages may be the following:

- Make sure that the mine is well ventilated
- Ensure that masks, helmets, gloves, and boots are worn.

5.10.3 Veterinary surveillance of domestic pig farms

In 2008-09, the Ebola Reston virus was isolated in pigs in the Philippines following an outbreak of porcine reproductive and respiratory syndrome (PRRS). Moreover, human infection through exposure to infected pigs has been demonstrated in workers on pig farms and in slaughterhouses.

Experimental inoculation of laboratory animals showed that pigs are susceptible to infection with the Ebola Zaïre virus, which can reproduce and spread among them. Pig farms in outbreak areas must therefore be considered potential sites of virus amplification and the attendant risk must be managed.

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

- Establish a clinical and serological surveillance system of pig farms throughout the affected area so that any circulation of the virus on farms can be rapidly detected.
- If there are any confirmed pig cases, the veterinary services should alert the public health services immediately so they can put specific prevention programmes in place.
- If circulation of the virus on pig farms is confirmed, drastic health measures (slaughtering of infected animals, destruction of carcasses, compensation to farmers for the loss of earnings, restriction and regulation of movement of domestic pigs from the infected areas, quarantining of farms, all other measures recommended by international regulations) must be implemented in order to eradicate the infection in the pig population.
- Adopt measures to prevent animal-to-human transmission of the infection on all farms, including:
    - Avoiding direct contact with the blood or organs of sick animals or carcasses: do not cut the throat or handle carcasses or foetuses of domestic pigs without protection.
    - Wearing gloves and a mask (or any other protective device such as plastic bags on hands or a cloth to cover the mouth to avoid direct contact) when handling sick animals or carcasses, especially during birth assistance (foetus and placenta), cutting animals' throats, and burying carcasses.
    - Wearing good protective goggles when slaughtering or performing autopsies on infected animals.

    - Washing hands with disinfectant or soap immediately after contact with the body fluids of an animal.
    - Cooking all animal products (blood, meat, and milk) well prior to consumption.

- Strengthen the food production system by ensuring contaminated pork does not enter the food chain and supervising home-based slaughter and slaughterhouses.
- Implement appropriate biosafety measures in order to prevent the introduction of the Ebola virus into pig farms by bats (e.g. ban fruit trees on farms and within a perimeter of up to 50 metres around farms, put up nets to keep the bats off the pig farm, etc.)

The international veterinary authorities must ensure compliance with the standards for international trade in animals and animal products developed by the World Organisation for Animal Health (OIE).

Human and animal health response teams must collaborate with pig farmers, retail butchers, and exporters to enhance their understanding of the risks of spreading the disease by moving animals around and to get them involved in prevention activities.

Chapter 6 – After: What should be done once the epidemic is over?

6. After: What should be done once the epidemic is over?

6.1 Declare the end of the epidemic

The government(s) of the affected country(ies), in collaboration with WHO, declares the end of the epidemic at the recommendation of the coordination and resource mobilization committee. The subcommittee on surveillance, epidemiology, and laboratory testing, which is responsible for establishing the date of the end of the epidemic submits the date to the coordination committee.

This date is twice the maximum incubation period for Ebola or Marburg (42 days) since the last infectious contact with a confirmed or probable case.

The national authorities, in collaboration with WHO and international partners, should use the official announcement of the end of the epidemic as an opportunity to thank national and international actors involved in fighting the epidemic and the press. They should also formally convey their solidarity and empathy with the victims, victims' families, and the populations affected.

6.2 Resume the activities of the pre-epidemic phase

Once the outbreak is contained, the public health authorities should focus on the implementation of the long-term surveillance and prevention activities described in Chapter 3.

6.3 Medical follow-up of survivors

After the outbreak, the public health authorities should set up a medical follow-up with the patients who have survived the infection (e.g. ensure that all patients have fully recovered, follow-up possible medical complications, follow-up male patients regarding possible infectious sperm. See Section 5.6.3).

In addition, public health authorities should provide psychosocial follow-up for recovering patients (see Section 6.4).

6.4 Monitoring of recovering patients and social problems

After the outbreak, the public health authorities should provide psychosocial follow-up for recovering patients. The social and mental health interventions recommended during the post-epidemic phase are described below.

In addition to these interventions, comprehensive public education campaigns should be conducted to address social stigma and exclusion of former patients and health-care workers resulting from the public's potentially excessive fear of contagion, contamination, or any other commonly held belief.

<u>Social interventions during the post-epidemic phase</u>

Resume social activities at the end of the epidemic

- The prohibition of social gatherings during the epidemic interrupts cultural and sporting activities. The declaration of the end of the epidemic is always a great relief for the local population and should go hand-in-hand with an official resumption of social activities.
- Assuming the activities are safe (i.e. they do not violate standard infection prevention procedures), encourage the resumption of normal cultural, sports, and religious events (including grieving rituals in collaboration with spiritual and religious leaders).
- Encourage activities that facilitate the social inclusion of the bereaved, orphans, widows, and widowers.
- Help organize recreational activities and encourage children's return to school, even partially.

Conduct the appropriate social interventions described in Section 5.4.

Mental health interventions during the post-epidemic phase

- **Train and supervise health centre staff in basic mental health knowledge**. This should include: assessment of mental disorders; psychological first aid; supportive counselling; working with families; provision of appropriate psychotropic medication; suicide prevention; management of medically unexplained somatic complaints; management of organic mental disorders; substance use issues and referrals.

- **Train and supervise community workers to assist health centre staff with heavy case loads**. Community workers may be volunteers, paraprofessionals, or professionals, depending on the context. They must be thoroughly trained in a number of core skills: assessment of individual, family, and group perceptions of problems; psychological first aid; providing emotional support, grief counselling, stress management, and problem-solving counselling; mobilizing family and community resources and referrals.

- **Educate humanitarian aid workers and community leaders (e.g. village chiefs, teachers, etc.) in core psychological care skills**. Including: psychological first aid; emotional support; providing accurate and appropriate information; answering frequently asked questions; encouraging practical ways of coping; recognition of core mental health problems in order to raise awareness and community support and to improve the effectiveness of referrals.

- **Facilitate the creation of community-based self-help support groups.** The focus of such self-help groups is problem sharing, brainstorming for solutions or more effective ways of coping, generation of mutual emotional support, and sometimes the encouragement of community-based initiatives.

6.5 Produce the end-of-epidemic report

The main purpose of the end-of-epidemic-report is to describe the activities conducted during the epidemic, as well as constraints and difficulties encountered. This report is an important document detailing the management of the epidemic and the lessons learnt. It should be produced by the coordination committee and include a technical analysis and a financial and management report.

Upon completion, the report should be submitted for adoption to a working group made up of national experts and technical partners and subsequently be distributed to national authorities and national and international partners.

To the extent possible, the authors of the report should write articles on key information and recommendations contained in the report for publication in scientific journals or national or international magazines so that key challenges and lessons learnt are officially documented and available to the greater public health community.

6.6 Keep records on the epidemic

- Collect all reports, photographs, and other documentation on the management of the epidemic.

- Keep all records in a readily accessible location for future use.

6.7 Evaluate the management of the epidemic

Once the Ebola or Marburg outbreak is contained, the public health authorities and partners may decide to conduct an evaluation mission in order assess the quality of epidemic response interventions, draw lessons, and make recommendations for better management of future VHF epidemics. If at all realistic, the evaluation should be undertaken by a team of national experts and technical partners.

In the evaluation, the different components of the response strategy will be scrutinized: coordination; relationship with the media; epidemiological investigation; surveillance and laboratory systems; social and behavioural interventions; clinical case management; ethical and logistical aspects; and so on.

In its work, the evaluation mission should draw on meetings with Ministry of Health representatives, the end-of-epidemic report, records, and interviews with a range of target population groups (e.g. women's associations, opinion makers, hunting associations, etc.).

More specifically, the evaluation mission should:

- **Assess outbreak preparedness at the country level**
  - existence of an early warning system
  - existence of national and local outbreak control committees
  - existence of a national outbreak response plan
  - level of outbreak management training for health-care workers
  - level of public awareness
  - pre-epidemic availability of supplies and medicines for outbreak response at the national and local levels
  - existence of a working ethics committee
- **Evaluate epidemic response activities, especially in the following areas:**
  - global response strategy (procedures, strategies and actions, promptness of response and implementation of different phases, tools, partnership, etc.)
  - detection of the epidemic (investigation of rumours, laboratory confirmation, etc.)
  - establishment of a notification and report system: timeliness; accuracy of information/data; and completeness of reports
  - establishment of a surveillance and case detection system: timeliness; accuracy of
  - information/data; use of standard case definitions; contact follow-up/tracing
  - coordination of national and local epidemic management
  - clinical case management (evaluate the correct implementation of treatment protocols and the implementation and compliance with infection prevention and control precautions in health care)
  - behavioural and social interventions (including the evaluation of what worked well and what did not to inform what policies and standard operating procedures need to be adapted or changed)
  - provide an opportunity for community and partner feedback
  - suggest a mechanism to convey lessons learnt to local communities and partners
  - outbreak communication: information sharing with partners, the media and the public
  - hygiene and sanitation measures
  - logistics
  - safety
  - psychosocial management (especially assess the mental state of survivors, their families, and health-care workers who managed Ebola or Marburg cases)
  - resource mobilization

Formulate suggestions and recommendations on all areas reviewed and include them in the final report.

Once the evaluation report is completed, the results should be reported back to the national authorities and international partners and arrangements should be made for the report's dissemination.

Chapter 7 – Annexes

7. Annexes

Annexes on general information about Ebola and Marburg

Annex 1. WHO Ebola haemorrhagic fever fact-sheet (no. 103)

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

Annex 2. WHO Marburg haemorrhagic fever fact-sheet (November 2012)

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

Annex 3a. Standard case definition of viral hemorrhagic fever for routine surveillance

These case definitions are taken from the Technical Guidelines for Integrated Disease Surveillance and Response (IDS) in the African Region, available at the following web address:

http://www.afro.who.int/en/clusters-a-programmes/dpc/integrated-diseasesurveillance/features/2775-technical-guidelines-for-integrated-disease-surveillance-and-response-inthe-african-region.html

Suspected Ebola or Marburg cases for routine surveillance:

Illness with onset of fever and no response to treatment for usual causes of fever in the area, and at least one of the following signs: bloody diarrhoea, bleeding from gums, bleeding into skin (purpura), bleeding into eyes and urine.

Confirmed Ebola or Marburg cases for routine surveillance:

A suspected case with laboratory confirmation (positive IgM antibody, positive PCR, or viral isolation).

Note: During an outbreak, these case definitions may be changed to correspond to the local event.

Annex 3b. Standard case definition of viral haemorrhagic fever for community-based surveillance

This definition of “alert cases” of Ebola or Marburg virus disease has been developed for use by the community or community-based volunteers. It may be used for community-based surveillance during the pre-epidemic phase and during the outbreak.

Alert case:

Illness with onset of fever and no response to treatment of usual causes of fever in the area,

OR at least one of the following signs: bleeding, bloody diarrhoea, bleeding into urine

OR any sudden death.

Instructions:

If an alert case (living or dead) is identified:

Report the case of a surveillance team or to the closest health centre

Annex 3c. Examples of Marburg or Ebola virus disease case definitions that may be used during the outbreak

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

SUSPECTED CASE:

Any person, alive or dead, suffering or having suffered from a sudden onset of high fever and having had contact with:

- a suspected, probable, or confirmed Ebola or Marburg case;
- a dead or sick animal (for Ebola)
- a mine (for Marburg)

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

• headaches • vomiting

• anorexia / loss of appetite • diarrhoea

• lethargy • stomach pain

• aching muscles or joints • difficulty swallowing

• breathing difficulties • hiccup

OR: any person with inexplicable bleeding

OR: any sudden, inexplicable death.

Instructions when a suspected case has been identified:

- Report the case to the surveillance team
- After obtaining express consent, collect a sample
- Fill in a case notification form
- Create a list of contacts of the suspected case

If the subject is alive, explain to the patient and his/her family the need to go to hospital to receive adequate medical care. After having obtained the consent of the patient or his/her family, arrange for the hospital transfer. If the subject has passed away, explain to the family the need for conducting a safe burial. After obtaining consent, coordinate funeral arrangements with the burial team.

(b) Case definition for exclusive use by hospitals and surveillance teams

PROBABLE CASE:

Any suspected case evaluated by a clinician

OR: Any deceased suspected case (where it has not been possible to collect specimens for laboratory confirmation) that has an epidemiological link with a confirmed case.

Note: If laboratory specimens are collected from the patient during the illness, the suspected and probable categories should be reclassified as “laboratory-confirmed” cases or “non-cases” once laboratory results are received.

LABORATORY-CONFIRMED CASES:

Any suspected or probable cases with a positive laboratory result. Laboratory-confirmed cases must test positive for the virus antigen, either by detection of virus RNA by reverse transcriptase-polymerase chain reaction (RT-PCR), or by detection of IgM antibodies directed against Marburg or Ebola.

NON-CASE:

Any suspected or probable case with a negative laboratory result. Non-cases are those which showed no specific antibodies, RNA, or specific detectable antigens.

Annex 4. Contact tracing: Standard definition of Ebola or Marburg contacts

Important note: During an epidemic, these definitions may be changed to correspond to the local event.

Ebola or Marburg case contacts:

Any person having been exposed to a suspect, probable or confirmed case of Ebola or Marburg in at least one of the following ways:

- has slept in the same household with a case
- has had direct physical contact with the case (alive or dead) during the illness
- has had direct physical contact with the (dead) case at the funeral
- has touched his/her blood or body fluids during the illness
- has touched his/her clothes or linens
- has been breastfed by the patient (baby)

Provided that this exposure has taken place less than 21 days before the identification as a contact by surveillance teams

Contacts of dead or sick animals:

Any person having been exposure to a sick or dead animal in at least one of the following ways:

- has had direct physical contact with the animal
- has had direct contact with the animal's blood or body fluids
- has carved up the animal
- has eaten raw bush-meat

Provided that this exposure has taken place less than 21 days before the identification as a contact by surveillance teams

Laboratory contacts:

Any person having been exposed to biological material in a laboratory in at least one of the following ways:

- has had direct contact with specimens collected from suspected Ebola or Marburg patients
- has had direct contact with specimens collected from suspected Ebola or Marburg animal cases

Provided that this exposure has taken place less than 21 days before the identification as a contact by surveillance teams

Other infection risk factors include: contact with a hospital where Ebola or Marburg cases are being treated; infection; or vaccination in the 21 days preceding the onset of symptoms.

The contact person should be followed for 21 days after exposure.

If the contact person is asymptomatic for 21 days after exposure, he released the follow-up.

Annex 5. Ebola or Marburg case investigation and recording sheet

Case ID number: _____

Date of case detection ___/___/___
Case reported by *(tick the box and specify):*
☐ Mobile team, n° _____ ☐ Health centre _____
☐ Hospital _____ ☐ Other: _____
Form filled in by (last and first name) _____
Information passed on by (last and first name) _____
Relationship with the patient _____

Patient identity Nickname: _____
Surname _____ Second Names _____ First Names _____
Son/daughter of (name of father/mother) _____
Date of birth ___/___/___ age (years)_____ Sex ☐ M ☐ F
Ordinary residence: Head of household (last and first name) _____
Village/neighbourhood of residence _____ District _____
GPS coordinates of domicile: Latitude _____ Longitude _____
Nationality: _____ Ethnic group: _____

Patient's profession *(tick the appropriate box and provide details if necessary)*
☐ Planter ☐ Homemaker ☐ Child ☐ Hunter/Bushmeat etailer
☐ Health-care worker, specify: health-care facility _____ Qualification _____
☐ Mineworker/Gold prospector_____ Starting date of mining activity: _____
☐ Pupil/Student ☐ Other (specify) _____

Patient's condition
Condition of the patient when found ☐ Alive ☐ Dead
If deceased, date of death ___/___/___
Place of death: ☐ Community, village/neighbourhood _____ District _____
☐ Hospital, name and department _____ District _____
Burial place, name of village/neighbourhood _____ District _____

History of present illness
Date on onset of symptoms ___/___/___
Name of the village where the patient became ill _____ District _____
Has the patient moved around since he/she became ill? ☐ Yes ☐ No ☐ DK
If the answer is "yes", complete the list indicating villages, health-care facilities, and districts:
Village _____ Health-care facility_____ District _____
Village _____ Health-care facility_____ District _____
Village _____ Health-care facility_____ District _____

Clinical
Does the patient show any of the following symptoms *(tick all applicable)*
Has the patient had a fever? ☐ Yes ☐ No ☐ DK
If so, date of fever onset: ___/___/___

Does the patient have or had any of the following symptoms *(tick the corresponding boxes and provide details if necessary)*:
- headaches ☐ Yes ☐ No ☐ DK

- diarrhoea ☐ Yes ☐ No ☐ DK
- stomach pain ☐ Yes ☐ No ☐ DK
- vomiting ☐ Yes ☐ No ☐ DK
- lethargy ☐ Yes ☐ No ☐ DK
- anorexia ☐ Yes ☐ No ☐ DK
- muscular pain ☐ Yes ☐ No ☐ DK
- difficulty swallowing ☐ Yes ☐ No ☐ DK
- difficulty breathing ☐ Yes ☐ No ☐ DK
- intense coughing ☐ Yes ☐ No ☐ DK
- skin rash ☐ Yes ☐ No ☐ DK
- bleeding at injection points ☐ Yes ☐ No ☐ DK
- bleeding gums (Gingivitis) ☐ Yes ☐ No ☐ DK
- bleeding in eye (conjunctival injection) ☐ Yes ☐ No ☐ DK
- dark or bloody stool (melaena) ☐ Yes ☐ No ☐ DK
- vomiting of blood (haematemesis) ☐ Yes ☐ No ☐ DK
- nose bleed (epistaxis) ☐ Yes ☐ No ☐ DK
- vaginal bleeding outside of menstruation ☐ Yes ☐ No ☐ DK

Exposure risk

- Has the patient been in contact with a **suspected or confirmed case** in the 3 weeks preceding the onset of the symptoms? ☐ Yes ☐ No ☐ DK

If so, specify: Last name _____ First name _____
At the time of contact, was the suspected case ☐ alive or ☐ dead? If dead, date of death ___/___/___
Date of last contact with the case ___/___/___

- Was the patient **hospitalized** or has he/she visited a hospital nearby in the 3 weeks preceding the onset of the symptoms? ☐ Yes ☐ No ☐ DK

If so, where _____ when (dates) ___/___/___ - ___/___/___

- Has the patient seen a **traditional healer** in the 3 weeks preceding the onset of the symptoms? ☐ Yes ☐ No ☐ DK

If so, last name:_____ Village _____ District _____
Where and when did the consultation take place? Place _____ Date: ___/___/___
Has the patient received traditional treatment? ☐ Yes ☐ No ☐ DK
If so, specify the type of traditional treatment: _____

- Has the patient attended any **funerals** in the 3 weeks preceding the onset of the symptoms? ☐ Yes ☐ No ☐ DK

If so, last and first name of the deceased: _____

- Has the patient had contact with any wild **animals** in the 3 weeks preceding the onset of the symptoms? ☐ Yes ☐ No ☐ DK

If so, kind of animal _____ Locality _____ Date ___/___/___

- Has the patient worked or spent time in a **mine/cave inhabited by bat colonies** in the 3 weeks preceding the onset of the symptoms?

☐ Yes ☐ No ☐ DK
If so, name of the mine_____ Locality _____ Date ___/___/___

- Has the patient **travelled** in the 3 weeks preceding the onset of the symptoms?

☐ Yes ☐ No ☐ DK

If so, where to _____ and when ___/___/___ to ___/___/___

Specimen collection

Question for the investigation team: after having provided clear and full information to the patient (or in absentia to his/her family or legal guardian) did you obtain his/her express and/or informed consent to the collection of specimens?

☐ Yes ☐ No ☐ DK

- Did you collect specimens? ☐ Yes ☐ No ☐ DK

If so, when ___/___/___ Type of specimen? ☐ Blood ☐ Urine ☐ Saliva ☐ Biopsy ☐ Stool

Transfer of the patient to hospital

To be completed ONLY by mobile teams and health centres

Was the patient taken to hospital? ☐ Yes ☐ No

If so, name of hospital _____ Date of transport ___/___/___

Updated information provided from the isolation unit

To be completed ONLY by the hospital OR the surveillance office

Was the patient referred to an isolation area? ☐ Yes ☐ No

If so, name of hospital _____ Date of hospitalization ___/___/___

Family member(s) accompanying the patient, last and first name _____

Date of discharge ___/___/___ OR Date of death ___/___/___

Laboratory data

The specimen tested was collected from: ☐ Sick person ☐ Recovering patient ☐ Post-mortem

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

Type of specimen ☐ Blood sample using dry tube ☐ Blood using anticoagulants
☐ Saliva ☐ Stool / Urine
☐ Biopsy ☐ Other, specify _____

Results					
	Antigen detected	☐ pos	☐ neg	☐ NA	Date ___/___/___
	IgM serology	☐ pos	☐ neg	☐ NA	Date ___/___/___
	IgG serology	☐ pos	☐ neg	☐ NA	Date ___/___/___
	RT-PCR	☐ pos	☐ neg	☐ NA	Date ___/___/___
	Virus culture	☐ pos	☐ neg	☐ NA	Date ___/___/___
	Immunohistochemical staining	☐ pos	☐ neg	☐ NA	Date ___/___/___
	Immunofluorescence	☐ pos	☐ neg	☐ NA	Date ___/___/___

Outcome (to be verified 4 weeks after onset of symptoms)

☐ alive ☐ dead

in case of death, date ___/___/___

Final case classification *(tick the appropriate box)*

☐ **Suspected** ☐ **Probable** ☐ **Confirmed** ☐ **Non-case**

Laboratory-related annexes

Annex 6. Guidelines for the collection of clinical specimens during field investigation of outbreaks (WHO/CDS/CSR/EDC/2000/4)

http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_CSR_EDC_2000_4/en/index.html

Annex 7. Guidance on regulations for the Transport of Infectious Substances 2011-2012

http://www.who.int/ihr/publications/who_hse_ihr_20100801_en.pdf

Annex 8. List of laboratories and WHO Collaborating Centres for the diagnosis of Ebola or Marburg VHF

Janusz Paweska, Head
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National Center for Emerging and Zoonotic Infectious Diseases
US Centers for Disease Control and Prevention
1600 Clifton Road
Atlanta, Georgia 30333
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Tel: (1) 404 639 1115
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Fax: +49 (40) 42818 378
E-mail: guenther@bni.uni-hamburg.de

Annexes on social and behavioural interventions and communication

Annex 9. Outbreak Communication. Best practices for communicating with the public during an outbreak. (WHO/CDS/2005.32)

http://www.who.int/csr/resources/publications/WHO_CDS_2005_32/en/

Annex 10. Communication for Behavioural Impact (COMBI): A toolkit for behavioural and social communication in outbreak response.

http://www.who.int/ihr/publications/combi_toolkit_outbreaks/en/index.html

Annex 11. COMBI Toolkit: Field Workbook for COMBI planning steps in outbreak response.

http://www.who.int/ihr/publications/combi_toolkit_fieldwkbk_outbreaks/en/index.htm

Annex 12. Behavioural and Social interventions: a checklist for conducting a rapid situation analysis during suspect Ebola and Marburg events

When and how to use this checklist

The following checklist can be used during suspect Ebola and Marburg events in the initial investigation stage to obtain critical behavioural, sociocultural, economic, and political information that could either help or hinder implementation of initial control measures and epidemiological investigation activities (Section 4.1.1.).

The checklist can be used as a guide and adapted as necessary. The main goal of the analysis is to ensure that the proposed risk reduction behaviour(s) is/are technically sound, feasible, and culturally appropriate. It may be necessary to identify ways in which social mobilization can support the public health objectives of outbreak control and the uptake of risk reduction behaviour(s). Specific activities for groups that might require different communication approaches and messaging may need to be developed.

At-risk groups and populations

- Can particular targets or beneficiaries be segmented or identified?
- For occupational exposure to the disease: e.g. health-care workers, hunters, mineworkers, funeral workers; and traditional healers.
- For household or community exposure to the disease and the deceased: e.g. women who care for sick household members, people who are in charge of organizing funerals.
- Are there particularly vulnerable, disadvantaged, or high-risk groups that should be reached?

Knowledge, awareness, and perceptions

- What do you know about the culture and practices of individuals and communities relevant to understanding disease transmission and amplification in the current event?
- What do individuals and communities know about the cause and transmission of the disease?
- What are the local terms or descriptions of the disease?
- What are the individual and community perceptions of the risk posed by the outbreak?
- Have individuals and community experienced previous outbreaks? How have they managed them?
- What are the messages currently circulating within the community?

Information sources, channels, and settings

- Where and from whom do people in the community get information and why? Who are the trusted and credible information sources, and what makes them so: e.g. local leaders, religious leaders, health-care staff, and influential people (formal and informal)?
- What channels of communication (structures and people) are available to disseminate information?
- Which channels are the most accessible, popular, and influential?
- What traditional media are used (e.g. traditional media, community meetings, social media)?
- What active community networks and structures exist? How are they perceived and used by the local population?
- What other organizations are involved in outbreak prevention and control activities within the community?
- Which settings are suitable for communication interventions, e.g. clinics, homes, villages?

Household and community practices

- What are the current health-seeking practices and options for health care?
- What are the current funeral practices (including burial)?
- How are decisions made about seeking health care and funeral organization in communities and households?
- Do the existing practices amplify the risk of disease spread? Which beliefs and values support them?
- Are there existing practices that reduce risk, e.g. hand-washing, cooking food thoroughly? Which beliefs and values support them?

Sociocultural, economic, and environmental context

- Are there social and political tensions that could affect the adoption of risk reduction practices?
- Do people have access to sufficient resources to implement the risk reduction practices (e.g. health care, funeral ceremony)?
- Do they have access to clean water?
- Are health services available and accessible?
- Is it difficult to transport sick people to clinics or hospitals?
- Are there traditional beliefs and social norms that might prevent people from implementing risk reduction practices?
- Are there traditional beliefs and social norms that might favour implementation of risk reduction practices?

Annex 13. Contribution of medical anthropology to Ebola and Marburg viral haemorrhagic fever outbreak control

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In the Ebola and Marburg virus epidemics that have occurred in Africa, anthropologists have been part of the international response teams at various levels: during epidemiological investigations and surveillance activities; supporting patient and family care; helping organize safe burials; dialoguing with traditional practitioners; and advising on social sensitization and mobilization activities.

In public health in general and especially during epidemic control efforts, there are always two extremes whose relative importance varies with the circumstances: a coercive authoritarian approach and an empathic approach. The coercive approach has a tendency to consider only the viruses and the organs, anonymous individuals, or communities, whose opinion matters little. The empathetic approach highlights the specificities of persons and populations, striving to benefit the largest number of people – privileges usually reserved for family, relatives, and friends.

Medical anthropology contributes to the success of epidemic control efforts in a number of fields:

- By gaining better knowledge of disease transmission chains;
- By identifying the psychologically, socially, and culturally diverse behaviours of local populations and proposing appropriate interventions;
- By confronting the rumours and the widespread fear generated by Ebola or Marburg epidemics; and
- By giving interventions a human face, finding a balance between the authoritarian enforcement of sanitary measures and empathic approaches.

A) Gaining better knowledge of disease transmission chains

In 11 of the 17 Ebola epidemics reported to WHO, there were no doubts regarding the epidemiological chain of transmission. The following steps were documented, in chronological order:

- high-mortality epizootic affecting gorillas or chimpanzees;
- group of hunters killing an infected animal or recovering an infected animal carcass;
- several days later, one member of the group becomes ill, often the one who carried or butchered the game;
- infection of the patient's companion, through close contact with infected body fluids;
- infection of persons physically or psychologically close to the patients who are not discouraged by managing the vomiting, diarrhoea and bleeding (sisters, mother, spouses, family and close-friend caregivers, medical personnel, religious leaders and healers);
- infection of others, directly by caregivers or through accidental exposure to infected medical items
- spread of the infection in a hospital setting;
- infection of individuals responsible for washing the bodies or people touching the corpse as part of a mourning ritual, etc.

It is difficult to accurately reconstruct the disease transmission chains without ethnographic knowledge related to peoples' behavior: in their daily life as well as during ceremonies; at home and at work; in the fields, forests or in urban settings; at the traditional healer, the pastor, or medical caregiver.

Three months after the Ebola epidemic in Yambio in the Sudan in 2004, an anthropologist specializing in the Azande was instrumental in pinpointing its perplexing origin, namely a baboon found dead in the forest by a Sudanese bank employee who had been hunting across the border in the Democratic Republic of the Congo. This information was vital in understanding the origin of the epidemic and thus laying to rest any skeptical, mystical, or political interpretations.

During the Ebola epidemic in the Democratic Republic of the Congo in 2007, an anthropological-epidemiological investigation devised a model involving transmission of the virus from bats directly to people, without the need for nonhuman primate intermediaries. In this case, the focus of the epidemic was located close to a major African river lying along the route of mass migrations of fruit bats. It is possible to bring down more than a dozen bats with a single rifle shot when the bats stop to feed in the daytime on an island in a gallery forest abounding in fruit, not far from some former colonial palm-oil plantations that are now abandoned or only partially exploited. In 2007, a few weeks before the emergence of the virus and during a major seasonal migration of bats, the local population had a plentiful source of meat which apparently gave the Ebola virus the opportunity to pass from animals to people.

However, in 6 out of 17 Ebola epidemics, no evidence of human-wild animal contact has ever been proven. Likewise, in the case of Marburg virus, the human-bat contact noted in the index case (European traveller, indigenous minor) was applicable in just 7 out of 9 epidemics. During the 2004- 2005 epidemic in Angola that left 329 people dead, no animal was found to be at the origin of the human infections.

Are the uncertainties regarding the origin of the epidemics a reflection on the shortcomings of epidemiological investigations or is the enigmatic natural cycle of the Ebola virus to blame? Our knowledge has increased since the Ebola and Marburg viruses were first discovered, but there are still many uncertainties and unknowns concerning: vaccines; treatment; the virus reservoir; interspecies transmission; acquisition of virulence; different rates of infection and morbidity among persons exposed to the same strain of the virus; and asymptomatic infections, etc.

Therefore, anthropologists help to give psychological and social sense to disease transmission chains and the history of the disease, on a case-by-case basis, through familiarity with the affected individuals and societies and through behaviours, mentalities, and local ways and customs, whether explicit or illicit, overt or unspoken.

B) Identifying the socioculturally diverse behaviours of local populations and proposing appropriate interventions

Several human factors that can contribute to the spread of Ebola and Marburg viruses include the following:

- hunting during an epizootic (especially of primates);
- consumption of animals found dead in the forest;
- community mourning rituals involving a high degree of contact with the body of the deceased;
- inadequate training in microbiological hygiene for health-care workers;
- shortages of gloves and disinfectant at health facilities;
- poor hospital hygiene practices due to underfunding and lack of resources;
- poor compliance of the population with health instructions, criticism of health instructions or refusal to comply with them, or irrelevance of health instructions to local conditions;

- ejection of the virological model in favour of theories involving divine will, the action of nonhuman agents, persons endowed with supernatural powers, or criminal experiments in laboratories;
- victims seeking revenge when they note the disappearance of the considerable financial resources mobilized for the epidemic, both from donors and themselves.

In this context, the role of an anthropologist is to shift perspectives, break out of ethnocentrism, overcome social distance, juxtapose the culture of the patients with that of the caregivers, and to help the latter understand (although not necessarily approve of) the other's point of view and imagine themselves in the place of the other. In an epidemic, an anthropologist is a “cultural translator”, or spokesperson, for the victims and the wider population, as well as for the caregivers, specifically the subordinate (Red Cross volunteers, community health-care workers) who are not listened to and are badly paid. Very often, an anthropologist reveals the latent emotions and anxieties of the medical and social personnel, whether or not overtly expressed, that pose an obstacle to appropriate action.

The role of an anthropologist

An anthropologist’s role during an outbreak is to:

- establish a dialogue with religious leaders and traditional healers/practitioners;
- assess the level of danger represented by non-science-based practices and rituals;
- communicate to religious and traditional leaders the need for protective measures;
- collaborate, if possible, with traditional healers/practitioners in psychological and social support of their patients;
- involve practitioners in community mobilizations and sensitization activities;
- decipher materials and symbolic local rules related to contamination and hygiene;
- identify various systems for dealing with and treating disease and misfortune;
- identify key interlocutors; i.e. opinion makers, religious figures, traditional practitioners, associations; NGOs.

An anthropologist's role is also to establish a dialogue with religious leaders and traditional healers and practitioners, especially those who deny the existence of the virus and its mode of transmission.

The level of danger represented by their practices must be assessed (equipment used to perform multiple injections, scarifications, laying-on of hands, purgatives, emetics, etc.), and they must be made aware of the risks to which they expose themselves and their followers. Whatever their beliefs, experience has shown that they willingly accept gifts of disinfectants and gloves and they rapidly learn how to use these items to protect themselves. Depending on the local context, and in accordance with requests from the parties concerned and the customary and institutional authorities, it might be possible to envisage collaboration with traditional practitioners in psychological and social support of their patients. As with other opinion makers, it is important to try to involve these practitioners in community mobilization and sensitization activities. This can be a delicate matter, because without proper judgment there is always a risk of giving prominence to impostors and strengthening the hand of those who deny scientific evidence and explanations.

An anthropologist must quickly decipher material and symbolic local rules related to contamination (everyday hygiene, greetings, the treatment of human waste products, uses of and attitudes towards blood, rules of contact with patients, funeral practices, etc.). S/he must understand how this "new" disease and its various symptoms found their place within local medical thinking systems. S/he must rapidly identify the

various systems for dealing with and treating diseases and misfortunes, specifically those that exist and operate in situ: family, folk, learned, public and private biomedical, ethnic, religious, parascientific, mystical, etc. Finally, s/he must identify key interlocutors; for example, opinion makers, religious figures, traditional practitioners, associations, and nongovernmental organizations (NGOs).

These local systems for dealing with diseases not only offer remedies but also widely intelligible explanations regarding the cause of the problem. They also make sense of individual or community misfortune. Supernatural or malevolent aggression, the violation of taboos, failure to respect the social, ecological, or religious order, and even conspiracy theories are always invoked, all with their panoply of associated remedies and rituals. Each system of thought exploits the epidemic to justify the merits of its theories and practices.

The models thus invoked gain in credibility owing to the frequent shortcomings and even negligence of the political, administrative, and health authorities. Moreover, many scientists are unable to criticize their own theories nor does their logic take into account the human factor.

Anthropology, the cousin of clinical and social psychology, can be helpful for understanding individual and collective behaviours which are considered irrational or aberrant from the standpoint of biomedical reasoning, not only in Africa but on other continents too; for example, in France in the Dombes region in 2007 during an outbreak of avian influenza in wild birds.

This is because epidemiological, statistical, and genetic explanations do not address the central concerns of the individual and society: why now, why me, and why not someone else? What is the relationship between the various events that affect me, my friends, and my foes?

Even with treatments and vaccines, and still more so without them, the biomedical model is just one explanation among others, leaving the field open for all manner of psychological, social, economic, or political use of misfortune, whether conscious or unconscious, overt or unspoken, honest or dishonest. The management of misfortune, biological or otherwise, and of catastrophes, is always a contest of knowledge and power between the proponents of a worldview based on the existence of viruses, microorganisms, and other molecular forms and the adherents of a worldview based on mystical powers that have been inherited or acquired, supernatural beings, evil sorcerers, and divine interventions. It is an ideological and religious confrontation, one between science and parascience.

A number of explanatory models coexist in Ebola or Marburg VHF epidemics, but on each occasion there are different nuances, not so much to do with the type of supernatural explanation invoked as with the partisan interests they serve: intra-lineage score-settling, between young and old, with inlaws, between districts and/or villages, between ethnic groups, cults and religions, indigenous people versus foreigners, local versus national officials, Africans versus “Westerners”, political forces versus economic forces, etc.

Sociopolitical investigation of the various causality models proposed shows that, consciously or otherwise, they enable their respective adherents to defend particular social structures and partisan interests, whether at the level of the affected family, village, town or region, or in terms of the political and economic authorities at the regional, national, and even international level.

The presence of anthropologists makes it possible to anticipate with greater precision the impact of the proposed epidemic control measures, thereby avoiding incomprehension of social and political customs and individual or collective responses to misfortune, particularly with regard to the stigmatization of affected individuals and communities and/or those held responsible for the spread of the epidemic.

There is a high risk of the authorities rerouting the work of anthropologists for their own ends. Recruiting anthropologists should not be a superficial attempt to listen and engage with communities by avoiding the real underlying problems such as insecurity and poverty.

All too often anthropologists are required to provide an immediate return on investment, without giving them sufficient time to carry out their investigations. They are recruited to perform immediate operational work, for example organizing health education sessions, not taking into account local specificities. When their

observations compel them to question the methods and management of resources engaged in epidemic control operations, even to reveal dysfunction of national and/or international institutions, their views are often not welcomed.

C) Confronting the rumors and the widespread fears generated by Ebola or Marburg epidemics

Ebola and Marburg are highly infectious diseases that are fatal for 25-90 % of all patients. The epidemics are usually concentrated over a small geographical area and are of unpredictable onset. They destroy human solidarity by putting the lives of patients' families and caregivers in danger. Death ensues after a brief but serious and painful illness with terrifying symptoms (fever, diarrhoea, vomiting and - most of all - external bleeding).

The disease is terrifying for all sections of the community. Public health interventions such as isolation of infected patients and barrier nursing may cause sick family members to be kept hidden and sometimes abandoned in their homes or obliged to flee. Many health-care workers, who may not have been paid for months and have been frightened by the death of their colleagues, may abandon hospitals. Local outbreak control teams are therefore powerless to act pending the arrival of material and human reinforcements from inside the country and overseas (Ministry of Health, Red Cross, WHO, MSF, etc.).

The response to Ebola or Marburg epidemics involves drastic health measures that may infringe on individual and collective freedoms, such as: establishment of isolation wards; banning of unsafe burials; banning the consumption of the principal source of protein (bushmeat); and restrictions on gatherings and travel, etc. The isolation of patients in secure areas to avoid hospital-acquired infections among patients and caregivers alike is complex and costly to organize. Safe burials organized without consideration for customary funeral rites, often in the absence of the family, and sometimes in unmarked or even mass graves, can provoke anger in the community.

Political and administrative constraints, for example mobilization of financial resources, interpersonal rivalry, different national or international institutions, NGOs, research teams, and laboratories, all complicate the epidemic response effort. And even after the response has finally been organized, these dysfunctional elements persist against a background of scientific uncertainty, difficulties of communication with the poverty-stricken local population, and conflicting political and economic interests. In addition, the local context in which the virus emerges is always one of economic, health, and medical underdevelopment, not to mention, in some countries, the aftermath of armed conflicts.

Without mobilization and sensitization efforts tailored to the populations concerned, respect for health measures is at best patchy: there are many ways to get around a ban which may be poorly understood or considered irrelevant, arbitrary, or even discriminatory.

Normal “spontaneous” gestures of nonverbal communication – handshakes, touching, sharing drinks or meals, travelling in the same vehicle – are very often prohibited. The security requirements imposed by the risk of virus transmission prompt intervention teams to minimize contact with others and to maintain a physical and psychological distance from the population, which merely accentuates the social and cultural distances.

Thus, doubts can emerge, voluntarily or involuntarily maintained by certain parties, both as regards the existence of the virus and the real intentions of the health-care workers. The health-care workers’ identity is then merged with that of politicians (who only put in an appearance during election campaigns), religious leaders, traders, forest and mining prospectors, or even the repressive armed forces. In each epidemic, the intervention teams must contend (at the very least) with poor adherence to their instructions, but also with defiance on the part of the population, expressions of verbal hostility, and even physical aggression. They are accused of experimenting on living people or of sorcery, for example when taking blood or tissue specimens from corpses, during laboratory investigations, or at burials. In sub-Saharan Africa, as confirmed by a number of anthropological treatises on AIDS, blood is an important body fluid coveted (symbolically rather than physically) by evil humans and nonhumans and by sorcerers. It is believed that notables and politicians need to acquire blood to obtain riches and maintain their grasp on power.

Epidemic response workers thus find themselves unable to resolve a problem using normal concepts or methods. Coercive measures have no effect and the health teams lack the transcultural communication tools to adopt an empathetic intervention.

For all these reasons, WHO decided – and was able to convince its national and international partners – to systematically enlist medical anthropologists into the initial international intervention teams during Ebola or Marburg virus epidemics.

D) Giving interventions a human face, striking a balance between the authoritarian enforcement of sanitary measures and empathetic approaches based on sensitization and mobilization of individuals and societies

An important contribution of anthropology is to seek to promote approaches based on sensitization and mobilization of individuals and societies, taking into account the knowledge and practices of users and endeavouring to secure genuinely informed consent. If they are to be effective, coercive measures must win the consent of those affected; otherwise, they will not be enforceable and will not be enforced. Without having a monopoly, at all stages from reflection to action, the anthropologist ensures respect for people and his family human rights, often put to the second plan because of the emergency.

During an Ebola or Marburg epidemic, patients must be isolated at a secure medical facility. When patients or their families refuse to go to hospital or where no such facility exists, it is important to gain the patients' and their families' confidence by organizing at home the implementation of measures to control or reduce intra-family transmission and by providing relatives with instructions and proper equipment (gloves, masks, disinfectant, treatments) (Annex 16).

When an isolation facility has been set up, it is important to ensure transparency – which does not simply mean prohibiting the use of perimeter screens. Communication should be maintained with the outside world through family visits, telephone, radio, etc. Families should be kept well informed of the condition of their sick relatives. Information about the organization of the isolation facility and the treatment must be communicated to the public so as to dispel all doubt about the risk of hospital-acquired infections and the quality of care being delivered.

If the medical team observes that a patient is at the point of death, it must first inform the family and then make provision for funeral rituals, which should be organized in such a way as to avoid additional infections, either through contact with the corpse or through family and community gatherings. If mortality is high, mortuary facilities risk being rapidly overwhelmed; in such cases, the burial of corpses in unmarked graves without the family being present could complicate the mourning process and fuel violence that would jeopardize the entire epidemic control operation.

It is also likely that survivors, their families, and local medical and social workers will experience posttraumatic stress syndrome. They must bear a double burden: first of all, that imposed by the virus, plus a secondary stigma after the epidemic has passed (accusations of profiteering or – more often – sorcery).

Anthropologists are therefore extensively involved at all times and at all levels in sensitization and social mobilization efforts, whether through tailoring channels of communication and messages to the local context or by taking into consideration the views of the target population, specifically those of neglected constituencies such as women and indigenous minorities.

Note: An additional contribution of an anthropologist is to help decision-makers on the behavioural and social interventions subcommittee to design a range of communication materials (paper, audio, video), for example by drawing on digitized databases (scientific articles, drawings, posters, photos and videos of real situations).

Please note that an important supplementary input of medical anthropology has been the production of ethnographical videos on safe funeral rites with a human dimension, which have been disseminated during epidemics for the purpose of social mobilization and in the context of ongoing vocational training between epidemics (Annex 33).

Annexes on clinical management of patients

Annex 14. Hospitalized patients' charter (May 2013)

http://www.american-hospital.org/en/your-stay/hospitalized-patients-charter.html

Annex 15. WHO Aide-Memoire. Standard precautions in health care (October 2007)

http://www.who.int/csr/resources/publications/standardprecautions/en/index.html

Annex 16. WHO Fact sheet. Waste from health-care activities (No. 253, November 2011)

http://www.who.int/mediacentre/factsheets/fs253/en/index.html

Annex 17. Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings, with Focus on Ebola.

http://www.who.int/entity/csr/resources/who-ipc-guidance-ebolafinal-09082014.pdf

Annex 18. Transmission risk reduction of filoviruses in home-care settings

1. Introduction

The strategy for transmission risk reduction of filoviruses in home-care settings was developed during the Ebola epidemic in Kellé, Republic of the Congo, in 2003 and has been used successfully in subsequent epidemics.

The strategy aims at reducing the risk of Ebola and Marburg transmission in home-care settings in families of suspected cases refusing hospitalization. The strategy does not guarantee full protection of family members and is certainly not the best treatment option, but it should always be offered to those families that might otherwise sever all communication with the medical teams, or hide or relocate the patient and thus secretly spread the epidemic.

The strategy for transmission risk reduction of filoviruses in the home-care settings should be used in two cases:

1. If the patient (or their family, if the patient is unable to do so) categorically refuses referral to a hospital isolation unit, or

2. If there is no hospital isolation unit.

The strategy should be seen as a tool for communicating with families in the hope that they will accept referral to an isolation ward at a later stage. The strategy involves providing personal protective equipment (PPE) (gloves, gowns, masks, buckets, chlorinated water) and training family caregivers. Home-care patients are monitored by a home nurse (chosen by the family) who has been trained in basic disinfection techniques and the use of PPE and has been given vital information about the virus.

2. Explaining the protocol to families or the community

Ebola and Marburg are transmitted:

- By touching infected animal carcasses or eating infected meat.
- By touching infected patients.
- Through contact with the blood, vomit, stool, or urine of the patient.
- Via droplets emitted by the patient while talking, coughing, or vomiting.
- Through contact with materials such as clothing and bedding that have been contaminated by the body fluids of the patient.

All direct contact with infected patients is dangerous and should be avoided. Hospital referral of the patient is preferable because:

- The patient has a better chance of survival when treated by specialized doctors trained in the clinical management of Ebola and Marburg.
- Infection of relatives and home caregivers is avoided.

If hospital referral is not an option, the information below helps reduce disease transmission to other members of the household or the community. While not precluding it entirely, the information below can help to significantly reduce the risk of transmission in the home.

To reduce the risk of transmission, the following general recommendations should be followed:

- Kill Ebola and Marburg viruses using chlorine bleach solutions prepared, as described below in item 3.
- Wear gloves or use towels soaked in bleach to avoid direct contact with the patient's body fluids: blood, vomit, stool, or urine.
- Put on a mask or use a dry towel to protect the nose and mouth from droplets emitted by the patient.

- Avoid contact with body fluids by staying behind or to the side of the patient while giving care.

3. Protocol for transmission risk reduction in the home

To be used by caregivers only.

The bleach solution must be at a concentration of at least 2.5%.

Care and cleaning:

1. Select one person to look after the patient. This person should also prepare the bleach solution.

To prepare the bleach solution, mix 1 part concentrated bleach with 5 parts water (fill a cup with the bleach, empty the cup into a bucket and refill the cup with water five times, adding the water to the bucket).

2. The bleach solution loses its effectiveness after 24 hours, so fresh solutions must be prepared every morning.

3. For cleaning blood stains, vomit, stool, or urine:

- Pour the bleach solution on to the blood, etc.
- Soak a large towel in the bleach solution.
- Use that soaked towel to clean off the blood.
- Place the soiled towel in a bucket and cover with bleach solution.
- Soiled towels must be soaked in a bucket filled with bleach solution for at least one hour. After one hour, the towels may be washed with soap and reused once they are dry.

4. Never put bleach or bleach solution in the patient's mouth or eyes.

5. The community must build a separate latrine that is used only by the patient.

6. Used and soiled bleach must be emptied into the latrine used by the patient.

7. Always stay behind or to the side of the patient; if possible, never face the patient.

8. Use bleach-soaked towels for carrying or moving the patient.

In the event of the patient's death:

9. Use bleach-soaked towels for taking the dead body to the grave or coffin.

10. Clean the room used by the patient with bleach.

11. Burn or bury all objects that cannot be cleaned. In particular, destroy the mattress used by the patient.

Always wash hands with bleach solution after touching the patient or their vomit, blood, stool, urine, etc. If the bleach irritates your hands, stop handling bleach and hand over the care of the patient to someone else.

Everyone in the community must wash hands with clean water and soap before eating. The same water should not be used twice. Use clean water for each person.

Annex 19. Protocol for the reintegration of returning patients into their families and their community

The successful reintegration of survivors requires in-depth dialogue with the families and village chiefs prior to their return to the community. Their return to the community means that they were successfully treated and are no longer infectious and will not spread the disease to family members or others within the community.

1. Hospital discharge of Ebola or Marburg patients

The doctor in charge of the care unit must examine the patient before declaring them fit to leave hospital. Once the laboratory diagnostic tests shows that antibodies are developed and they no longer have an active infection, the doctor can release the patient. Recovering patients are no longer contagious to others and their return home or transfer to a general hospital is safe. Upon discharge, the patient should be given a medical certificate stating that they no longer pose a risk to relatives or neighbours.

Before the patient leaves the care unit:

- The cleaning staff must clean and disinfect all the patient's personal belongings.
- Blankets and sheets MUST NOT be taken away by the patient. The care unit must provide the patient with new blankets and sheets if they brought their own to the hospital.
- The relatives must provide clothes for the patient to wear when leaving the care unit. The patient's clothes should be cleaned using appropriate infection control procedures at the hospital and will be returned to them the following day.
- On discharge, patients must follow the doctor's instructions.

2. Once the patient is back home

After recovery, the patient may feel tired for a period of up to two months. It is important that the patient:

- Get plenty of rest.
- at a varied diet (for example bread, vegetables, fruit, meat, beans).
- Drink plenty of water to rehydrate.

If the patient becomes ill, especially if they have a fever, they should go to a health centre immediately to have a check-up and receive treatment.

Warning: Male patients must be informed that their sperm may still be contagious for a period of three months after leaving hospital and Ebola or Marburg may be transmitted during sexual intercourse. During that period, the patient must either abstain from sex or use condoms. The medical team must provide a sufficient supply of condoms. This warning must be stated on the medical certificate issued on release.

The patient returning home may be given certain items (food, bedding, clothes, lamps, machetes) to compensate them for the loss of personal belongings that were destroyed during disinfection and to help them to rebuild their life. Before implementing this strategy, careful evaluation is in order, because these donations may stigmatize the patient and generate envy.

Experience in the field has shown that survivors of Ebola and Marburg are often stigmatized. Intensive public education campaigns are needed to reduce stigma. For measures to address stigmatization, see Annex 21.

Annexes on psychosocial management

Annex 20. Mental health in emergencies

http://www.who.int/mental_health/emergencies/MSDMER03_01/en/

Annex 21. IASC Guidelines on Mental Health and Psychosocial support in Emergency settings

http://www.who.int/hac/network/interagency/news/iasc_guidelines_mental_health_checklist.pdf

Annex 22. Mental health and psychological support in emergency settings: what should humanitarian health actors know?

http://www.who.int/mental_health/emergencies/what_humanitarian_health_actors_should_know.pdf

Annex 23. Psychological first aid: Guide for field workers

http://whqlibdoc.who.int/publications/2011/9789241548205_eng.pdf

Annexes on research ethics

Annex 24. Medical Ethics Manual – World Medical Association

http://www.wma.net/en/30publications/30ethicsmanual/index.html

Annex 25. Research Ethics in International Epidemic Response. WHO Technical Consultation

http://www.who.int/ethics/gip_research_ethics_.pdf

Annex 26. Ethical considerations in developing a public health response to pandemic influenza

http://www.who.int/csr/resources/publications/WHO_CDS_EPR_GIP_2007_2c.pdf

Annex 27. Guidance on ethics of tuberculosis prevention, care and control

http://whqlibdoc.who.int/publications/2010/9789241500531_eng.pdf

Annex 28. Model guidelines for writing informed consent documents

http://www.cerul.ulaval.ca/doc/Guide_rediger_formulaire_consentement.pdf

Annex 29. Website of the interactive Health Research Web (HRWeb) platform

http://www.healthresearchweb.org/en/home

Annex 30. Training and Resources in Research Ethics Evaluation site

http://elearning.trree.org/index.php?lang=en_utf8

Annex 31. The Siracusa Principles on the Limitation and Derogation Provisions in the International Covenant on Civil and Political Rights

http://www.refworld.org/cgibin/texis/vtx/rwmain?page=search&docid=4672bc122&skip=0&query=SiracusaPrinciples

Annex 32. Description of disposable, nonperishable personnel protective equipment for indoor utilization in health-care facilities (Module PPE A: Basic Module of Personnel Protective Equipment)

Module PPE A. Basic Module of Personal Protective Equipment **MOPPEBASA**

Indoor utilization, Health care facility, infection control, disposable, not perishable.

MODULE PPE BASIC A A1		
Gloves surgical, disposable, small size	50	pairs
Gloves surgical, disposable, medium size	50	pairs
Gloves surgical, disposable, large size	50	pairs
Gowns, M size	10	each
Gowns, L size	10	each
Gowns, XL size	10	each
Face shield	30	each
Head Covers	50	each
Face mask N95/FFP2	40	each
Surgical Mask (patients)	50	each
Bio-hazard plastic bags, 100 pcs/roll	100	each

MODULE PPE BASIC A A2		
Hand wash disinfectant, bottle 100 ml	8	each

Details of packaging box 1:

Type
Carton Box tri-plies, Type WHO "Carton Maritime"

Dimensions Module Basic A1
L= 60 cm
W= 40 cm
H= 42 cm

Dimensions Module Basic A2
L= 31 cm
W= 23 cm
H= 9 cm

Logo
WHO name on a Blue vertical strip (see picture)

Labeling and marking
Paper sticker with WHO logo = blue on white (see attached picture)
Packing list visible on the outside of the box
WHO label with consignee name and address

Details of packaging box 2:

Type and dimensions of packaging for Hand Wash Bottles will depend on the number of Modules A to be shipped.

Dangerous Goods
The hand wash bottles have to be packed separately with the adequate marking matching the IATA regulation

ESTIMATED COST FOR THE MODULE: **280 USD**

Annex 33. Description of heavy-duty personnel protective equipment associated with Basic Module PPE A, for outdoor utilization during disinfection of contaminated areas, objects, and cloth, and when dealing with dead bodies and burials (Module PPE B: Heavy Duty Personnel Protective Equipment)

Module PPE B: Heavy Duty Personal Protective Equipment — **PPE B - Heavy Duty**

Heavy duty activities, outdoor, associated with Module PPE A Basic, Disinfection of contaminated areas, objects and cloth, dealing with dead bodies and burials.

PPE MODULE B Heavy duty (complement to PPE Module A)		
Coveralls XL	10	each
Coveralls L	10	each
Coveralls M	10	each
Gum boots size 42	3	pairs
Gum boots size 43	3	pairs
Gum boots size 44	3	pairs
Boot covers	100	pairs
Heavy Duty gloves	30	pairs
Heavy Duty Aprons	10	each
Body bags	10	each
Goggles	15	each
Spray anti-fog	5	each
Hand sprayer	2	each
Backpack sprayer	1	each
WHO tape role	3	each

Details of packaging:

Type
Carton Box tri-plies, Type WHO "Carton Maritime"

Dimensions
L= 70 cm
W= 40 cm
H= 50 cm

Logo
WHO name on a Blue vertical strip (see picture)

Labeling and marking
Paper sticker with WHO logo = blue on white (see attached picture)
Packing list visible on the outside of the box
WHO label with consignee name and address

Dangerous Goods
No dangerous goods in this box. The disinfectant product should be procured separately (local procurement is preferable)

ESTIMATED COST FOR THE MODULE: 1190 USD

Annex 34. Logistics assessment form

Logistics assessment from - Pages 1/8

I. GENERAL INFORMATION	
Name:	
Function:	
Contact details (telephone, email, etc.)	
Date of Survey:	

Country:	
Province/Region /Department	
District / Area / Zone / Centre	

Name of formal/informal settlement	
Number of households (approx.)	
Total Population:	*<5 years:*
GPS coordinates (if available):	
Main economic activities (farming/trading/mining, etc.)	

Type of site:				
1. Village ☐	2. Camp/ Settlement ☐	3. Town ☐	4. Slum ☐	5.Other ☐

1.Christians ☐ No. churches	2.Muslims ☐ No. mosques	3.Other ☐ If other, specify: No. places of worship

Reference contacts: (Main contact details)	
WHO contact and function	
MOH focal point	
Other influential local leader(s): political/religious	

Map availability:		
Detailed area map available:	Yes ☐ No ☐	Scale:
Source of map:		

Climate/weather conditions			
Period	Type of weather	Average temperature	Comments

Money and Cash access.			
Banking System	ATM machine	Cash Changer	Currencies available
☐	☐	☐	
Notes:			

II. TRANSPORT

	Air	Road	Train	Boat (sea)	Boat(river)	Other
capital > province						
province > district						
district > operations site/zone						

Means of transport available in the area (for hire, loaned, MOH, others)							
	Car	Motorbike	Boat	Pick-up	Truck	Plane/ helicopter	Animals
Hire / rent							
On loan from							
Purchase							
MOSS yes/no							

(Please enter data, including number of available vehicles, type, an average of costing, etc., in the notes part.)

Local carburant availability:						
Diesel	Kerosene	Petrol	Wood	Coal	Charcoal	Others
☐	☐	☐	☐	☐	☐	☐

Notes on costing:
>Car / pick-up / truck /motorbike.....= US$ per day /week/month.
>Boat.....= US$ per hour / day / week / month
>Plane/ helicopter.....= US$ per hour / day
>Animals.....= US$ per day / week.

Is there need for 4WD vehicles?	Yes	No

Air transport Landing zones								
	Airstrip for planes				Helicopter landing zone			
Nature / description								
Size and dimensions (in meters)								
Orientation (GPS coordinates)								
Quality estimation	Good ☐	Fair ☐	Bad ☐	Impossible to use ☐	Good ☐	Fair ☐	Bad ☐	Impossible to use ☐
Airport authorities on the ground								
Staff available								
Operation hours / days?								
IFS / ILS?								
Airplane carburant available locally	Yes ☐		No ☐		Yes ☐		No ☐	
Security of the airstrip (population, animals, etc.)								

General comments:

III. TELECOMUNICATION SYSTEMS		
Telephone network operators: Fixed / Mobile / Both		
Mobile telephone network:		
Roaming services for cell phone and Blackberry	Yes ☐	No ☐
Local purchase of cell phone SIM cards:	Yes ☐	No ☐
Possibility to locally purchase credits (units)	Yes ☐	No ☐
Local Internet network available:	Yes ☐	No ☐
Radio Networks (VHF/HF):		
VHF/UHF Network available (for UN use)	Yes ☐	No ☐
HF Network available (for UN use):	Yes ☐	No ☐

General Recommendations:

IV. SECURITY:			
General situation	Good ☐	Fair ☐	Bad ☐
Armed people present	Yes ☐	No ☐	
Military activity	Yes ☐	No ☐	
Populations hostility	Yes ☐	No ☐	

Environmental threats	Yes ☐	No ☐

If you ticked "yes" to any of the above, please briefly explain in the box below:

V. LOCAL AUTHORITIES & PARTNERS

Local health authorities:			
Contact name:	Position	Telephone number(s)	E-mail address

UN agencies present in the area:			
Agency	Contact person	Telephone number(s)	E-mail address

NGO and other partners present in the area and their area of work			
Name	Contact person	Telephone number(s)	E-mail address

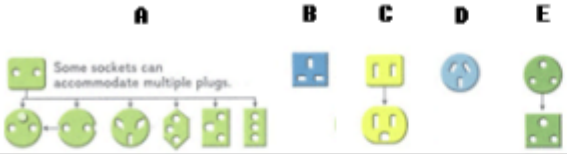
Local authorities			
Contact Name	Title	Telephone number(s)	E-mail number
VI. ACCOMMODATION AND TEAM LIFE			

Hotel	House	Camping	Others
☐	☐	☐	☐

Rooms, hotels:					
Price (average, in US$)	Comfort and Hygiene			Security	
	Good ☐	Fair ☐	Bad ☐	Good ☐	Bad ☐
Possibility of holding an office	Yes ☐			No ☐	
Internet connection available	Yes ☐			No ☐	
	Type:			Wi-Fi ☐	Ethernet ☐

Houses (rentals)					
Price (average, in US$)	Comfort and Hygiene			Security	
	Good ☐	Fair ☐	Bad ☐	Good ☐	Bad ☐
Possibility of renting an office	Yes ☐			No ☐	
Energy (Local electrical system)					

Voltage	110-125V	220-230V	50HZ	60HZ
Type of plug:				
European (A)	UK (B)	USA (C)	Australia/NZ (D)	India/Pakistan/South America (E)
☐	☐	☐	☐	☐



Availability of electricity			
24/24 h	Some hours (h/day)	None	Generator
☐	☐	☐	☐

Local market supplies			
Food supply:			
Available ☐	Limited ☐	Safe ☐	Imported ☐

Access to safe water:		Yes ☐	No ☐
Type:	Town system (piped)	Bottled	Other
	☐	☐	☐

Water treatment products in local market:		Yes ☐		No ☐	
Type:	HTH	NaDCC	Aquatabs	Blitch	Others
	☐	☐	☐	☐	☐

Construction materials available:	Yes ☐	No ☐
Type of materials (bricks/timber/concrete/etc.):		

VII. HEALTH STRUCTURES AND INFECTION CONTROL

Health structure in place	
Description: (if possible, attach a sketch)	

Space for isolation ward in place:					
Present	Yes ☐	No ☐	If no, possibility to set up:	Yes ☐	No ☐
Description: (add a sketch, if possible)			Justification:		
What are the local funeral practices?					
Level of personal precautions taken in the funeral practices:					
Appropriate	Basic (incomplete) ☐		Notion (not in place) ☐	None ☐	
Does Health Staff have access to PPE?			Yes ☐	No ☐	
Morgue:	In good shape ☐		In bad shape ☐	Inexistent ☐	
Need of a rapid assessment for improvement?			Yes ☐	No ☐	

Nearest Referral Hospital/Laboratory			
Name of the institution	Public/Private	Distance to reach (km)	Name of focal point

VIII. SUPPLY CHAIN AND STOCKS			
Space available for stocks:		Yes ☐	No ☐
Characteristics:			
Space (in m^2)	Security	Ventilation	Accessibility
Cold chain available:		Yes ☐	No ☐
Type of refrigerator/freezer?			
Capacity in litres:			

PPE stocks available:	Yes ☐	No ☐
Stock of drugs available?	Yes ☐	No ☐
Stock of medical items available?	Yes ☐	No ☐
Stock pharmaceutical items available?	Yes ☐	No ☐

General comments:

IX. ANY OTHER ADDITIONAL ASPECTS AND COMMENTS:

Annexes containing Ebola and Marburg subject-specific bibliographies

Annex 35. Ebola and Marburg bibliography, relevant videos, and web sites

General information about Ebola and Marburg

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- *Mise en bière d'une petite fille [Laying a little girl in her coffin*] 25 min

http://video.rap.prd.fr/video/mnhn/smm/miseenbiere_00.rm

- *Funérailles de crise, le tailleur et les siens [Burial in haste, the tailor and the family]* 37 min

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http://video.rap.prd.fr/video/mnhn/sm/20040211_00_ebola_au_congo_fevrier_2003.rm

- *Virus, paroles et vidéo [Virus, lyrics and video],* juin 2003, Kellé, Mbomo, 30 min

http://video.rap.prd.fr/video/mnhn/smm/20040614_00_ebola_au_congo_juin_2003.rm

- *Virus, braconnier et fétiche [Virus, poacher and fetish],* décembre 2003, Mbomo, 40 min

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Centers for Disease Control and Prevention (CDC), Atlanta (United States of America)

http://www.cdc.gov/

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

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

European Network for Diagnostics of "Imported" Viral Diseases (ENIVD), Berlin (Germany)

http://www.enivd.de/index.htm

Franceville International Centre for Medical Research, Franceville (Gabon)

http://www.cirmf.org/

Institut Pasteur, Paris (France)

http://www.pasteur.fr/

Médecins Sans Frontières, Paris (France)

http://www.msf.fr/

National Institute for Communicable Diseases (NICD), Johannesburg (South Africa)

http://www.nicd.ac.za/

Public Health Agency of Canada, Winnipeg (Canada)

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

«Santé, maladie, malheur» [Health, disease, misfortune] video library SMM CNRS MNHN, Paris (France)

http://www.rap.prd.fr/ressources/vod.php?videotheque=mnhn/smm

World Health Organization, Geneva (Switzerland)

http://www.who.int/en/ http://www.who.int/fr/

Annexes regarding the International Health Regulations (IHR)

Annex 36. WHO International Health Regulations (IHR)

http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf