



EMERGENCY GUIDELINE

Implementation and management of contact tracing for Ebola virus disease

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Organization**



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List of Abbreviations

CDC	United States Centers for Disease Control and Prevention
ETU	Ebola Treatment Unit
ETC	Ebola Treatment Centre
EVD	Ebola Virus Disease
FIMS	Field Information Management System
PPE	Personal Protective Equipment
RT-PCR	Reverse transcriptase polymerase chain reaction
WHO	World Health Organization
WHO AFRO	World Health Organization Regional Office for Africa
VHF	Viral Haemorrhagic Fever

Acknowledgements

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1. Introduction

1.1 Purpose of the document

The scale, duration, and complexity of the Ebola virus disease (EVD) outbreak in West Africa have underscored the need for prompt and effective preparation for and implementation of containment measures. A person with EVD can spread the disease to others as soon as he or she begins to have symptoms; therefore, it is crucially important to identify and isolate symptomatic persons immediately to stop the disease from spreading. Contact tracing is one of the critical tools available to effectively break chains of transmission and control EVD outbreaks.

Contact tracing is the process of identifying, assessing, and managing people who have been exposed to a disease to prevent onward transmission. People who may have been exposed to EVD are systematically followed for 21 days (the maximum incubation period for the disease) from the date of the most recent exposure. This process allows for the rapid identification of people who become symptomatic. Identifying people at the onset of symptoms and promptly isolating them reduces exposure to other persons, preventing subsequent EVD infections. Additionally, prompt isolation and admission of the symptomatic person to a treatment facility decreases the delay to supportive treatment, which improves the likelihood of survival.

Experience from previous EVD outbreaks has demonstrated contact tracing's efficacy in stopping ongoing EVD transmission. During the 2014 EVD outbreak in West Africa, however, contact tracing has posed serious challenges. Factors include the wide geographical expanse of the EVD outbreak (involving urban and rural areas), insufficient resources (human, financial and logistical), community resistance, and to some extent, limited access to affected communities. The procedures for setting up contact tracing have varied significantly among the stakeholders involved, with no standardized approach. The absence of systematic implementation and management methods of contact tracing has led to delayed and often ineffective contact tracing, contributing to ongoing transmission.

In order to provide a practical tool to implement effective, context-specific contact tracing, WHO Headquarters, WHO Regional Office for Africa (AFRO), and the U.S Centers for Disease Control and Prevention (CDC) have partnered to develop a revised version of the existing WHO AFRO Contact Tracing Guidelines (September 2014).¹⁻³ This operational document has been prepared to guide the implementation and management of contact tracing in all countries preparing for and managing EVD outbreaks. In addition to discussing potential solutions to common contact tracing challenges, the guide also provides direction regarding the monitoring and evaluation of the contact tracing process. The guide has been prepared based on best practices from extensive field experiences during previous EVD outbreaks as well as the most recent 2014 EVD outbreak in West Africa.

1.2 Target audience

This guide is intended for all countries preparing to implement contact tracing. Additionally, this guide can be used by countries currently engaged in contact tracing activities. National and sub-national emergency management committees, epidemiologists, surveillance officers and volunteer organizations involved in EVD preparedness and response activities may use this document to plan, implement and manage contact tracing. The guide should be adapted to the local context in its application.

1.3 Contact tracing in the overall EVD response

Contact tracing is a critical tool for controlling an EVD outbreak, but represents only one aspect of a multifaceted control strategy for EVD outbreaks (Figure 1). Contact tracing is intricately connected to case finding (surveillance) and case investigation processes; the detection of an EVD case activates the case investigation process, at which time contacts are identified, initiating the contact tracing process. These efforts further rely on other concurrent aspects of the EVD response such as social mobilization, logistics, case management, and laboratory capacity.

Contact tracing can only be effective if it is immediately implemented after case finding and efficiently managed, thus, all aspects of the response need to be addressed when preparing for, implementing, and managing contact tracing.

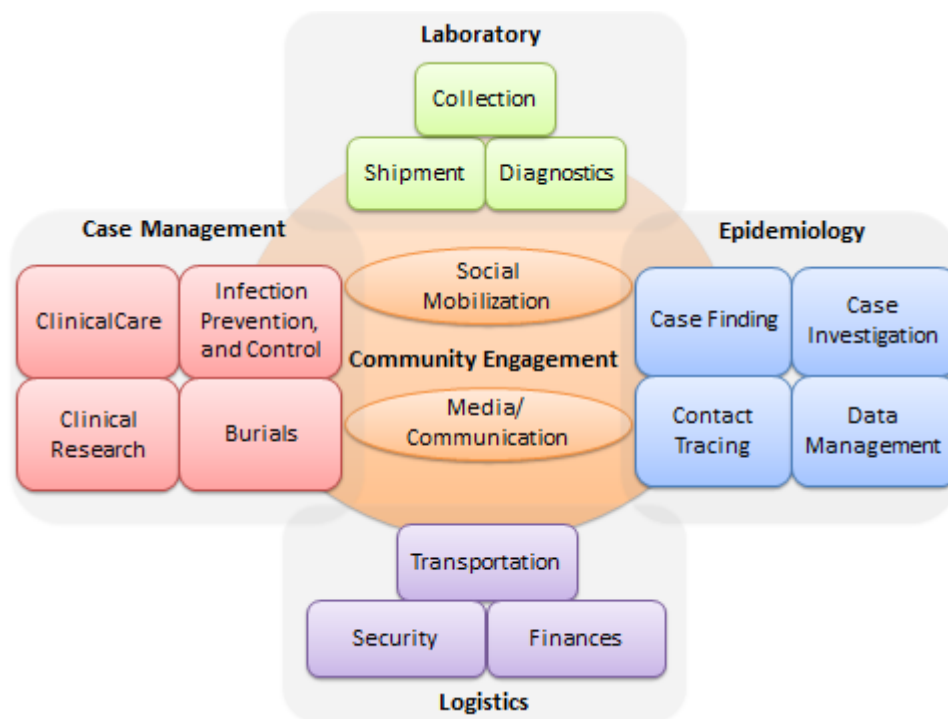


Figure 1: Structure of the different committees involved in EVD outbreak control activities

1.4 General considerations for contact tracing

Contact tracing relies on active participation and cooperation from the affected communities to be effective. To develop a relationship of trust between public health officials and the community, every effort should be made to engage communities. Involving key local community members, stakeholders and volunteers very early in response planning and preparation is important to cultivate community ownership and trust in the health system. Communities should have the confidence to cooperate with teams that are conducting case investigation and contact tracing and support the referral of symptomatic contacts to designated isolation and treatment facilities.

Social mobilization and community engagement efforts are critical.

Contact tracing is best undertaken in settings where appropriate, accurate and culturally sensitive communication and messaging exist. Insensitive and inappropriate messaging and practices during outbreaks can be counterproductive. For example, enrolment of contacts relies on their willingness to be followed; they may be more or less willing to be followed based on their understanding of EVD, the stigma associated with being a contact (from peers, family, or the community), and how they feel about the overall EVD response. They also may not want to be

identified or found if prohibitions from work or school are likely, and they may not want to report other contacts because of this stigma and potential retaliation. Public misinterpretations and perceptions of contact lists as a list of people who are likely to die may lead to community resistance and impede contact tracing. Therefore, the health communication and messaging as well as psycho-social support provided to the community are critical. The following measures may enhance community engagement and avoid stigma:

- Engage and educate community leaders regarding EVD infection, transmission, and the steps communities can take to combat it.
- Engage religious centres, such as churches and mosques, to provide accurate messaging to the community.
- Use early health communication and education efforts, if possible, before the first introduction of EVD.
- Use early psychosocial support to overcome the fear associated with EVD.
- Educate the media on the importance of confidentiality for cases and contacts.

Successful contact tracing requires skills in the assessment of EVD symptoms, interviewing techniques and counselling. Persons who conduct contact tracing should have investigative skills to find and track all potential contact, and the ability to analyse the evidence. They also need to be flexible and empathic with the cases, contacts and their families in order to build trust and good community relations. Contact tracing that is undertaken without sufficient expertise and due consideration to individual, community, social, cultural and religious sensitivities can alienate individuals and communities and thus, deter contact tracing efforts. Contact tracing activities may provide opportunities to establish strong partnerships with the community.

In EVD outbreaks, the implementation of contact tracing activities may vary with the burden of disease and the local context. The number of EVD cases and contacts traced daily may cover wide geographical areas and extend into defined pockets such as densely populated urban areas, posing logistical challenges to locating and tracing all those who have been in contact with an EVD case. In such instances, comprehensive and systematic contact tracing activities need to be enhanced through robust community engagement and intensified social mobilization. Active case finding activities to detect other symptomatic individuals in the defined areas should also be undertaken in conjunction with contact tracing activities.

1.5 Definitions

Effective contact tracing requires the strict application of definitions for what defines a “contact” and an EVD “case” in order to promptly identify all contacts and EVD cases. Failure to apply correct definitions can result in ongoing transmission.

Although not required, it may be helpful to develop a local definition of an EVD “alert”. An alert should have less stringent criteria than an EVD case, so there is a lower threshold for detecting people infected with EVD. Such an alert case definition could include a history of travel to an area with on-going EVD transmission. All alerts should be investigated to determine whether or not the alert meets an EVD case definition.

1.5.1 Case definitions

For the purpose of this document the case definitions in Box 1 are used.^{4,5} Please see the WHO website (www.who.int) for the most up-to-date case definitions. Case definitions may be adapted considering the local context.

Box 1. Case definitions

Suspected EVD 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 a dead or sick animal, **OR**
- Any person with sudden onset of high fever and at least three of the following symptoms: headache, vomiting, diarrhoea, anorexia/loss of appetite, lethargy, stomach pain, aching muscles or joints, difficulty swallowing, breathing difficulties, or hiccups; **OR**
- Any person with unexplained bleeding/haemorrhaging; **OR**
- Any person with sudden, unexplained death

Probable EVD Case

- Any suspected case evaluated by a clinician, **OR**
- Any person who died from ‘suspected’ EVD and had an epidemiological link to a confirmed case but was not tested and did not have laboratory confirmation of the disease

Confirmed EVD Case

- Any suspected or probable cases with a positive laboratory result

1.5.2 Contact definition

For the purpose of this document the contact definition in Box 2 is used.^{4,5} Please see the WHO website (www.who.int) for the most up-to-date contact definition. Contact definitions may be adapted considering the local context.

Box 2. Contact definition

Any person who has been exposed to a suspected, probable, or confirmed case of EVD in at least one of the following ways:

- has slept in the same household as a case
- has had direct physical contact with the case (alive or dead) during the illness
- has had direct physical contact with the (deceased) case at a funeral or during burial preparation rituals
- has touched the blood or body fluids (including urine, faeces, vomit, tears, or sweat) of a case during their illness
- has touched the clothes or linens of a case
- a baby who has been breastfed by the case

Note: This should include health workers (including those involved in cleaning, waste management, laboratory technicians, healthcare workers, etc.)

2. Planning and Preparation for Contact Tracing

Contact tracing can only break the chain of EVD transmission if it is implemented immediately when a case of EVD is found. Any delay can lead to a rapid spread of EVD. Therefore, preparation is essential and should include identifying and allocating the required infrastructure, personnel, resources, and funding before the first case of EVD is detected.

2.1 Infrastructure

Incident Management Framework

This includes organized teams of people who are designated to lead the response (see Figure 3). Ideally, the staff of the incident management framework would have a representative from each ministerial stakeholder. An incident manager leads the incident management framework and must have the authority to make *immediate* decisions, *immediately* allocate resources and funds, and coordinate each involved ministry.

Alert system

While the alert system can be designed in a number of ways and is country and context dependent, the system should operate at both the national and sub-national levels. For example, a nationwide toll-free hotline can operate as event-based surveillance at the district level, obtaining information on community deaths, unsupervised burials, and other situations requiring precaution. At a minimum, the alert system should be in place at health facilities nationwide, particularly in districts that border EVD-affected countries and in capital cities. Any staff involved in the alert system needs to know: (a) the definitions of what constitutes an alert and an EVD case, (b) the signs and symptoms of EVD, and (c) how to activate the alert system when they encounter a person who meets the alert or EVD case definition. Once activated, the alert system should result in the deployment of specially trained staff to assess the suspected EVD case and ensure safe specimen collection and case transportation to a treatment facility, if required. Those involved in contact tracing also need to be able to activate the alert system if contacts become symptomatic.

Transit/Isolation Unit/Community Care Centre (CCC)

These areas should be designated for the isolation of persons meeting the definition of a suspected EVD case. Although separate facilities can be created, existing infrastructure can be used. Locations are recommended to be close to places where EVD cases are most likely to be identified such as ports of entry/departure (e.g. airports and border posts), and healthcare facilities. Food, potable water, and basic necessities will be needed for suspected EVD cases who are awaiting confirmation. In some settings, suspected and probable EVD cases may have blood drawn for EVD testing in the transit/isolation unit and may need to wait there until results are received. If a suspected or probable EVD case has a negative laboratory result before 72 hours of symptom onset (i.e. 3 days), a new blood sample must be obtained 72 hours after symptom onset and tested to confirm the absence of EVD.

Laboratory

Having a laboratory capable of EVD testing in country is preferred, but if that is not possible, it is important to identify a laboratory nearby that can provide rapid results. Planners should consider the equipment available (including reagents), biosafety level, and the availability of properly trained staff. Standard operating procedures for proper specimen packaging and shipment need to be identified and provided to all hospitals/healthcare facilities.^{6,7}

Ebola Treatment Unit/Center (ETU/ETC) (CCCs in some cases)

This is the facility where probable or confirmed EVD cases go for treatment. In some settings, suspected and probable EVD cases will be taken immediately to ETUs/ETCs where they will have their blood drawn and await their test results. ETUs/ETCs are specifically designed to prevent transmission of EVD to others and should be set up according to WHO guidelines. At least one ETU/ETC should be established and functional before the first EVD case is detected in the country.

Data Management

A specific data manager should be responsible for ensuring all data are entered and managed, including the daily follow-up of contacts. If contacts are in more than one district, a data manager in each district may be needed. A system of collecting, managing and analysing data should be decided upon. If possible, electronic data entry should be considered as it permits faster data exchange, allows for immediate reporting to key

stakeholders about current contact tracing activities, and facilitates mandatory reporting to WHO. If electronic data entry is not possible, paper based data management can be used; standardized forms should be created and the completion of all data fields will need to be enforced.

2.2 Personnel

Under the incident management framework, different teams are needed to coordinate a response to identify, control, and eliminate EVD. These are suggested teams, titles and responsibilities. This guide focuses on the Contact Tracing Team (see Figure 3) and provides an overview of several other teams with whom the Contact Tracing Team collaborates. These other teams include the Case Management Team, Social Mobilization Team, Laboratory Team, and Logistics Team. Communication between the Contact Tracing Team and other teams, via the team leads, is vital. Suggested qualifications and responsibilities of members of a Contact Tracing Team and other closely related teams (Transportation Teams, Disinfection Teams, and Burial Teams) are provided but should be adapted to the local context [Annex 7]. Resources for training personnel are also provided [Annex 8]. Figure 2 illustrates an example of an incident management structure.

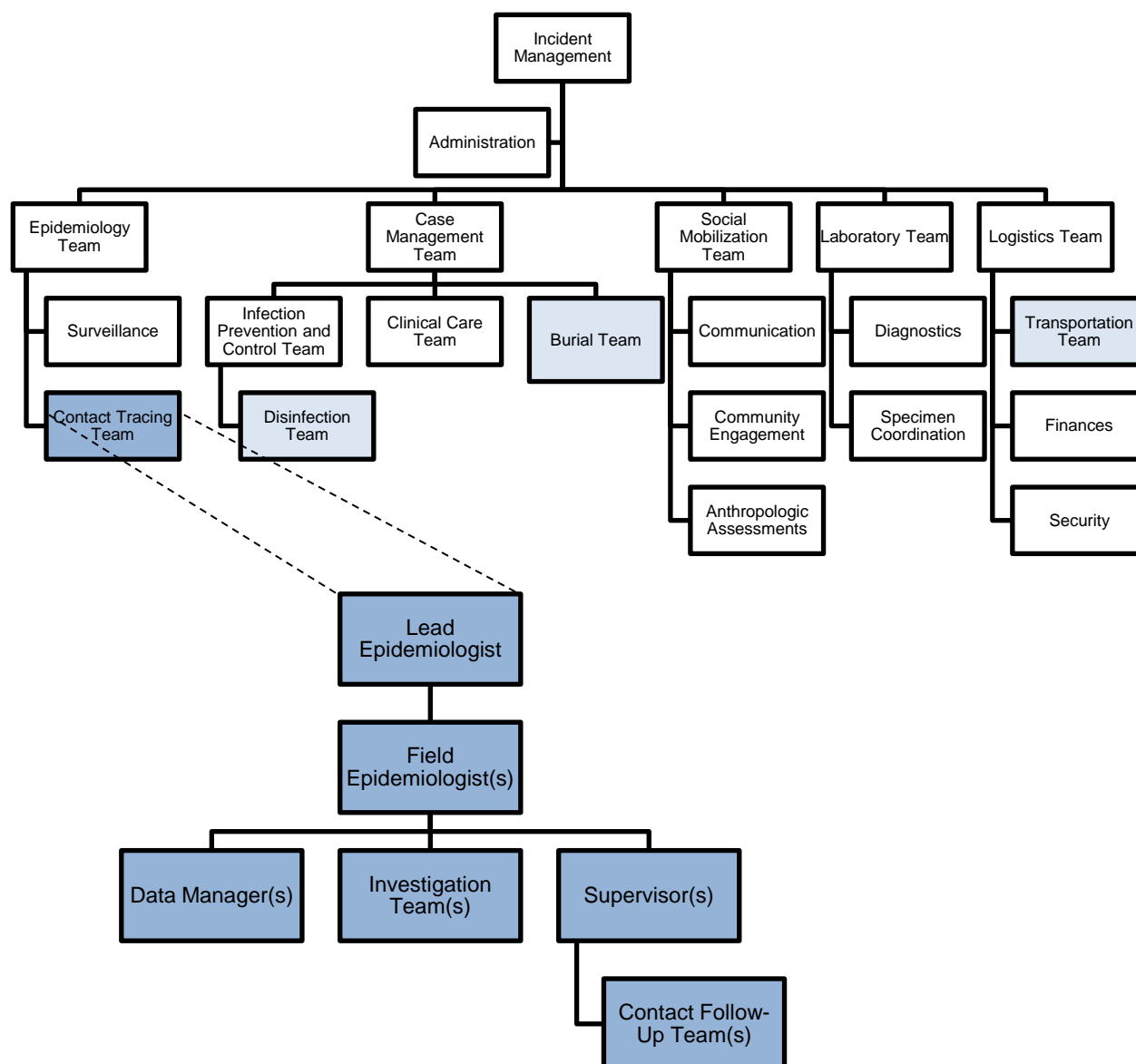


Figure 2: Sample Incident Management Framework for Ebola Virus Disease Response

2.3 Resources

Resources and equipment must be acquired and ready for distribution for the Investigation Team and initial response processes. Although scalability should be considered, the primary focus should be on the resources required for the initial response in order to avoid a delay in the intervention.

A sample minimum equipment list is provided as a guide [Annex 5]. Required resources will vary by country, depending on the existing infrastructure and available resources.

2.4 Funding

A common barrier to rapid response during initial EVD case identification is the lack of discretionary funds or an authority to release funds immediately if needed. Any delay in response activities, even just a few hours, can result in a large transmission chain. Funding needs to be allocated during preparation activities and before the initial EVD case is detected.

Budgetary considerations for the initiation of rapid response are provided [Annex 6]. Required resources will vary by country, depending on existing infrastructures and financial status.

3. Implementation of Contact Tracing

3.1 Case investigation and contact identification

Contact tracing can only break the chain of EVD transmission if it is implemented immediately upon identification of an EVD case, including suspected, probable and confirmed EVD cases. Laboratory confirmation should not delay the initiation of contact tracing.

When an alert of a potential EVD case is first detected, an Investigation Team should be immediately mobilized to investigate. The Investigation Team should evaluate the person in question for EVD symptoms, the type of EVD exposure they had, and any EVD risk factors. If the person meets the definition of an EVD case, then the Incident Management Framework is activated.

Working simultaneously with the Case Management Team, the Investigation Team should interview the EVD case, systematically identifying all potential contacts since the case's onset of symptoms. They should ask probing questions to ascertain all of the case's activities since the onset of illness and identify everyone involved in those activities. This interview should be comprehensive, detailed, and extensive [see key considerations]. No aspect of the case's daily activities since becoming ill should be missed.

If the case is well enough to talk, the Investigation Team should interview the case directly. If the case is unable to talk or has died, the team should talk to people who were likely involved in the case's routine activities and in the events leading up to their identification as a case. The team should talk to family and other contacts regardless of whether the case is alive or dead. Sometimes a case may forget or deliberately not name contacts or the case might be too sick to provide an accurate list. The team should gather information from people who cared for or had geographic proximity to the case, including healthcare workers, family and neighbours, and funeral attendees (if applicable). Thus, the Investigation Team must visit the household of each case and any health facilities visited by the case.

To ensure a complete and accurate list of contacts, the Investigation Team may have to conduct several interviews and visit places that the case went to after they started to have symptoms to get the names of contacts that the case does not know or remember (i.e., others at a restaurant, hotel, conference, market, place of worship, clinic or workplace). The Investigation Team should verify and double check the exposure information for consistency and completeness during re-interview in later visits to ensure that all contacts and potential chains of transmission are identified. Failure to identify even a single contact may lead to ongoing EVD transmission.

All persons, including the case, their family and other close contacts, should be provided with an easy way to reach the Investigation Team if he or she recalls more contacts after an interview is over. An outline of step-by-step procedures is available. [See Annex 1].

Key considerations

- Laboratory confirmation should not delay the initiation of contact tracing.
- Case and contact interviews should be conducted in a safe and conducive environment to establish trust and rapport between the team, case, family and community.
- The members of the Investigation Team should be persons trained in contact tracing, and interviewing (e.g., actively listen, know how to ask probing questions, show empathy, adjust the interview based on the case's or family members' emotional state, etc.).
- Probing questions should be dependent on the culture and local customs/activities in the area, and should focus on the period when the case developed symptoms.
- Questions should be designed to elicit the names of:
 - People with direct physical contact
 - People with sexual contact
 - All people who lived with the case (alive or deceased) since symptom onset in the same household
 - All people who visited the case (alive or deceased) since symptom onset (e.g., at home, healthcare facility)
 - All places the case visited since symptom onset (e.g., work, pharmacy, place of worship, extended family, traditional healers)
 - All healthcare facilities visited by the case and all healthcare workers who cared for the case

- In the event that the case is a healthcare worker, all patients and colleagues of this healthcare worker.
 - In the event that the case has died, all persons who had contact with the deceased person, including those who attended burial ceremonies
 - Anyone else who might have been exposed to the case
- It may be helpful to use a calendar or specific dates, such as local holidays, to help potential cases recall activities.
 - When EVD cases are first notified of their status, fear can inhibit their ability to recall persons with whom they have had contact. Including psychosocial support staff on the Investigation Team may help to reassure the case, and thereby facilitate contact identification.
 - During initial contact tracing, it may be helpful to split the Investigation Team so that one group focuses on healthcare contacts and one focuses on community contacts. However, it is important to maintain strong communication between teams, and to remember that there may be overlap between community and healthcare contacts.
 - Finding all contacts can be a logistical challenge. Common difficulties include: contacts without addresses, locations with no street names, use of personal nicknames, countries with no national identification program (e.g., no licenses, or birth certificates). Some solutions to these problems have included engaging community leaders to help find where contacts live and enlisting the help of cell phone companies to track contacts through Global Positioning Systems.

3.2 Contact listing

Any person considered to have had a potential EVD exposure and meeting the contact definition criteria should be listed as a contact, using the Contact Listing Form [Annex 2]. Information should be collected about:

- A contact's relationship to the case
- Date of last interaction
- Type of interaction

Additional information should include where the contact lives (address) and whenever available, a telephone number.

The Investigation Team should make every effort to personally identify and interview every listed contact. During this interview, the contact should be asked about their last date of interaction with the case. If there is a discrepancy between the date provided by the case and by the contact, the most recent date since the case's symptom onset should be used as the start of the 21 day follow-up period (the maximum EVD incubation period). If no risk of exposure is identified, the person will no longer be considered a contact and will not need follow-up.

When contacts are identified and confirmed, they should be informed of their risk status and the plan for follow-up. Contacts should be educated about the signs and symptoms of EVD and preventive measures they should take to protect themselves and others. The Contact Tracing Team should explain that getting early and good clinical care improves outcomes, and that immediate isolation reduces the risk of infecting family members. Contacts should be given the Contact Tracing Team's contact information (i.e., telephone numbers, hotline, etc.). Should the contact develop symptoms, the contact should be instructed to self-isolate and notify the team, in order to keep others from getting EVD. The contact should also be made aware of the importance of notifying the team if they move or leave the area.

The first meeting with a contact is critical for building trust.

Any contact that is found to be symptomatic during this initial interview is a potential suspected EVD case. In this situation, the Investigation Team will contact the Field Epidemiologist, who will activate the Case Management Team. The suspected EVD case will then be transported to a transit/isolation unit for further testing. While awaiting EVD testing, contact identification and contact listing should be initiated for this new suspected EVD case.

Key considerations

- The first meeting with a contact is critical. It should be conducted by an epidemiologist and preferably in conjunction with psychosocial support. It is essential that trust is built during this meeting. To facilitate this, the Contact Follow-up Team that will be assigned to the contact should ideally be introduced during this meeting so that the contact knows who will be visiting them.
- The process of informing the contact of their status can be traumatizing and should be done with tact and empathy.
 - Avoid using alarming information, such as “Ebola has no treatment” or “Ebola has a very high case fatality rate”.
 - Focus on the benefits of being a contact:
 - i. Access to immediate medical care if symptoms develop
 - Symptoms do not necessarily mean they have EVD but the system allows them access to immediate medical care, and prompt EVD testing.
 - If they are EVD positive, they get immediate treatment, which can increase the chance of survival.
 - If they are EVD negative, they will get the testing and medical care they need, as available.
 - ii. Reduce the risk of infecting family, neighbours, community, etc.
 - iii. Critical role in breaking the chain of transmission in their community/region

3.3 Contact follow-up

The Contact Follow-up Team performs contact follow-up through daily visits with the contact at a predetermined location and time. Contact Follow-up Teams should ideally be assigned to the same contact for all 21 days of follow-up. This will ensure continuity and facilitate the development of a relationship, which should, in turn, foster trust. Such an environment will encourage contacts to report if they develop symptoms. Additionally, this continuity will help identify the details of a contact’s activities of daily living, to ensure that all contacts are consistently found every day of follow-up.

During the daily visits, Contact Follow-up Teams will evaluate the health status of the contact by direct observation and by asking at least the following two questions: 1) How are you feeling? 2) Have you had a fever? This information should be recorded on the **Daily Contact Follow-Up Form** [Annex 3]. Because of potential risk to contact tracers, measuring the temperature is not required or recommended but is at the discretion of the country. Nevertheless, a contact with symptoms should never have their temperature taken by the Contact Follow-up Team. After finishing the interview/assessment, the Contact Follow-up Team should 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 finding”.

*Asymptomatic contacts
are not infectious*

If a contact is not at home, the Contact Follow-up Team should try to establish the contact’s location by asking family, neighbours, and community leaders. An explanation should be obtained for a contact’s absence.

The Contact Follow-up Team should report all the contacts found and any contacts that were not found to their assigned Supervisor at the end of each day. The Supervisor should record this information by listing the names of all the contacts in the appropriate categories in the **Contact Tracing Summary Form** [Annex 4]. This summary report should then be given to the Data Manager, who in turn will send the information to the Field Epidemiologist and Lead Epidemiologist for analysis.

Key considerations

- It is essential that the Contact Follow-up Team work to build rapport with the contact in the first few meetings. Trust is essential for contacts to be truthful regarding their health status and willingness to come forward if they develop symptoms.

- Asymptomatic contacts are not contagious and may be allowed to continue their activities of daily living during the 21 days of follow-up provided they can be easily followed up and have timely access to healthcare facilities if they become symptomatic.
- Contacts who are not seen by the Contact Follow-up Team should be identified and prioritized until they are found.
- A contact may be unwilling to continue the follow-up process so that he or she can maintain activities of daily living. This may result in the inability to commit to daily meetings with Contact Follow-up Teams. Contacts that continue to work in jobs which require interactions with large numbers of people or that impede a contact's ability to report immediately if symptoms develop (for instance, long distance bus drivers) should be discouraged. Measures that can be used to overcome this pressure include:
 - Engage community leaders about the importance of the follow-up process and ask for their support.
 - Work with psychosocial workers and Social Mobilization Teams so that they can provide mental and psychosocial support.
 - Explore local solutions to adapt to needs of the community (e.g., create incentives to participate). Note that if these are offered, people who are not actually contacts may come forward.
 - Provide basic supplies such as food, water, soap, and buckets.
- Contacts may flee the area for several reasons. Any lost contact can undermine the contact tracing process and the ability to stop the ongoing spread of EVD.
 - Countries should develop a standard operating procedure for how to classify flight risk in contacts and document what the correct response should be.

3.4 Managing contacts who develop EVD symptoms

If there is any concern about the health status of the contact during the follow-up process, the Contact Follow-up Team should immediately communicate with the Supervisor. The Supervisor should then alert the Field Epidemiologist who will then activate the Investigation Team to determine if the contact meets the suspected EVD case definition. If the contact fits the case definition of an EVD suspected case, the Investigation Team will explain what the next steps are and what it means to be sent to a transit/isolation unit. The Field Epidemiologist will then coordinate with the Case Management Team to activate other teams, including the Transportation Team and Disinfection Team. The suspected EVD case should be sent to a designated transit/isolation unit for medical care and confirmation testing. During this time, the Investigation Team should immediately start contact identification for this new suspected EVD case.

The RT-PCR assay for EVD does not always detect EVD during the first three days that a patient is symptomatic. For this reason, a negative lab test (RT-PCR assay) for EVD from a blood specimen collected less than 72 hours after the onset of symptoms does not rule out EVD. If the patient is still symptomatic 72 hours after symptom onset, a new specimen should be obtained and the test should be repeated. If the patient has recovered within 72 hours from the illness that brought them to medical attention, a repeat test is not required.

A blood specimen collected less than 72 hours after symptom onset, does not rule out EVD.

If the contact-turned-suspected EVD case tests negative for EVD after day 3 (72 hours) of symptoms, the suspected EVD case can return home and continue with the previous 21-day follow-up process, as they now return to being a contact. If the contact had been admitted to an Ebola Treatment Unit/Centre he/she may have had additional exposures to EVD cases while receiving care and therefore, should be followed for 21 days since the discharge date from the facility.

If the suspected EVD case tests positive for EVD, the patient is considered a confirmed EVD case and should be transported to an ETU/ETC (or other designated location for treatment of EVD patients); the Investigation Team should continue with contact identification, as previously described (Figure 3).

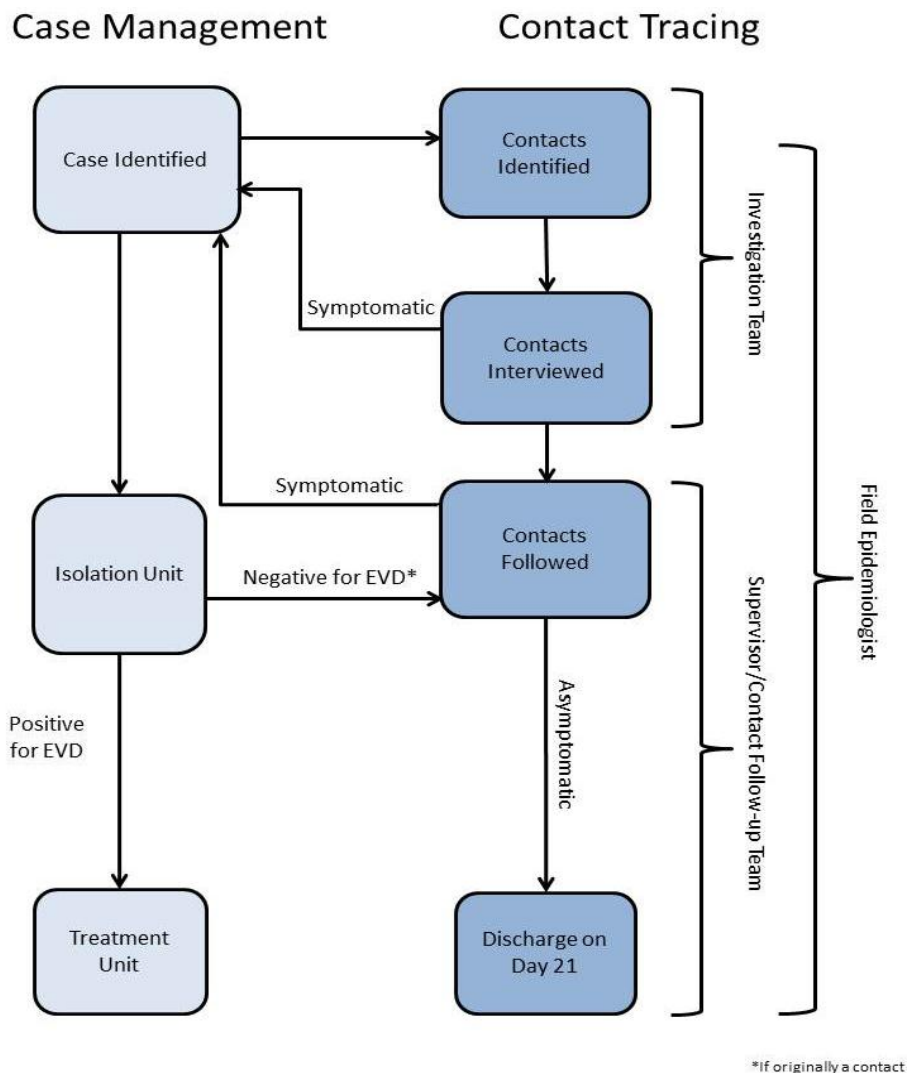


Figure 3. Relationship between Case Management and Contact Tracing in the EVD Response

3.5 Contact discharge

Contacts should be seen and interviewed on the 21st day of follow-up and, in the absence of any symptoms compatible with EVD, the contacts can be discharged from the contact follow-up process. Contacts who have not been seen on day 21 require priority follow-up daily until they are found. No contact can be discharged from follow-up without having been seen and evaluated on the 21st day or later.

Contacts may also be discharged if during the follow-up process it is discovered and verified (by the Field Epidemiologist) that the individual did not have an EVD exposure and was erroneously listed as a contact.

Key considerations

- Contacts who have completed the 21-day contact follow-up process may continue to be stigmatized by their families, peers, and/or communities. Health communication campaigns, educational activities and other efforts may need to be considered to help the contacts return to their communities.
- Community education should underscore the fact that discharged contacts do not pose a risk of transmitting disease.
- An employer may request an official letter declaring the end of follow-up. This should be provided by a coordinator of the EVD response.
- Any contact re-exposed to another case of EVD must restart their 21 days of follow-up from the last date of the most recent exposure.

4. Contact Tracing Management

4.1 Database management

To effectively and efficiently manage cases and their respective contacts, an electronic database is a necessity. In addition to being able to register information about cases and contacts, an electronic database will allow staff to produce daily reports, export data for analysis, geographically map contacts, and visually represent the chains of transmission. However, if the number of contacts is small these extra features may not be necessary. Using an electronic database will facilitate the quick reporting of data and trends, and thus, quick decisions about the contact tracing process.

Databases such as WHO's Field Information Management System (FIMS) and Epi Info's Viral Hemorrhagic Fever (VHF) application can be used. If sufficient resources and infrastructure exist, electronic data collection in the field should be considered. This would require providing mobile data collection devices (such as smartphones or tablet computers) to Investigation and Contact Follow-up Teams so the data can be entered directly in the field. Additionally, this would require a data movement coordination plan consisting of either manually uploading the devices to a computer or utilizing a secure Internet process. Overall, this would reduce the need for paper forms and additional data entry mechanisms (i.e., hiring data entry staff).

If an electronic database cannot be used it is essential that standardized forms are created and strictly enforced, so that data is uniform and complete. This may require training of anyone involved in data collection (Contact Follow-up Teams, Supervisors, Investigation Teams, etc.) to ensure the forms are filled out appropriately. This should be done prior to the first EVD case identification.

4.2 Quality assurance and quality indicators

4.2.1 Quality assurance

Ensuring that contact tracing is operating efficiently and effectively is essential to ending the spread of EVD. Even a single contact that is lost to follow-up or not accurately assessed clinically increases the risk that EVD will spread. Supervision and monitoring of contact tracing activities should be undertaken at all levels (subnational and national levels) and throughout all aspects of the contact tracing process.

More specifically, the following strategies may be employed to ensure quality of the contact tracing process;

- Every member of the Contact Tracing Team should evaluate cases with a low number of reported contacts.
 - The number of contacts will depend on the geographic location, culture, living conditions, activity/profession, and the amount of time the case was symptomatic before being identified.
 - Be cautious when the numbers don't match or are too few compared with previous cases with similar characteristics [above bullet].
 - Consider re-interviewing the case, family, and neighbours.
 - Consider prompting for additional daily activities that the case, family member, and/or neighbours may have forgotten.
- The Field Epidemiologists and Lead Epidemiologists should evaluate the transmission chains.
 - Identify the number of cases that are detected outside of the contact tracing process (versus cases that emerge from an enrolled contact).
 - Cases that occur in people who were not enrolled as contacts, indicate a problem in the case investigation and/or contact tracing process.
- Supervisors should ensure Contact Follow-up Teams are visiting the contacts they are assigned to evaluate every day.
 - If the technology is readily available, employ mobile Global Positioning Systems to track Contact Follow-up Teams.
 - If culturally appropriate, consider having the Contact Follow-up Team take a picture of the contact near a key landmark associated with the contact to submit to the field officer each day.
 - Perform house-checks by randomly selecting contacts of different Contact Follow-up Teams and interview the contacts to ensure they have been receiving a daily visit by the Contact Follow-up

Team every day. If days were missed, confirm they were accurately recorded by the Contact Follow-up Team.

- Supervisors should join Contact Follow-up Teams on a rotating basis to ensure that home visits are being done correctly.
- Supervisors should conduct regular meetings with all Contact Follow-up Teams to address any issues that might have an impact on the functioning of contact tracing.
- Supervisors should ensure Contact Follow-up Teams are providing an accurate assessment of a contact's health status*
 - Perform house-checks by randomly selecting contacts of different Contact Follow-up Teams to interview and evaluate whether the assessment of the health status is similar to the Contact Follow-up Teams' reports.
 - **Although it is recommended that a single Contact Follow-up Team be assigned to the same contact-person for all 21 days, if there is significant fear and stigma associated with the ETUs/ETCs in the country, the developing relationship may make the Contact Follow-up Team less likely to report should the contact develop EVD symptoms. If this is the case, consider changing the Contact Follow-up Team during the follow-up process.*

4.2.2 Quality indicators/measures

Contact tracing efforts should be analysed to ensure that it is taking place consistently and effectively. The following quality measures and indicators have been adopted from the WHO Ebola Response Roadmap⁸ and modified for this document. The Lead Epidemiologist, Field Epidemiologists, and Supervisors must be held accountable for ensuring all of the following quality measures are accurate and complete to help stop the spread of EVD.

The following quality measures should be regularly obtained and reported on standardized reporting forms:

- Daily situational reports (also called "SitReps")
- Weekly active surveillance reports
- Percentage of contacts being traced daily (goal is to reach 100% of contacts)
- Percentage of contacts followed for all 21 days (goal is to reach 100% of contacts)
- Percentage of new cases arising from registered contacts (goal 100% of cases)
- Percentage of cases that had contact tracing implemented within 24 hours of case identification (goal is 100% of cases)

Other indicators that can be obtained regularly include: number of contacts listed for each case, proportion of contacts lost to follow-up, and number of Contact Follow-up Teams submitting reports daily.

Additionally, the Supervisors and Field Epidemiologists should prioritize the contacts not reached each day and identify if some have not been reached for multiple days. These contacts are a priority and must be reached to ensure that they are not lost to follow-up.

4.3 Personnel management

4.3.1 Hiring

Because of the increased exposure to suspected and confirmed EVD cases that can occur while performing contact tracing, hiring staff may be challenging. Addressing this will be country-dependent but incentives include:

- Increasing wages
- Providing health and/or life insurance for staff

Potential staff should be reassured that all the training and resources will be provided for them to perform their job safely.

Additionally, staff may be stigmatized by their peers, families, or communities by engaging in EVD control activities. Health communication and education efforts in the community may help to reduce these stigmas. EVD survivors are ideal candidates for contact tracing personnel; they are more knowledgeable than the

general population regarding the contact tracing process and can serve as living proof that EVD is not necessarily a death sentence. Another strategy is to educate communities about how contact tracing is the best way to fight Ebola and keep their community safe, presenting contact tracing staff as heroes.

Paying staff on time is very important. Personnel should know how much and how often they will be paid and that they will be paid reliably. However, they should be paid only after they perform their duties.

4.3.2 Training

Training should be provided when employees are hired and before the employee starts contact tracing. Ensure that they feel comfortable with and are well-trained to perform their assigned duties. Training should be tailored to their job duties, and refresher trainings should be conducted regularly to remind staff of standard operating procedures (Annex 9) and to eliminate “bad habits” that may develop in the field. In addition to EVD-specific training, all staff should have standard infection prevention and control training. Retraining may also be necessary if members of the Contact Tracing Team were not properly trained and/or if standard operating procedures change. It is important to educate Contact Tracing Teams about EVD; without education, members of the team may be afraid to interact with contacts.

There are situations when the professional level of a contact may be higher than that of the Contact Follow-up Team (for example, the Contact Follow-up Team maybe a nurse following a contact who is a doctor). These status differences may impede the contact follow-up process if the contact refuses to be followed by the Contact Follow-up Team. Awarding a formal certificate of training completion to the Contact Follow-up Team may help circumvent this problem.

It's also important to empower Contact Follow-up Teams by explaining to them that many people may not understand the symptoms of Ebola and/or may be afraid to admit they are sick, and therefore, need to directly observe and assess the contact's clinical status, instead of simply documenting what the contact reports.

4.3.3 Health and safety precautions for contact tracing teams

Maintaining the health of the staff is essential so that they can fulfil their duties. Health care should be provided for any medical issues, including EVD infection, while staff are employed.

The health of the staff depends on maintaining their safety while interacting with contacts and potential cases. Although asymptomatic contacts are not contagious, it is prudent the Contact Tracing Team adhere to the following safety measures while interacting with contacts in situations where a contact may be hiding their symptoms, or the symptoms have not yet been recognized. The following measures should be strictly enforced:

- Avoid direct physical contact with all persons
- Maintain a distance of at least three feet (1 meter) from the contact at all times.
- Do not enter a contact's home.
- Do not sit on chairs in or near the contact's home.
- Do not share or accept a meal or drink with the contact. Try to have a good breakfast before home visits to avoid the temptation of eating or drinking while visiting contacts.
- Personal protective equipment (PPE) is not needed for Contact Follow-up Teams and should not be worn. It can be very alarming for communities if Contact Follow-up Teams show up wearing PPE; the community may interpret that they need PPE as well and there's a risk of further stigmatizing the contacts.
- Maintain standard infection prevention and control measures.

Safety of staff is essential. The following should be communicated to staff and strictly enforced:

- Do not enter communities that seem hostile, aggressive, or unwelcoming.
- Do not try to stop contacts or cases who are trying to flee.

The Supervisor should be immediately contacted if there are any problems so that the appropriate support and resources can be provided to the affected staff member. The Supervisor also needs to communicate with other appropriate teams (such as the Social Mobilization Team) to try to resolve the problem that occurred in the community.

In certain circumstances, engaging local law enforcement, police, or military may be necessary, to protect contact tracing staff but this should NOT be routinely employed to perform contact tracing; contact tracing is not a law enforcement measure. It should be noted that if security professionals interact with any EVD cases, they themselves may become contacts and require follow-up.

It may be important to involve community members or liaisons before arrival in certain jurisdictions to ensure local customs, practices, and attributes are acknowledged and respected, which will help increase the likelihood of being welcomed into the community, reduce community resistance, and improve safety.

4.4 Scalability

Although the initial focus should be on preparing for an initial EVD case and the case's contacts, there should be planning at the same time to be able to increase the size and scale of the response.

Scale-up requires hiring more personnel, expanding infrastructure, and acquiring more resources, as well as the financial sources to support these efforts. A country plan should be in place to coordinate scale-up, possibly involving assistance from external sources and the international community. Additional sources of funding (including from nongovernmental organizations) should be considered.

In the event that the emergency response needs to be scaled up because of an increase in the number of cases or contacts, the contact tracing process can be modified to enable the hiring of more Investigation Teams, Field Epidemiologists, Supervisors, and Contact Follow-up Teams. Additional measures for scale-up will depend on the country and the outbreak situation.

If resources are limited, the prioritization of contacts can be considered, although this is not ideal. Prioritization can include closely following only those contacts that have more concerning exposure to a case (e.g., a contact who touched body fluids of an EVD case is more concerning than a contact who only slept in the same household as an EVD case). Prioritization of contacts should be done at the discretion of the country and only when resources are limited, as this method increases the chance that contacts will be missed, which can lead to ongoing EVD transmission.

Optimal control of EVD sometimes requires cross-border collaboration between affected and neighbouring countries. As part of contact tracing process systems, standard operating procedures should be in place to facilitate not only cross-border sharing of surveillance data, but also cross-border coordination of contact investigations when a case has a travel history across an international boundary. Travel history should include possible cross-border travel in all case investigations. High-risk contacts living in neighbouring countries should be identified, and information shared with previously identified public health counterparts in the neighbouring country to ensure contacts can be located and monitored appropriately. Follow-up information should be provided back to the notifying country.

5. Conclusion

Contact tracing is essential for the identification, control, and elimination of the spread of EVD. Even if one contact is missed, continued spread is possible and can lead to a rapid increase in the number of cases and contacts, quickly overwhelming the response. It is therefore extremely important that contact tracing begins immediately and is managed correctly so that the EVD response will be effective.

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Annex 1: Step-by-step procedure for EVD response

Initial Case Identification

1. The potential initial EVD case or alert is identified by the alert system.
2. The Investigation Team is activated.
3. The Investigation Team assesses the patient's clinical signs and symptoms as well as their risk factors and determines whether they meet the definition for a suspected EVD case.
4. If the patient meets the definition for suspected EVD case, the Investigation Team interviews the case further to identify his/her contacts and performs a household visit to establish a comprehensive list of contacts.
5. The Investigation Team meets with each contact and performs the following tasks:
 - a. Assesses the health status of the contact.
 - b. Alerts the contact of his/her status.
 - c. Interviews the contact.
 - d. Explains the procedure of follow-up daily for 21 days.
 - e. Identifies an appropriate meeting place and time for follow-up with the contact.
 - f. Identifies a Contact Follow-up Team to follow-up with the contact for 21 days.
 - g. Prepares the **Contact Listing Form** (Annex 2).
6. The Field Epidemiologist assigns Supervisors based on the geographic distribution of contacts.

Daily

1. The Field Epidemiologist distributes an updated contact list to Supervisors.
2. The Supervisors meet with their assigned Contact Follow-up Teams and distribute the contact list for each team, clustering contacts in geographic proximity.
3. The Contact Follow-up Teams meet each contact and perform the following tasks:
 - a. Observe the contact's general condition for any overt signs of illness.
 - b. Interview the contact regarding health status (presence or absence of specific symptoms).
 - c. Fill out the Daily Contact Follow-Up Form (Annex 3).
 - d. Ask if the contact knows of anyone else who is sick.
4. The Supervisor provides:
 - e. Logistical support, including arranging transportation of Contact Follow-up Teams and ensuring payment.
 - f. Activation of the next step in the alert system (which is setting-specific) for any contact whom Contact Follow-up Teams identify as having developed symptoms.
 - g. Quality assurance to ensure accuracy of the Contact Follow-up Teams' reports. Check on:
 - i. Number of contacts followed that day vs. the number of contacts recorded on form.
 - ii. Number of contacts well, symptomatic, and not seen (not just symptomatic contacts).
 - iii. For contacts not seen in the past 24 hours, the Contact Follow-up Teams should gather any information they can from the family or neighbours.
 - iv. Completeness of the form per contact (demographic information, symptoms).
 - h. Review of any safety or security concerns with Contact Follow-up Teams (check if the members of the Contact Follow-up Team are ill).
5. At end of day, Contact Follow-up Teams contact their Supervisors and report status of their contacts.
6. The Supervisors complete the Contact Tracing Summary Form based on the information provided by the Contact Follow-up Teams, and the data is sent to both the Field Epidemiologist and Data Manager.
7. The Data Manager or data entry staff enters the data electronically.

8. The Data Manager assesses whether there are cases with no or too few contacts, whether there are contacts that haven't been seen for several days with no explanation, and gives that information to the Field Epidemiologist and Lead Epidemiologist.
9. The Field Epidemiologist reviews the data and sets up the list of current/ongoing contacts for the following day.
10. The Lead Epidemiologist reviews the data to see if there are any issues, sharing the data to local partners, Ministry of Health, and WHO.

Annex 3: EVD Daily Contact Follow-Up Form

<h3>Daily Contact Follow-Up Formⁱⁱⁱ (for Contact Follow-Up Teams)</h3>						FORM COMPLETED BY:	
						NAME	TITLE
						TEAM	TEL. NO.
Contact Information						ADDRESS	TEL. NO.
NAME	GENDER	AGE	DATE OF LAST CONTACT	DD/MM/YY			

Instructions: For each day, evaluate the contact for the symptoms below and write “yes” if the contact has the symptom and “no” if the contact does not have the symptom. If a contact has any of the symptoms, immediately call the Supervisor at: _____.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Date																						
Fever																						
Malaise																						
Muscle pain																						
Headache																						
Weakness/Fatigue																						
Sore throat																						
Vomiting																						
Diarrheal																						
Rash																						
Haemorrhage																						
Hiccups																						
COMMENTS																						

ⁱⁱⁱ This form is a tool recommended for use by the intended user. The information collected is not being used for the CDC data collection instrument. CDC does not intend on collecting this information.

Annex 4: EVD Contact Tracing Summary Form

Contact Tracing Summary Form^{iv} (for Supervisors)	DATE
	SUPERVISOR NAME
	TEAM NAME
	TEAM MEMBERS
1. Contacts currently under follow-up	
a. Followed-up today (non-symptomatic)	NUMBER
b. Followed-up today (symptomatic)	NUMBER
c. Discharged from follow-up today	NUMBER
d. Not followed-up today	NUMBER
e. Total contacts currently under follow-up	NUMBER
2. Contacts not seen in the past 24+ hours	
a. Family/neighbour visits done today	NUMBER
b. No family/neighbour visits done today	NUMBER
c. Total contacts not seen in the part 24+hours	NUMBER
3. Contact Quality Assurance Checks Done Today	
NOTES	NUMBER
4. Contact Follow-up Team Observations Done Today	
NOTES	NUMBER
5. Alerts Called Today (for symptomatic contacts)	
NOTES	NUMBER
6. Other notes from today	
NOTES	

^{iv} This form is a tool recommended for use by the intended user. The information collected is not being used for the CDC data collection instrument. CDC does not intend on collecting this information.

Annex 5: Sample equipment list for Contact Tracing Team

Contact Tracing Team					
	Lead Epidemiologist	Supervisor	Investigation Team	Contact Follow-up Team	Data Manager
Personal Protective Equipment					
Disposable gloves			•		
Gowns					
Face shield (or goggles)					
Face mask N95/FFP2					
Surgical mask for the case					
Biohazard plastic bags					
Information Technology					
Global positioning system (GPS)		•	•	•	
Cell phones (with credit)	•	•	•	•	•
Computers	•	•			•
Internet Access	•	•			•
Electronic data collection tools			•	•	•
Field Equipment					
Thermometers ¹				•	
Office supplies ²	•	•	•	•	•
Weather appropriate gear ³			•	•	
Hand sanitizer or bleach	•	•	•	•	•
Appropriate forms	•	•	•	•	
Transportation					
Driver/car		•	•	•	

¹ Do not overly rely on temperature, particularly using the infrared thermometers, which may be less accurate when used outside of ideal conditions, such as arid environments or extreme temperatures. Subjective fever and/or other symptoms in a contact should raise suspicion.

² For example, paper, pens, folders (or waterproof folders if it is rainy season). Most people do not have these materials already.

³ For example, if it is rainy season, rain coats and rain boots.

Annex 6: Budgetary considerations for Contact Tracing Team

Setting up a functional system for contact tracing requires significant human, financial, and logistical resources. These suggestions below provide an example of resources needed for contact tracing. These examples are for the Contact Tracing Team only. Other teams mentioned in this document will also need to be budgeted. For a more detailed template budgeting tool for contact tracing, please see the WHO document *Contact Tracing During an Outbreak of Ebola Virus Disease*.⁸

Example Resources Needed	
Salaries	<ul style="list-style-type: none"> • Lead epidemiologist • Field epidemiologists • Supervisors • Investigation Teams • Contact Follow-up Teams • Data managers • Drivers (if used)
Equipment	<p>See Annex 5 but also consider:</p> <ul style="list-style-type: none"> • Cost of cell phone credits • Hand sanitizer • Printing all forms needed in the field
Transportation	<p>For Supervisors, Contact Follow-up Teams, and Investigation Team</p> <ul style="list-style-type: none"> • Taxis (if used) • Rental vehicles (if needed) • Fuel (if using own vehicles)

Annex 7: Essential staff overview

Contact Tracing Team

Team Member and Quantity	Background/Experience	Responsibilities
<p>Lead Epidemiologist <i>At least one person at the National level.</i></p>	<ul style="list-style-type: none"> The Lead Epidemiologist should be a senior level epidemiologist with experience in outbreak response, contact tracing, and surveillance. The Lead Epidemiologist coordinates efforts with other committees in the overall EVD response 	<ul style="list-style-type: none"> Overseeing all Field Epidemiologists. Informing and updating other committee leaders in the Incident Management Framework regarding surveillance and contact tracing activities. Overseeing operations, monitoring completeness of investigations and training, and mobilizing resources. Liaising with the laboratory to confirm the status of suspected or probable EVD cases.
<p>Field Epidemiologist <i>At least one person in each affected district.</i></p>	<ul style="list-style-type: none"> Trained in outbreak response, including outbreak investigation and contact tracing, the Field Epidemiologists should be at the district level and oversee all Supervisors. This person should be highly organized and detail-oriented. They need to be able to commit full-time to contact tracing during an outbreak. 	<ul style="list-style-type: none"> Deciding which contacts should continue to be followed, which contacts are priorities, and which contacts can be discharged from follow-up. Communicating with other teams, such as the Case Management Team and Logistics Team, when a contact becomes a suspected EVD case. Overseeing operations, monitoring completeness of investigations and training, and mobilizing resources.
<p>Data Manager <i>At least one Data Manager in each affected district.</i> <i>If multiple districts are involved, there should be an additional Data Manager appointed to the National level.</i></p>	<ul style="list-style-type: none"> Someone with prior data management experience and proficient computer skills. If using an electronic database to manage the daily follow-up of contacts, the person should be well trained on how to use the database. If multiple districts become involved, a Data Manager at the National level should supervise and coordinate all the data coming in from the districts. 	<ul style="list-style-type: none"> Making sure that all data are entered electronically and for sending reports to the Field and Lead Epidemiologist, as well as to other reporting authorities. Providing accurate, up-to-date lists of all contacts to be followed to the Supervisors (daily or every time the list is modified). Analysing contact tracing data to identify problems in contact tracing (e.g., contacts who haven't been followed successfully, cases with unrealistically low number of contacts, etc.). Supervising activities of any additional staff used for data entry Performing data quality checks.

Team Member and Quantity	Background/Experience	Responsibilities
<p>Investigation Team <i>At least two people for each Investigation Team.</i></p>	<ul style="list-style-type: none"> • Team composed of epidemiologists, clinicians, psychosocial behavioural experts (for stigma and mental health issues), and health communication experts (for education and networking issues). • The team should have experience and training in asking probing contact tracing questions. • The Investigation Team may identify a smaller group of investigators that are on call to deploy 24 hours a day when a case is reported. 	<ul style="list-style-type: none"> • Interviewing any alert or potential case (or proxies if the person is dead) and determine if the person meets an EVD case definition, as well as generating an initial list of contacts from the case. A clinician is helpful for determining if the person meets the case definitions. • Questioning all possible contacts of a case (suspected, probable, or confirmed case). • Assessing a symptomatic contact to determine whether the contact should be considered a case. • Identifying and interviewing all contacts. • Alerting contacts of their status, telling them about the contact tracing procedure, and offering support. • Listing all contacts on the Contact Listing Form.
<p>Supervisor <i>One Supervisor for every 5 to 10 Contact Follow-up Teams.</i> <i>In addition to the number of people a Supervisor oversees, geography must also be taken into consideration.</i> <i>A Supervisor will typically oversee 1 to 2 villages or urban neighbourhoods as is logistically feasible.</i></p>	<ul style="list-style-type: none"> • An epidemiologist or other healthcare staff with prior contact tracing experience, if possible. • This person should be highly organized and detail-oriented. • They need to be able to commit full-time to contact tracing during an outbreak. • They should speak the national language and the local language of the area in which they work. 	<ul style="list-style-type: none"> • Assigning Contact Follow-up Teams to contacts • Handling challenges and questions that arise in the field • Alerting the Field Epidemiologist if there is a symptomatic contact • Identifying and tracking contacts that miss follow-up • Assessing quality assurance measures • Collecting data on current tracing efforts to report to the Data Manager and Field Epidemiologist
<p>Contact Follow-up Team <i>The number of Contact Follow-up Teams will vary by number of contacts, geographic distribution, personnel available, etc.</i> <i>Ideally, at least two people should be assigned to work together on each Contact Follow-up Team.</i> <i>The number of contacts assigned to each Contact Follow-up Team will vary.</i></p>	<ul style="list-style-type: none"> • Each member of the Contact Follow-up Team should have undergone contact tracing training. • The Contact Follow-up Team can include healthcare providers, community health workers, and community members. These individuals should be reliable and responsible, and aware of local culture and customs. • The Contact Follow-up Teams also need to be people who are known and respected in the local communities so that contacts will talk to them and be honest about their symptoms. • They also need to be able to read and write in the language that the rest of the Contact Tracing Team is using, as well as speak the local language. • Organizing Contact Follow-up Teams by geographic areas may help maximize efficiency. • In addition, using Contact Follow-up Teams from specific or nearby communities may increase acceptability of contact tracing activities among community residents. 	<ul style="list-style-type: none"> • Initial community and family engagement • Visiting contacts every day for 21 days. During this time, are responsible for: <ul style="list-style-type: none"> - Interviewing and asking about the health status of the contact - Providing daily reporting of follow-up activities - Verifying the contact list - Notifying the Supervisor when a contact is ill. • Alerting Supervisors of any problems in the villages (such as community resistance or potential cases among people who were not known contacts) and also continuing to try to identify additional contacts for each case (sometimes people were initially reluctant to admit they were contacts, or simply forgot they'd had contacts until a few days later).

Other Teams

Teams and Quantity	Background/Experience	Responsibilities
<p>Transportation Team</p> <p><i>At least three people on a Transportation Team. Two people are designated to physically transport the EVD case, and one person is designated as the driver. The number of Transportation Teams depends on the number of cases, contacts, and geographic distribution.</i></p>	<ul style="list-style-type: none"> Staff must have a sound understanding of the terrain and geography of the region. They must have undergone infection prevention and control training. 	<ul style="list-style-type: none"> The Transportation Team is responsible for transporting suspected, probable, and confirmed EVD cases to isolation units or ETUs/ETCs. The team must be equipped with a vehicle that can transport people and that carries PPE and can be disinfected.
<p>Disinfection Team</p> <p><i>At least two members per Disinfection Teams. The number of Disinfection Teams depends on the number of cases, contacts, and geographic distribution.</i></p>	<ul style="list-style-type: none"> The Disinfection Team can be composed of community members and environmental health officers (sanitarians) who have been trained in EVD infection control. 	<ul style="list-style-type: none"> Sanitizing places where probable or confirmed cases have been, places where the initial identification occurred, and burial locations, depending on the situation. Additionally, they disinfect transport vehicles and therefore, coordinate with the Burial Team and Transportation Team. Disinfection should follow the latest guidelines.
<p>Burial Team</p> <p><i>One Burial Team should have at least six people. Four people are designated to carry the body, one person to disinfect the body, and one to drive. The number of Burial Teams depends on the number of cases, contacts, and geographic distribution.</i></p>	<ul style="list-style-type: none"> The Burial Team can be composed of community members as well as environmental health officers who have undergone the Ebola infection prevention and control training. 	<ul style="list-style-type: none"> Conducting safe and dignified burials of dead people with probable and confirmed EVD, as well as of deceased contacts. By default, dead contacts without laboratory confirmation are probable cases unless there is clear evidence that they died of other causes.

Annex 8: Recommended training modules

The following training modules are necessary for staff to be ready to implement contact tracing immediately. Although other emergency response staff may not be directly involved in contact tracing, everyone involved in the emergency response should be aware of the general contact tracing process and its importance, including members of logistics, case management (such as healthcare workers), and social mobilization groups.

Training Module	Description
Contact Tracing training module	This 1-day training course should be administered to the Contact Follow-up Teams and Supervisors. The objective of the module is to understand EVD, how EVD is spread, infection prevention and control, the contact tracing procedure (specific to the Contact Follow-up Teams), safety, and how to deal with common challenges in the field.
Contact Tracing Implementation and Management module	This 2-day training course should be administered to epidemiologists and Supervisors. The course covers the implementation and coordination of the contact tracing process, highlighting common challenges of implementation and ongoing management.
Contact Tracing Tabletop Exercise	<p>A simulation exercise that is usually performed on the second day of the 2-day training course, Contact Tracing Implementation and Management Module, but that can be administered as a stand-alone training course as well. The exercise was developed to be administered to Contact Tracing Team leaders, such as epidemiologists and Supervisors.</p> <p>The goal of this tabletop exercise is to identify areas for improvement but also to educate those leading Contact Tracing Team activities about proper protocols and problem solving, while familiarizing them with documents and resources needed to trace contacts. The exercise starts from the introduction of a case into a fictitious country and continues through a contact tracing simulation of case finding, contact identification, contact listing, contact follow-up, and contact discharge.</p>
Epi Info VHF Database Training	CDC's Epi Info VHF Database can be used to track contact tracing activities. Although no formal training course exists, the manual can help in training and is essential for the data manager's training. The Epi Info VHF free software is available for managing cases and contacts at: http://epiinfovhf.codeplex.com . Several guides and video tutorials are also available on this site under the "Documentation" tab.
Infection prevention and control training	This training is essential for all personnel who will be involved with the EVD response. In addition to basic understanding of infection prevention and control, the training covers procedures that are specific to EVD, such as proper use of PPE. There are no formal training courses at this time but guidelines are available from WHO and CDC. ^{9,10}
Community engagement module	This training course should be administered to all persons involved in the EVD response. The objective of the module is to understand the importance of community engagement and cover the key principles for effective communication for education to control Ebola in communities.

Annex 9: Standard Operating Procedures

Purpose

The purpose of these Standard Operating Procedures (SOPs) is to describe the composition and function of the Contact Tracing Team responsible for following contacts. Once an EVD case has been identified, the investigation process generates a contact list. The Contact Tracing Team is then responsible for evaluating each contact on this list daily for 21 days since the last exposure to the EVD case. Any contact that develops EVD symptoms is immediately isolated, referred for testing, and investigated.

These SOPs are drawn from the CDC-WHO *Emergency Guideline for the Implementation and Management of Contact Tracing for Ebola Virus Disease* and have been developed based on WHO Technical Guidance and inputs by WHO Technical Teams working on Ebola Preparedness. These procedures must be adapted to local contexts.

Human resources requirement

- Lead Epidemiologist
- Field Epidemiologists
- Supervisors (1 per 5-10 Contact Follow-up Teams)
- Contact Follow-Up Team (2 person team, team per # of contacts will vary)
- Data Managers
- Drivers

Equipment/Materials requirement

- Definitions of cases and contacts
- Contact Tracing forms
- Alcohol-based sanitizer
- Cell Phones or other reliable communication equipment
- Dedicated vehicles

Procedures

Daily Operations

1. The Field Epidemiologist meets with the Supervisors to distribute an updated contact list.
2. The Supervisors meet with the Contact Follow-up Teams to distribute the contact tracing forms, review activities of the previous day, and highlight areas to improve.
3. The Supervisors and Contact Follow-up Teams proceed with field work.
4. At conclusion of the field work, the Contact Follow-up Teams' forms are synthesized by the Supervisor into a summary report. Any missing contacts are reviewed and highlighted in the report.
5. The summary report is then sent to the Data Manager and Field Epidemiologist for electronic entry and analysis.
6. The Lead Epidemiologist reviews the data and shares the summary report and data analysis with Partners.

Team Member	Responsibilities
Lead Epidemiologist	<ul style="list-style-type: none"> • Oversees all operations: monitoring investigations, staff training, mobilizing resources • Supervises all Field Epidemiologists • Informs and updates all committee leaders in the Incident Management Framework
Field Epidemiologist	<ul style="list-style-type: none"> • Oversees overall contact tracing performance • Assigns contacts to the appropriate Supervisors • Generates the daily contact list, incorporating new contacts • Identifies contacts not followed the previous day as priorities • Supervises data entry process and performs data analysis
Supervisor	<ul style="list-style-type: none"> • Distributes updated contact tracing forms to the Contact Follow-up Teams daily • Assigns new contacts to Contact Follow-up Teams • Provides in the field support for the Contact Follow-up Teams • Synthesizes data collected by the Contact Follow-up Teams into a daily summary report • Ensures tracers are visiting the assigned contact daily and providing accurate assessments • Ensures that contacts not seen the previous day are followed
Contact Follow-up Team	<ul style="list-style-type: none"> • At the first visit <ul style="list-style-type: none"> - Establishes a relationship and trust - Provides the contact with his/her telephone number and hotline number, if available • Answers any questions that arise during the follow-up process • Meets each contact daily from the list provided by the Supervisor • Returns the form to the Supervisor at the conclusion of the daily field work • If the contact develops any symptoms, immediately calls the Supervisor
Investigation Team	<ul style="list-style-type: none"> • Interviews any potential cases • Identifies all contacts of a case and interviews them • Assesses symptomatic contacts to determine if person meets case definition. • Alerts contacts of their status, explains the follow-up procedure, and offers support
Data Manager	<ul style="list-style-type: none"> • Ensures all data is entered and accurate • Provides reports to the Field Epidemiologist and Lead Epidemiologist • Provides updated contact lists

Flow of information and communication

The following information is shared with Partners by the Lead Epidemiologist:

- Daily reports including:
 - Cumulative number of contacts
 - Number of contacts under surveillance
 - % number of contacts evaluated in the reporting period
 - Number of contacts not seen during the reporting period
 - Reason why contact was not seen
 - Number of contacts presenting with symptoms
 - Number of contacts meeting suspect case criteria
 - Areas for improvement
- Weekly reports including:
 - Percentage of contacts being traced daily
 - Percentage of contacts followed for all 21 days
 - Percentage of cases that had contact tracing implemented within 24 hours of case identification

Key Contacts

- Hot line to Call Centre
- Lead Epidemiologist
- Field Supervisor
- Others