

CONTACT TRACING DURING AN OUTBREAK OF EBOLA VIRUS DISEASE

September 2014

**Disease Surveillance and Response Programme Area
Disease Prevention and Control Cluster**



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Preface

The scale, duration, and complexity of the Ebola virus disease (EVD) outbreak in West Africa have underscored the need for prompt and effective implementation of evidence-based containment measures. Contact tracing is one of the interventions that have been used to effectively control EVD outbreaks in the WHO African region. Persons in close contact with Ebola cases (alive or dead) are at higher risk of infection. All potential contacts of Ebola cases should be identified and closely observed for 21 days from the last day of exposure. Contacts that develop illness should be immediately isolated to prevent further transmission of infection. An effective system for contact tracing should be established at the onset of the outbreak. Early involvement and full cooperation of affected communities is critical for successful contact tracing.

This document provides guidance for establishing and conducting contact tracing during filovirus disease outbreaks. The guidance notes are based on extensive field experience in filovirus disease outbreak response in the WHO African region. The notes are intended for frontline epidemiologists, surveillance officers, health workers and other volunteers involved in contact tracing. National and sub-national emergency management committees and rapid response teams require these guidelines to plan, implement and monitor contact tracing. National emergency management committees are advised to adapt these guidance notes to the local context in their application.

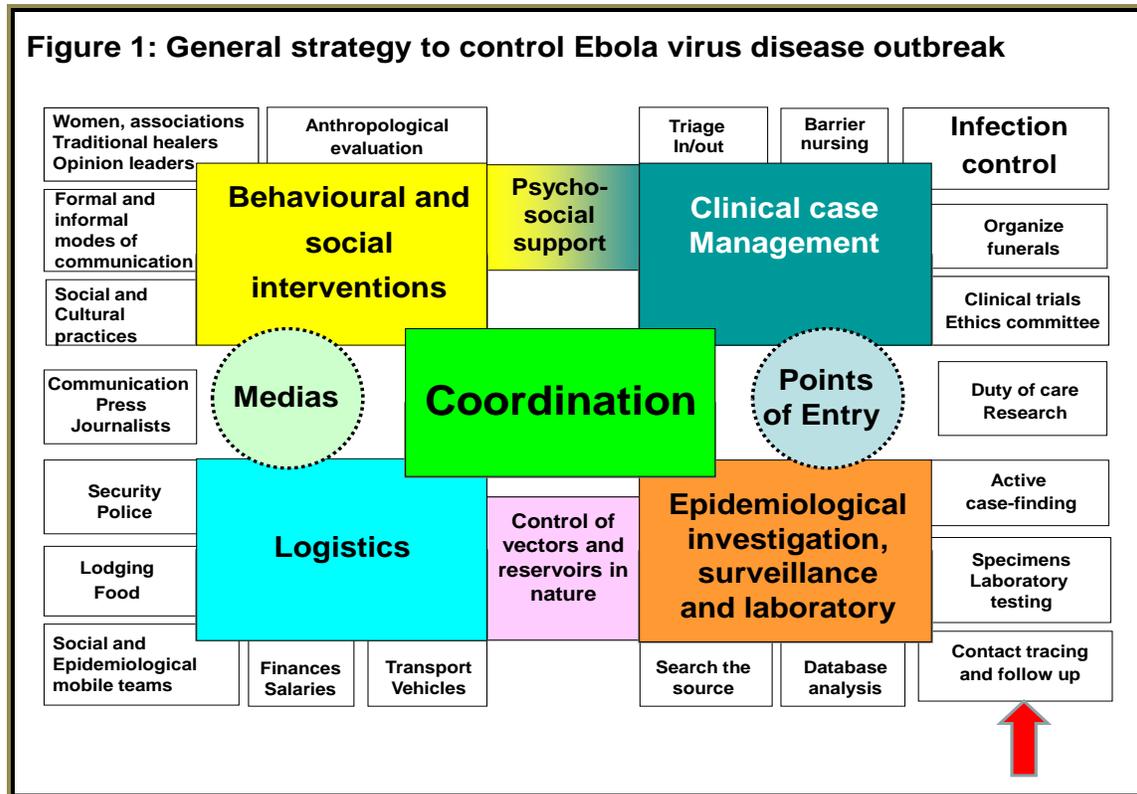
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1. Introduction

Contact tracing is an integral component of the overall strategy for controlling an outbreak of Ebola virus disease (EVD). Contact tracing is defined as the identification and follow-up of persons who may have come into contact with an infected person. As indicated in Figure 1, contact tracing is an important part of epidemiologic investigation and active surveillance.



1.1 Purpose of contact tracing

Interruption of Ebola virus transmission in the community is premised on the early detection and prompt isolation of new cases. During an EVD outbreak with established person-to-person transmission, new cases are more likely to emerge among contacts[†]. For this reason, it is critical that all potential contacts of suspect, probable and confirmed Ebola cases are systemically identified and put under observation for 21 days (the maximum incubation period of Ebola virus) from the last day of contact. Immediate evacuation of potentially infectious contacts with signs and symptoms of the disease to designated treatment centres or to the nearest health-care facility prevents high-risk exposure during home-based care, customary burial procedures

[†] A contact is any person without any disease signs and symptoms but who had **physical contact** with a case (alive or dead) or the body fluids of a case within the last three weeks. Physical contact includes sharing the same room/bed, caring for a patient, touching body fluids, or closely participating in a burial.

and other social activities. Contact tracing is therefore one of the most effective outbreak containment measures and must be implemented prudently.

1.2 Justification and rationale

During the EVD outbreak in West Africa, contact tracing posed serious challenges, in part as a result of the wide geographical expanse of the EVD outbreak, insufficient resources (human, financial and logistical), and to some extent, limited access to affected communities. The procedures for setting up functional contact tracing systems have also been unclear; inadvertently contact tracing has been conducted in many different ways.

These guidance notes have been prepared to articulate and streamline the process of contact tracing. The primary objective is to facilitate setting up a functional system for conducting systematic contact tracing. These notes are meant to standardize and scale up coordinated contact tracing activities in all affected communities. The document will also assist in estimating the resources required for conducting contact tracing as well as monitoring performance of contact tracing activities.

These guidance notes are based on best practice from extensive field experiences during previous outbreaks in the WHO African region. The document describes the elements of contact tracing; the procedures for conducting contact tracing up to the point of discharging the contacts; precautions to be taken by the contact tracing teams; contact data management; a guide to estimate the resources needed for an effective contact tracing system; and annexes containing the standard case definitions, tools for contact tracing, reporting, notification, and recommendations for home-based care.

2. Elements of contact tracing

In principle, contact tracing is broken down into three basic elements, namely, contact identification, contact listing and contact follow-up. The three elements of contact tracing are described below.

2.1 Contact identification

Contact identification is an essential part of epidemiologic investigation for all cases meeting the standard/surveillance case definitions of EVD. These cases are classified as suspected, probable or confirmed (see Annex 1 for case definition).¹ Epidemiologic investigation is also conducted for all deaths, either in the community or in a health facility, that are attributable to EVD. The process of verifying the cause of death is called verbal autopsy, which aims to establish the likely cause of death and identify chains of transmission. The tool for conducting an epidemiologic investigation is the case investigation form. The use of a comprehensive and standardized case investigation form is recommended. The epidemiologist/surveillance officer conducting the epidemiologic investigation should complete case investigation forms for all the EVD cases and deaths meeting the standard/surveillance case definition.

After completing the case investigation form, the epidemiologist/surveillance officer should systematically identify potential contacts. Contact identification therefore begins from a case. Identification of contacts is done by asking about the activities of the case (whether alive or dead) and the activities and roles of the people around the case (alive/dead) since onset of illness. Although some information can be obtained from the patient, much of the information will come from the people around the patient. In many instances, the patient will have died or have already been admitted to the isolation facility, with limited access. It is mandatory for the epidemiologist/surveillance officer to visit the home of the patient. The following information should be obtained:

- (a) All persons who lived with the case (alive/dead) in the same households since onset of illness.
- (b) All persons who visited the patient (alive/dead) either at home or in the health facility since onset of illness.
- (c) All places and persons visited by the patient since onset of illness e.g. traditional healer, church, relatives, etc. All these places and persons should be visited and contacts identified.
- (d) All health facilities visited by the patient since onset of illness and all health workers who attended to the patient (alive/dead) without appropriate infection prevention and control procedures.
- (e) All persons who had contact with the dead body from the time of death, through the preparation of the body and the burial ceremonies.

- (f) During the home visit, the contact tracing/follow-up teams should ask about persons who might have been exposed to the patient (alive/dead) but were not identified and listed as contacts through the above process.

Priority should be given to these **high risk categories of contacts**, persons who within the last 21 days:

- (a) Touched the patient's body fluids (blood, vomit, saliva, urine, faeces).
- (b) Had direct physical contact with the body of the patient (alive/dead).
- (c) Touched or cleaned the linens or clothes of the patient.
- (d) Slept or ate in the same household as the patient.
- (e) Have been breastfed by the patient (i.e. babies).
- (f) Health care workers who suffered a needle-stick injury from a contaminated instrument while attending to a probable or confirmed EVD patient.
- (g) Laboratory workers who had direct contact with specimens collected from suspected Ebola patients without appropriate infection prevention and control measures.
- (h) Patients who received care in a hospital where EVD patients were treated before the initiation of strict isolation and infection prevention and control measures (hospital-acquired infection – the circumstance of exposure should be critically examined).

The exposure information should be verified and double-checked for consistency and completeness during re-interview in later visits to ensure that all chains of transmission are identified and monitored for timely containment of the outbreak.

2.2 Contact listing

All persons considered to have had significant exposure (falling in the categories described above) should be listed as contacts, using the **contact listing form** [Annex 2]. Efforts should be made to physically identify every listed contact and inform them of their contact status, what it means, the actions that will follow, and the importance of receiving early care if they develop symptoms. The contact should also be provided with preventive information [Annex 3]² to reduce the risk of exposing people close to them.

The process of informing contacts of their status should be done with tact and empathy, since being a contact can be associated with serious health outcomes. Avoid using alarming information, such as 'Ebola has no treatment' or 'Ebola has a very high case fatality rate'. Advise all contacts to:

- (a) Remain at home as much as possible and restrict close contact with other people.
- (b) Avoid crowded places, social gatherings, and the use of public transport.
- (c) Report any suspicious signs and symptoms such as fever, headache, and weakness **immediately** (provide telephone numbers for the contact follow-up team, the supervisor or the Ebola hotline/call centre numbers). Explain that getting early and good clinical care

improves health outcomes, and immediate evacuation from the home and isolation reduces the risk of infecting family members.

In addition, provide information on:

- (a) EVD preventive measures through inter-personal communication and where applicable, provide materials like leaflets and brochures.
- (b) Preventive measures to mitigate the risk of exposing family members and others if a contact develops symptoms [Annex 3].
- (c) Guidance for home-based care at onset of illness while waiting for evacuation and isolation [Annex 3].

Contact identification and listing, including the process of informing contacts of their status, should be done by the epidemiologist or surveillance officer, not by the local surveillance staff/community health worker performing the daily follow-up. The local surveillance staff/community health worker should be introduced during the initial home visit as the person who will conduct home visits.

2.3 Contact follow-up

The epidemiologist/surveillance officer responsible for contact tracing should assemble a competent team comprising local surveillance and appropriate community members to follow-up all the listed contacts. This could include surveillance staff/health workers from health facilities, community health workers, volunteers e.g. from the Red Cross and community leaders.

An efficient contact tracing system depends on a relationship of trust with the community, which in turn fosters optimum cooperation. Communities should have the confidence to cooperate with contact tracing teams and allow the referral of symptomatic contacts to designated isolation facilities. Involving appropriate community members (in particular local leaders) in contact tracing is critical in cultivating this good relationship, trust and confidence. The local surveillance and community volunteers should be involved as early as possible in the response. The local surveillance staff and community health workers should be closely supervised by trained epidemiologists/surveillance officers.

The contact follow-up teams and their supervisors should be trained in a one-day workshop to familiarize the team with basic information on EVD, procedures and tools for contact tracing, and the required safety precautions. The training package should cover:

- (a) Basic facts about EVD, transmission, and preventive measures.
- (b) The rationale and procedures for contact tracing/follow-up.
- (c) Contact tracing/follow-up tools, temperature monitoring, reporting, etc.
- (d) Recommended infection prevention and control measures for contact tracing teams.
- (e) Home-based preventive measures at onset of illness.

- (f) Home-based care for symptomatic contacts/EVD cases.
- (g) Linkage/coordination with other response groups.

After the orientation, the contact follow-up teams should be equipped with all the necessary tools, including:

- (a) Contact listing, contact follow-up, reporting and monitoring forms.
- (b) Pens.
- (c) Thermometers (preferably digital).
- (d) Alcohol-based hand rub solutions.
- (e) Ebola fact sheets and posters.
- (f) Protocol for reducing risks of transmission at home [Annex 3].
- (g) Guidelines for home-based care for symptomatic contacts/EVD cases [Annex 3].
- (h) Important contact list (e.g. technical leads, supervisors, call centre, ambulance, etc.).
- (i) Disposable gloves.
- (j) Mobile phones with sufficient credit or other devices for supervisors.

3. Procedures for conducting contact follow-up

The steps below provide guidance on contact follow-up:

1. Each morning, the epidemiologist/surveillance officer responsible for contact tracing prepares the list of contacts to be followed that day using an appropriate application (e.g. FIMS, Epi-info or manually).
2. The epidemiologist provides the list of contacts to the supervisors in a meeting, taking into account the supervisors' route, the number of contacts in a particular area, and the local administrative setting.
3. The supervisors travel to their areas of work and meet the contact follow-up teams at a central meeting point e.g. nearby health facility, school, church, etc., and the teams are assigned the contacts to visit.
4. After receiving the lists of contacts, the teams go to their respective communities for home visits.
5. The team should observe the culturally recommended practice of greeting, except for those that entail direct physical contact like shaking hands or hugging. Explain to the household that the restrictions have been recommended to contain the spread of EVD.
6. If offered seats, inform the household that you will not stay long and need to quickly interview the contacts so that the team sees the other contacts before the day ends.
7. Interview and assess the contact for symptoms using the contact follow-up form [Annex 4], and take their body temperature. Do not take their temperature if they have symptoms.
8. If a contact is not at home, the team should inform the supervisor immediately while trying to establish the contact's location. The role of the community leader becomes critical in such incidents. A satisfactory explanation should be obtained for a contact's absence.
9. After finishing the interview/assessment, ask whether any other person in the house is not feeling well (even if the person is not a contact). This serves to identify any sick person in the community, a process referred to as active case search.
10. The contact follow-up team prepares a report summarizing the findings using the reporting format in Annex 5.
11. After completing the assigned home visits, the teams should assemble in the central meeting point to provide feedback to the supervisor.
12. The supervisor collects all the reports of contacts followed up that day and prepares a summary report for the epidemiologist/surveillance officer. The report should include any other issues encountered during the home visit.
13. The epidemiologist makes a consolidated report of all contact tracing, which forms part of the surveillance sub-committee report presented to the taskforce.

3.1 Managing contacts with signs and symptoms

The contact tracing/follow-up team is usually the first to know when a contact has developed symptoms. This may be volunteered by the contact in a phone call, or the contact tracing team makes the discovery during a home visit. The contact follow-up team **must not** take the temperature of contacts with symptoms. If a contact develops signs and symptoms, the responsible team should immediately notify the supervisor and/or the alert management desk/call centre. The alert management desk/call centre will complete the Ebola alert case notification form [Annex 6] and immediately inform the case management team leader. The ambulance team is then dispatched to conduct an assessment and/or evacuation of the symptomatic contact to the treatment centre.

3.2 Supervision of contact follow-up

Close supervision and monitoring of contact follow-up is necessary to ensure that the local surveillance/community workers visit and observe contacts daily. Supervisors should join contact follow-up teams for home visits on a rotating basis to ensure that home visits are done correctly. Quality checks may also include randomly calling some contacts to verify whether they were visited. Conduct regular meetings with all contact tracing teams to address any issues that might have an impact on the effective functioning of contact tracing. Other administrative strategies may be needed to address non-compliance and the management of uncooperative contacts.

3.3 Discharge of contacts

Contact identification, listing and follow-up should start as soon as a suspected case or death has been identified. However, follow-up of contacts for suspect cases that test negative for EVD should stop and the contacts removed from the contact list.

Contacts completing the 21-day follow-up period should be assessed on the last day. In the absence of any symptoms, the contacts should be informed that they have been discharged from follow-up and can resume normal activities and social interactions. The team should spend time with the contacts' neighbours and close associates to assure them that the discharged contacts no longer poses a risk of transmitting the disease. If an employer requests an official letter declaring the end of follow-up, this could be provided by the response team. The contacts should ensure that they are not re-exposed to symptomatic contacts or probable/confirmed cases of Ebola.

3.4 Recommended safety precautions for contact tracing teams

Since EVD cases are more likely to be discovered during contact follow-up, contact tracing teams should take precautionary measures to protect themselves during home visits.

The teams should abide by the following:

1. Avoid direct physical contact like shaking hands or hugging.
2. Maintain a comfortable distance (more than 1metre)) from the person.
3. Avoid entering the residence.
4. Avoid sitting on chairs offered to you.
5. Avoid touching or leaning against potentially contaminated objects.
6. Always have a good breakfast before home visits to resist the temptation of eating or drinking while visiting contacts.
7. Do not conduct home visits wearing personal protective equipment like masks, gloves, or gowns.
8. If you must take the contact's temperature:
 - (a) Put on disposable gloves.
 - (b) Have the contact turn around and take their temperature in the armpit.
 - (c) Avoid touching the patient and step back to wait for the thermometer.
9. If the contact is visibly ill, do not attempt to take their temperature, but notify your supervisor.
10. As part of the overall safety of the response team, all members of the contact tracing team should monitor their own temperature every morning.

4. CONTACT DATABASE

With increasing number of EVD cases, the effective management of contacts requires appropriate software applications designed to manage cases and their corresponding contacts. These applications, FIMS and Epi-info, have been developed to streamline management of contacts during infectious disease outbreaks. The applications support the following aspects of case and contact data management:

- (a) Registration of cases and case-related data.
- (b) Registration of contacts and contact-related data.
- (c) Production of daily follow-up reports.
- (d) Production of predefined situation reports.
- (e) Exporting data in different formats (txt, xls, xml etc.) for further analysis.
- (f) Summary case and contact mapping (using GIS software).
- (g) Visualization of chains of transmission.

During an outbreak, WHO or collaborating partners will deploy a data manager to train national epidemiologists and data managers and establish outbreak case-contact databases. This is a quick way of building local capacity to use the software to support field operations. The national authority, in collaboration with WHO, should then organize formal training for national outbreak response teams including data managers, biostatisticians, epidemiologists, and other public health professionals after the outbreak is controlled. For areas at-risk of EVD spread, training field teams should be prioritized to enhance EVD outbreak readiness and response capacity.

5. Estimating resource requirements for contact tracing

Setting up a functional system for contact tracing requires significant human, financial and logistical resources. The suggestions below provide a basis for estimating the resources needed for contact tracing. The epidemiologist/surveillance officer responsible for contact tracing, in collaboration with the national/sub-national emergency management committee, should determine:

- The average number of contacts to be visited per day by one contact follow-up team (comprising 1 surveillance staff and 1 community volunteer) e.g. 10 contacts per day.
- The remuneration for each member of the team per day e.g. US\$ 5 per day.
- The number of contact follow-up teams to be supervised by one trained supervisor e.g. one supervisor is responsible for an average of 15 teams.
- The allowance of the supervisor, e.g. each supervisor is entitled to US\$ 10 per day.
- The supervisor will require transport, either a motorcycle for one supervisor or a vehicle for 5 supervisors working along the same route.

Template for budgeting tool for contact tracing

No.	Budget item	Formula (examples of cost are in US\$)
1	Allowance for community volunteers	$\frac{\text{Total No. of contacts}}{10} \times \$ 5 \times 2 \times \text{No. of days}$
2	Allowance for supervisors	$\frac{\text{Total No. community health workers}}{15} \times \$ 10 \times \text{No. of days}$
3	Cost of fuel (motorcycle) for supervisors	$\text{No. of supervisors} \times \text{cost of fuel per litre} \times \text{No. of litres per day} \times \text{No. of days}$
4	Cost of fuel (vehicle) for supervisors Driver's allowance	$\frac{\text{No. supervisors} \times \text{cost of fuel/litre} \times \text{No. litres per day} \times \text{No. of days}}{5}$ $\frac{\text{Number of supervisors} \times \text{driver's allowance} \times \text{No. of days}}{5}$
5	Allowance for district data manager in affected districts	$\text{Number of data managers} \times \text{amount} \times \text{No. of days}$
6	Cost of phones and credit	Depends on local costs

References

¹ WHO 2014: Case definition recommendations for Ebola or Marburg Virus Diseases
<http://www.who.int/csr/resources/publications/ebola/ebola-case-definition-contact-en.pdf?ua=1>.

² WHO/AFRO 2014: Standard operating procedures for controlling Ebola and Marburg virus epidemics - Provisional recommendations from WHO.

Annex 1: Standard/surveillance case definitions for Ebola virus disease

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 case;

OR

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

- headaches
- anorexia /loss of appetite
- lethargy
- aching muscles or joints
- breathing difficulties
- vomiting
- diarrhoea
- stomach pain
- difficulty swallowing
- hiccups

OR

Any person with inexplicable bleeding.

OR

Any sudden inexplicable death.

Probable case:

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

OR

Any suspected case evaluated by a clinician.

Laboratory confirmed case:

Any suspected or probable case 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 Ebola.

Annex 3: Protocol for reducing risks of Ebola transmission at home

It is strongly recommended that patients and their contacts with symptoms are immediately evacuated to a health-care facility, ideally an Ebola treatment centre. However, in circumstances where admission is not immediately possible, these guidelines provide the minimum procedures required to protect family members and ensure optimal management of a patient at home. It is important to remember that:

1. EVD is spread from person to person by contact with blood, vomit, stool, urine, sperm, breast milk (and other body fluids) of persons with the disease;
2. Household members should avoid all direct physical contact with the patients and their body fluids;
3. Contact with materials contaminated by a patient's body fluids, such as clothing and bedding, can spread the disease to others.

To prevent infection, these recommendations should be followed:

1. The patient should restrict movement to one room in the household and avoid direct contact with other family members;
2. The patient should use one toilet that other household members do not use;
3. Only one person should look after the patient;
4. Caregivers should wear gloves or use towels soaked in bleach to avoid direct contact with the patient and their body fluids (blood, vomit, stool, urine);
5. Caregivers should avoid contact with the patient's body fluids by staying behind or beside the patient while giving care, and never facing the patient;
6. Avoid direct contact with the patient's clothes, bedding and other household items the patient has touched;
7. If the patient has vomit, diarrhoea or bleeding, a mask or a dry towel wrapped around the face can be used to protect the nose and mouth when touching the patient or items soiled with blood or body fluids. A waterproof gown, eye protection, gloves and rubber boots should also be worn in these circumstances.

Cleaning:

1. The caregiver should prepare a bleach solution to clean the room, clothes, bedding and others household items touched by the patient. To prepare the bleach solution, mix 1 part of concentrated bleach (5%) with 10 parts of water (fill a cup with the bleach, empty the cup into a bucket and refill the cup with water 10 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. Gloves should be worn before entering the room;
4. Hands should be washed with soap and water or an alcohol-based hand rub solution (hand sanitizer), if available, before and after entering the patient's room and immediately after glove removal;
5. For cleaning blood stains, vomit, stool, or urine:
 - (a) Pour the bleach solution over the blood or other stains and leave for at least 15 minutes;
 - (b) Soak a large towel in the bleach solution;
 - (c) Use the soaked towel to clean the blood;
 - (d) Place the soiled towel in a bucket and cover with the bleach solution;
 - (e) Soiled towels must be soaked in a bucket filled with bleach solution for at least one hour, after which the towels may be washed with soap and reused once dry;
6. Never put bleach or bleach solution in the patient's or caregiver's mouth or eyes;
7. Used and soiled bleach must be emptied into the latrine/toilet used by the patient;
8. Use bleach-soaked towels for carrying or moving the patient.

Essential items for home use are:

- 10 pairs of latex gloves (disposable);
- 5 face masks;
- Bleach solution of 2 litres diluted;
- 1 pair of heavy gloves ;
- 2 buckets (bleach solution and waste);
- Soap for hand washing and an alcohol-based hand rub solution (hand sanitizer);
- Home-based care instructions.

Home-based care instructions for contacts with symptoms

If you start to feel ill:

1. **Seek medical care as soon as possible** (immediately inform health workers);
2. **Do NOT use aspirin, ibuprofen or diclofenac:** These drugs can make bleeding worse;
3. You may take paracetamol (Panadol) for pain or fever;
4. **Drink a lot of fluid:** Drink oral rehydration solution (ORS). If you do not have ORS in a packet, you can make your own. In 1 litre of clean water, add 6 teaspoons of sugar and ½ teaspoon of salt. Orange juice, mashed banana or water from boiled rice can also be used with juice. If you have diarrhoea, you should try and drink as much fluid as you are losing. Adults should try to drink at least 4 litres a day of clean water mixed as described above.

Annex 5: Reporting form for field teams

REPORTING FORM FOR FIELD TEAMS

Variable		Date:
Team name:		
Team members:		
Villages assigned	No. of villages	
	No. of households	
	Names of villages	
Villages visited	No. of villages	
	No. of households	
	Names of villages	
Total cases under follow-up (list names)		
Total contacts under follow-up		
Contacts who have completed 21-day follow-up today		
Total cases followed up today		
Total contacts followed up today		
Contacts who developed symptoms		
Details of community alerts responded to		

Remarks/other issues

Annex 6: Ebola Alert Case Notification Form

EBOLA ALERT CASE NOTIFICATION FORM AT THE CALL CENTRE

Phone call received by: _____

on (date) __ __ / __ __ / __ __ __ __; at (time) __ __ : __ __ a.m. p.m.

The suspected Ebola case was reported by:

A Contact Tracing Team Name: _____ Phone: _____

A Health Facility Name: _____ Phone: _____

A Community Leader/member Name: _____ Phone: _____

Name of patient (case)	
Contact	<input type="checkbox"/> Yes <input type="checkbox"/> No
Status	<input type="checkbox"/> Alive <input type="checkbox"/> Dead
Symptoms	<input type="checkbox"/> Fever <input type="checkbox"/> Vomiting <input type="checkbox"/> Weakness <input type="checkbox"/> Headache <input type="checkbox"/> Diarrhoea <input type="checkbox"/> Muscle pain <input type="checkbox"/> Bleeding Other symptoms: _____
Date of onset of illness	

The patient is currently in:

Village/Street Address (Residential): _____

Sub-county: _____

District/State: _____

• Contact telephone number of case at home: _____

• Action taken: _____
