Ebola Outbreak in West Africa

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Key Facts

- Ebola virus disease (EVD), formerly known as Ebola haemorrhagic fever, is a severe, often fatal illness in humans
- EVD outbreaks have a case fatality rate of up to 90%.
- EVD outbreaks occur primarily in remote villages in Central and West Africa, near tropical rainforests
- The virus is transmitted to people from wild animals (monkeys, antelopes, bats) and spreads in the human population through human-to-human transmission
- Fruit bats of the *Pteropodidae* family are considered to be the natural host of the Ebola virus
- Severely ill patients require intensive supportive care. No licensed specific treatment or vaccine is available for use in people or animals

History of Ebola

Ebola first appeared in 1976 in 2 simultaneous outbreaks, in Nzara, Sudan, and in Yambuku, Democratic Republic of Congo. The latter was in a village situated near the Ebola River, from which the disease takes its name.

Geographical distribution of Ebola outbreak(s) in West Africa January to August 2014 as of 19th August 2014

Healthcare providers caring for Ebola patients and the family and friends in close contact with Ebola patients are at the highest risk of getting sick because they may come in contact with the blood or body fluids of sick patients

	Cases	Deaths
Guinea	543	394
Liberia	834	466
Sierra Leone	848	365
Nigeria	15	4

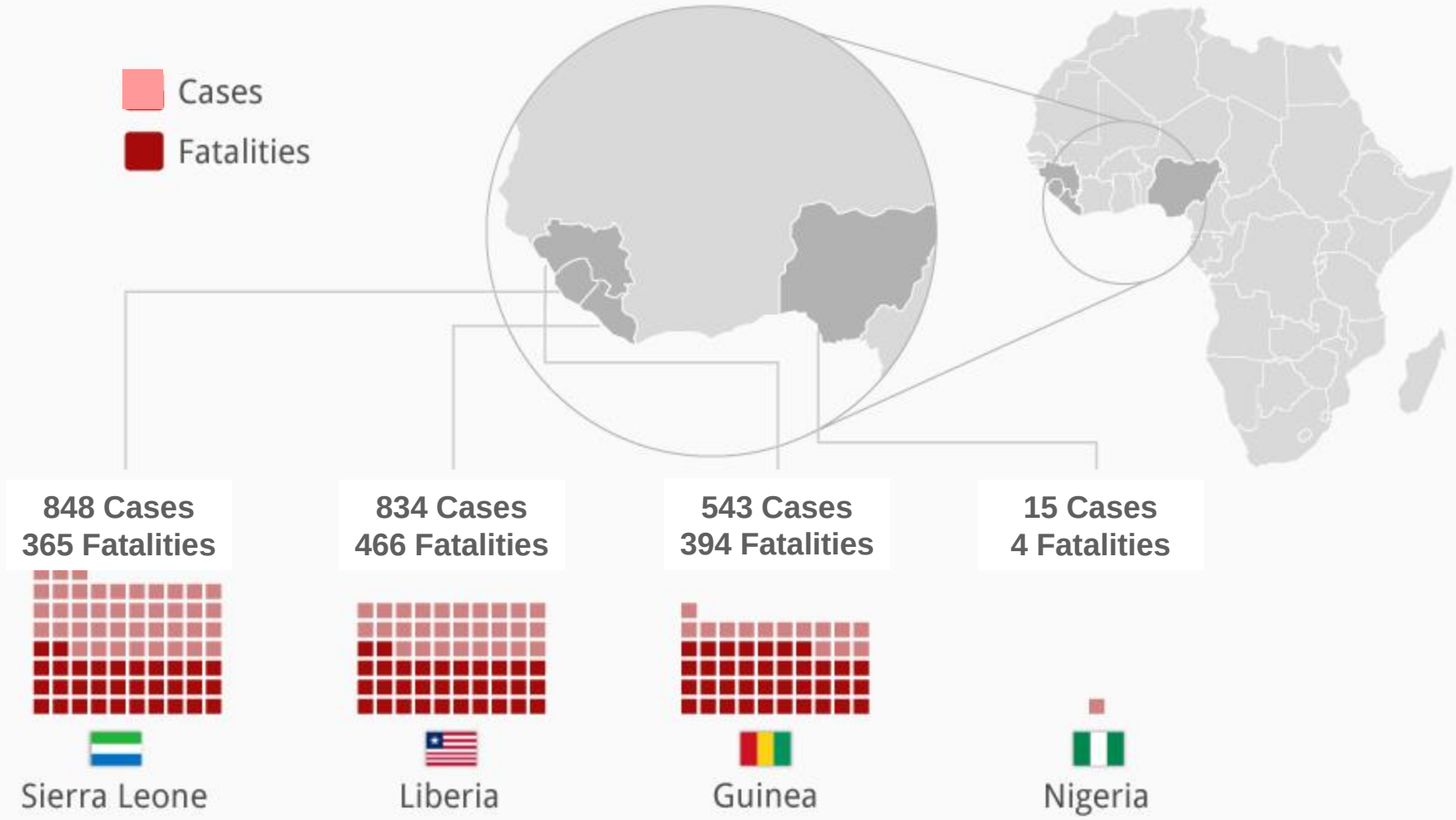
Total 2,240 cases
1,229 deaths

- Locality reported Ebola cases
- Locality with Ebola Treatment Center
- Capital city
- Ongoing Ebola transmission
- EDPLN - Ebola Laboratory
- Main roads

Sénégal
Dakar
Gambia
Banjul
Mali
Bamako
Guinée Bissau
Bissau
Guinée
Siguiri
Dinguiraye
Boké
Kouroussa
Télimélé
Dabola
Boffa
Dubréka
Conakry
Sierra Leone
Kissidougou
Kambia
Guéckédou
Port Loko
Macenta
Freetown
Kailahou
Daru
Bo
Foya
Nzérékoré
Kenema
Voinjoma
Côte d'Ivoire
Bong
Yamoussoukro
Monrovia
Margibi
Liberia

Ebola Claims More Than 1,000 Lives in West Africa

Number of reported cases and fatalities in the current Ebola outbreak, as of August 16



Total Cases – 2,240 **Total Deaths – 1,229**

Ebolavirus Ecology

Enzootic Cycle

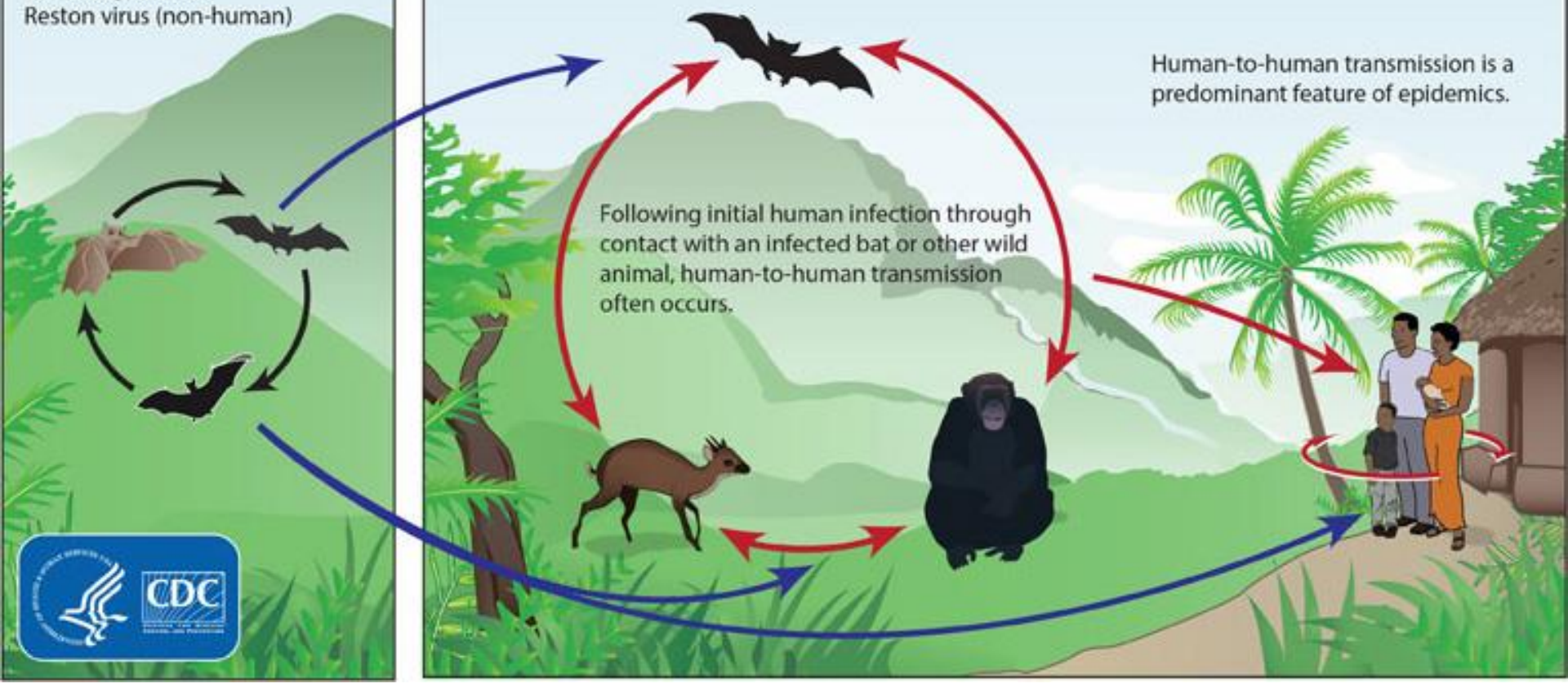
New evidence strongly implicates bats as the reservoir hosts for ebolaviruses, though the means of local enzootic maintainance and transmission of the virus within bat populations remain unknown.

Ebolaviruses:

Ebola virus (formerly Zaire virus)
Sudan virus
Taï Forest virus
Bundibugyo virus
Reston virus (non-human)

Epizootic Cycle

Epizootics caused by ebolaviruses appear sporadically, producing high mortality among non-human primates and duikers and may precede human outbreaks. Epidemics caused by ebolaviruses produce acute disease among humans, with the exception of Reston virus which does not produce detectable disease in humans. Little is known about how the virus first passes to humans, triggering waves of human-to-human transmission, and an epidemic.



The return of Ebola

An American doctor stricken with the deadly Ebola virus while in Liberia and brought to the United States for treatment in a special isolation ward is improving, a top U.S. health official said. Dr. Kent Brantly was able to walk, with help, from an ambulance after he was flown on Saturday to Atlanta.

Disease

Ebola is a virus that is found naturally in certain species of bats inhabiting wooded areas of Africa. Since their emergence in 1976 there have been 18 outbreaks in countries like the Democratic Republic of Congo, Gabon, Uganda and Sudan.

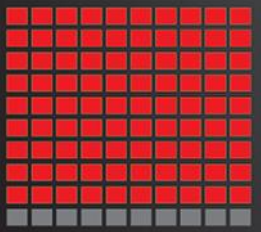
The virus.

Five species of Ebola

All of them are named after a river near the epicenter of the first outbreak in the Democratic Republic of Congo. By the place and year of discovery:

Sudan and Zaire	(1976)
Reston	(1989)
Ivory Coast	(1994)
Bundibugyo	(2007)

The Ebola virus can have a fatality rate of 90 percent.



How is it transmitted?

Through direct blood contact or other body fluids, or through indirect contact with an environment containing contaminated fluids. In Africa, there have been documented infection cases that are associated with the handling of infected chimpanzees, gorillas, fruit bats, monkeys and antelopes.

Symptoms

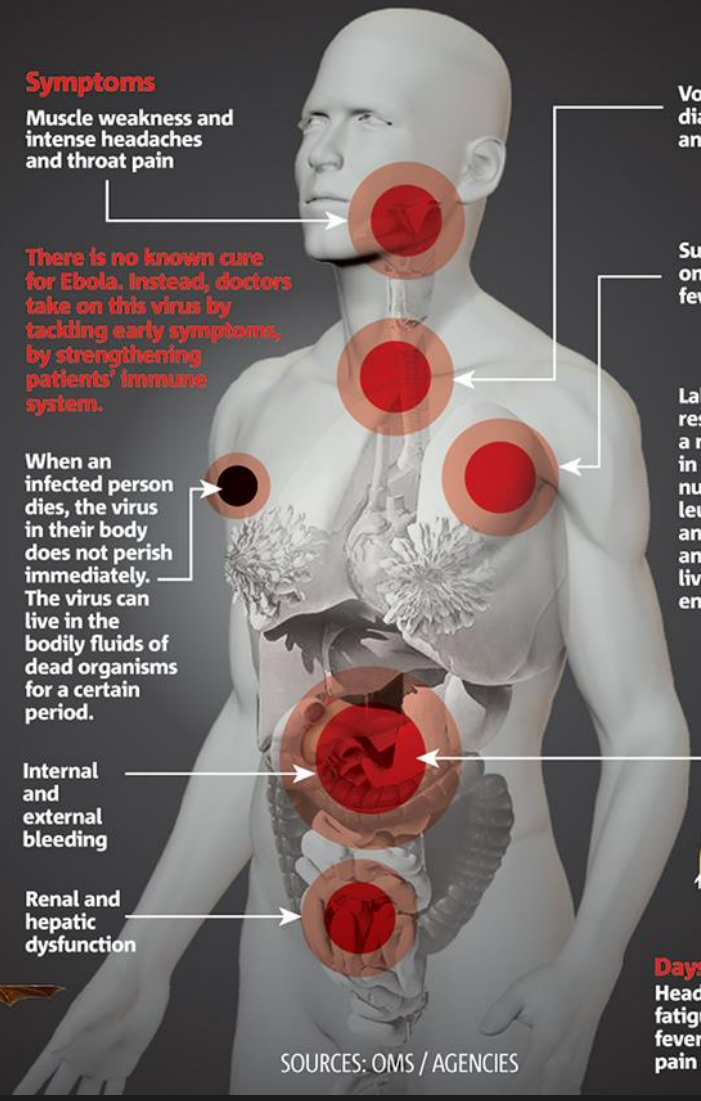
Muscle weakness and intense headaches and throat pain

There is no known cure for Ebola. Instead, doctors take on this virus by tackling early symptoms, by strengthening patients' immune system.

When an infected person dies, the virus in their body does not perish immediately. The virus can live in the bodily fluids of dead organisms for a certain period.

Internal and external bleeding

Renal and hepatic dysfunction



Vomiting, diarrhea and rashes

Sudden onset of fever

Laboratory results show a reduction in the number of leukocytes and platelets, and elevated liver enzymes.

SOURCES: OMS / AGENCIES

metro

Can the virus spread beyond Africa?

According to experts, the risk of contagion in Europe is low. Doctors in Guinea say that most Ebola patients are confined to remote villages and are unlikely to travel overseas.

Diagnosis

First we have to rule out other conditions such as malaria, typhoid fever, shigellosis, cholera, leptospirosis, plague, rickettsial, relapsing fever, meningitis, hepatitis and other viral haemorrhagic fevers.

Infections by the Ebola virus can only be diagnosed by various laboratory tests:

Enzyme-linked immunosorbent assay (ELISA)

Antigen detection tests

Serum neutralization test

Virus isolation by cell culture

The patient samples represent a huge danger and must be performed under conditions of maximum biological containment.

Evolution

Days 7-9
Headache, fatigue, fever, muscle pain

Day 10
Sudden high fever, vomiting of blood

Day 11
Hematomas, brain damage, bleeding nose, eyes, mouth, anus

Day 12
Convulsions, unconsciousness, massive bleeding and death

1st Ebola outbreak in West Africa

4 countries:

- Guinea
- Sierra Leone
- Liberia
- Nigeria

Likely host = bats

Ebola is fatal in

55-60%

of cases reported in this outbreak.

How do you get the Ebola virus?

Direct contact with:

1. **Bodily fluids of a person who is sick with or has died from Ebola.** (blood, vomit, pee, poop, sweat, semen, spit, other fluids)
2. **Objects contaminated with the virus** (needles, medical equipment)
3. **Infected animals** (by contact with blood or fluids or infected meat)

Early Symptoms:

Ebola can only be spread to others after symptoms begin. Symptoms can appear from 2 to 21 days after exposure.

Average incubation period is 8-10 days

- Fever
- Headache
- Diarrhea
- Vomiting
- Stomach pain
- Unexplained bleeding or bruising
- Muscle pain

How Do I Know Someone has Ebola?

The symptoms generally take **2 - 21 days** to become apparent.
The symptoms are deceptively general - tending to look a lot like malaria or a flu.
One more thing, people aren't contagious until they display symptoms.

Fever

Headache

Diarrhoea

Vomiting

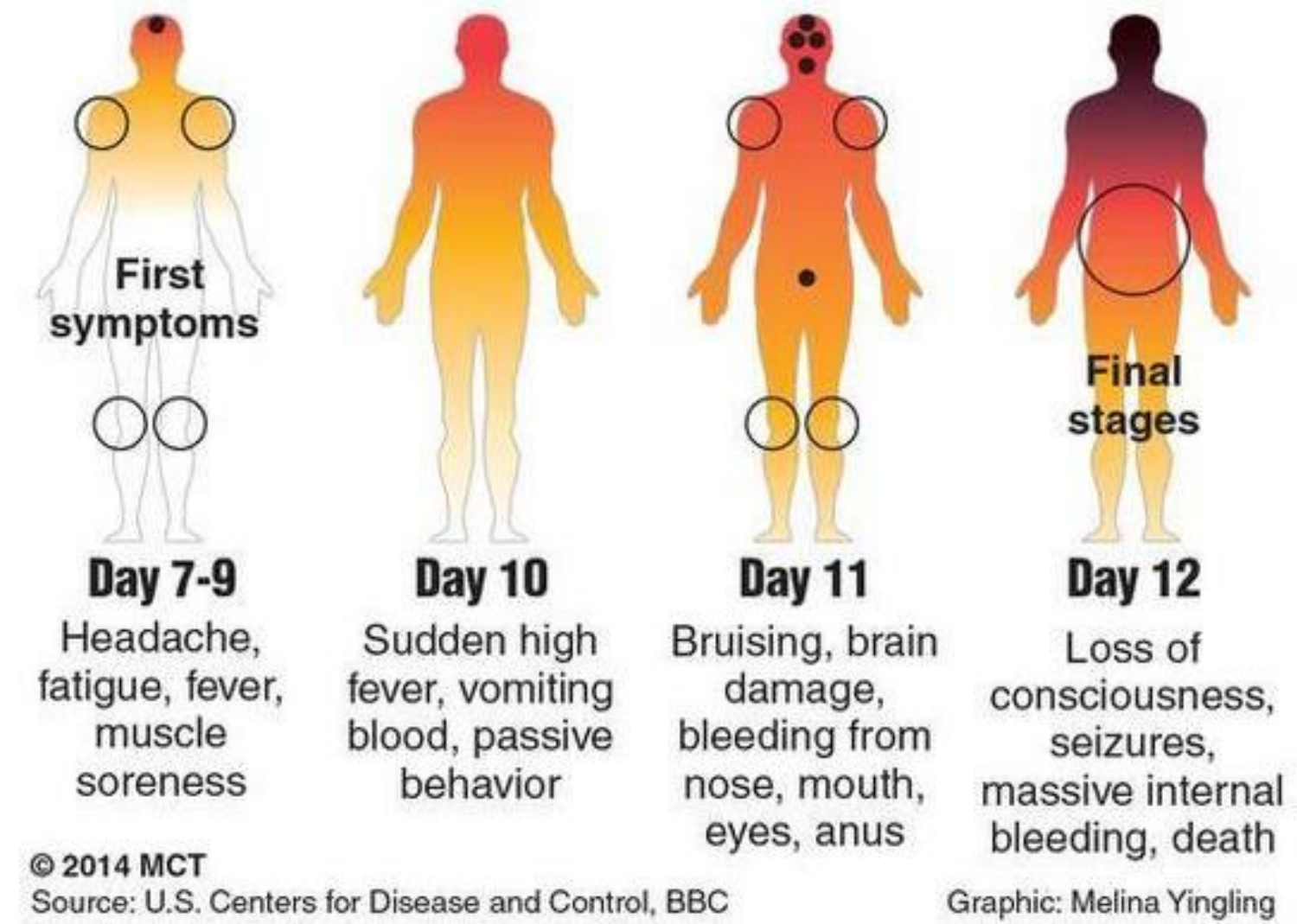
Weakness

Joint & Muscle Ache

Stomach Pain

Lack of Appetite

Ebola Virus Typical Path through a Human Being



When is someone able to spread the disease to others?

Ebola only spreads when people are sick.
A patient must have symptoms to spread the disease to others.

MONTH						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

After 21 days, if an exposed person does not develop symptoms, they will not become sick with Ebola.

Transmission

- Ebola is introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals.
- In Africa, infection has been documented through the handling of infected chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines found ill or dead or in the rainforest.
- Ebola then spreads in the community through human-to-human transmission, with infection resulting from direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and indirect contact with environments contaminated with such fluids.
- Burial ceremonies in which mourners have direct contact with the body of the deceased person can also play a role in the transmission of Ebola.
- Men who have recovered from the disease can still transmit the virus through their semen for up to 7 weeks after recovery from illness.

Virological Characteristics

- Genus Ebolavirus is 1 of 3 members of the Filoviridae family (filovirus), along with genus Marburgvirus and genus Cuevavirus. Genus Ebolavirus comprises 5 distinct species:
  - Bundibugyo ebola virus (BDBV)
  - Zaire ebola virus (EBOV) - Responsible for the current outbreak
  - Reston ebola virus (RESTV)
  - Sudan ebola virus (SUDV)
  - Taï Forest ebola virus (TAFV)
- BDBV, EBOV, and SUDV have been associated with large EVD outbreaks in Africa, whereas RESTV and TAFV have not. The RESTV species, found in Philippines and the People's Republic of China, can infect humans, but no illness or death in humans from this species has been reported to date.

Facts *about* Ebola

You can't get Ebola through air

You can't get Ebola through water

You can't get Ebola through food

You can only get Ebola from touching bodily fluids of a person who is sick with or has died from Ebola, or from exposure to contaminated objects, such as needles. **Ebola poses no significant risk in the United States.**

Global Health Security
Stopping the Ebola Outbreak

Find
Find patients and diagnose them

FEVER AND SYMPTOMS

BLOOD TEST

LABORATORY TESTING

Respond
Isolate patients and find contacts and monitor

ISOLATION BED

PATIENT INTERVIEW FOR CONTACTS

MONITOR CONTACTS FOR

AFTER EXPOSURE

ANY NEW PATIENT RESTARTS PROCESS

Prevent
Healthcare infection control and safe burial practices

INFECTION CONTROL

SAFE BURIAL PRACTICES

TRAVEL TO AND FROM EBOLA-AFFECTED COUNTRIES IS LOW-RISK HERE IS WHAT YOU NEED TO KNOW

WHILE TRAVELLING

If you develop a fever and Ebola symptoms yourself promptly inform airline personnel.

fever, weakness, muscle pain, headache, and sore throat; followed by vomiting, diarrhoea, bleeding.

Alert airline personnel about a fellow traveller who has Ebola symptoms:

AT AIRPORTS AND AT YOUR DESTINATION

DO NOT touch the body of a person who has died from Ebola.

Use alcohol rub throughout the day. When hands are visibly dirty use soap and water.

Seek prompt medical attention if you have Ebola symptoms.

Avoid direct physical contact with anyone who is displaying the symptoms of Ebola.

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However avoid non-essential travel to the 4 affected countries!

Ebola Travel Bans

Source : The Guardian, Sunday 17 August 2014

WHO Response to-date

- On 25 July, WHO declared the outbreak Grade 3 emergency according to the Emergency Response Framework
- On 8 August, WHO declared the current outbreak as Public Health Emergency of International Concern (PHEIC)
- > 200 experts deployed to 3 countries
  - WHO and GOARN partners
  - Epidemiology, logistics, clinical management, risk communication, lab
- Deployment of mobile labs & support national labs
- Ongoing shipments of PPE, other supplies
- Coordinating hub in Conakry, Guinea

WHO SEARO Preparedness and Response

- Memo sent by RD to all Ministers of Health informing about the situation and offering all possible support

- Memo sent to all WRs
  - Reiterating the need to provide all necessary support
  - Requesting consideration of staff to provide surge capacity

- A number of meetings and workshops planned for this year
  (eg: Training of trainers on infection prevention and control)

Sri Lanka Preparedness and Response

- Letter addressed to Hon. Minister by Regional Director, WHO SEARO providing a brief situation update and assuring technical support has been handed over to the Hon. Minister's Office

- MoH has reviewed the following preparedness activities recently:
  - International airport health post & immigration officials have been briefed about the EVD situation. Passengers traveling from Africa, especially from Western & Central Africa, are closely monitored for symptoms of Ebola. Disease surveillance is mainly focusing on passive case detection with provision of information to report to nearest health facilities if they develop symptoms within 3 weeks of travel to affected region

  - Isolation facilities at Negombo General Hospital & Infectious Disease Hospital are strengthened & facilities are available for immediate transfer of suspected cases to these hospitals (from airport)

  - PPEs procured and supplied to points of entry, referral hospitals

- Communication FP at WCO is closely monitoring the media and reports are promptly communicated to SEARO

- Onsite training programme is scheduled for MoH on packaging & shipping of infectious materials and cold chain management in 3rd week of September in Colombo. Around 20 local participants will participate at this programme facilitated by SEARO.

Essential Components for Control

- National leadership

- Community awareness and support

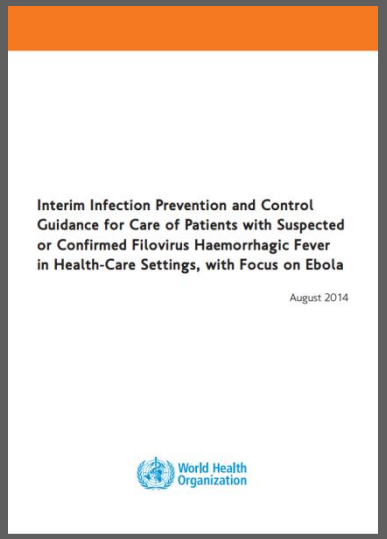
- Rapid response to stop transmission
  - Actively identify, investigate ALL new cases, contacts, deaths
  - Monitor contacts for 21 days (isolate if ill)
  - Confirm absence of virus by testing during recovery
  - Requires maintenance of detailed databases

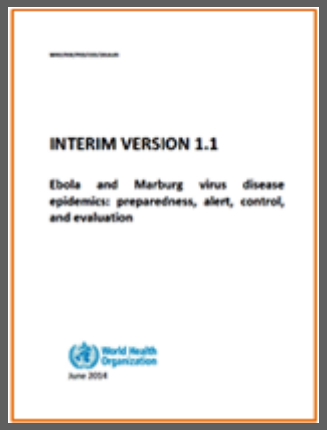
- Prevention
  - Informed HCW, consistent infection control/prevention
  - Culturally sensitive practices to reduce transmission

WHO Resources

WHO guidelines on drawing blood: best practices in phlebotomy

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

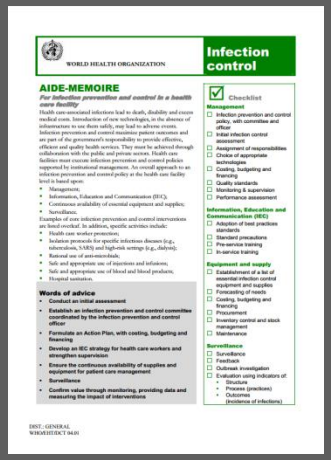




Interim manual - Ebola and Marburg virus disease epidemics: preparedness, alert, control, and evaluation

http://who.int/csr/resources/publications/ebola/en/

WHO Resources

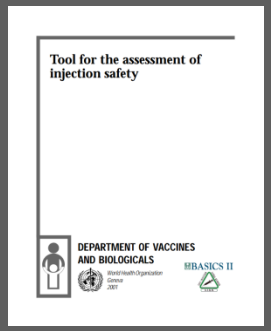


AIDE-MEMOIRE
For infection prevention and control in a health care facility

Five Moments for Hand Hygiene

Management of waste from injection activities at district level

Safe management of wastes from healthcare activities - Second edition

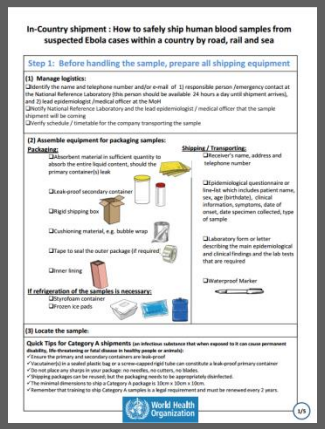


Tool for the assessment of injection safety

Waste from health-care activities

http://who.int/csr/resources/publications/ebola/en/

WHO Resources


In-Country shipment : How to safely ship human blood samples from suspected Ebola cases within a country by road, rail and sea

Step 1: Before handling the sample, prepare all shipping equipment

(1) Manage logistics:
❑Identify the name and telephone number and/or e-mail of 1) responsible person /emergency contact at the National Reference Laboratory (this person should be available 24 hours a day until shipment arrives), and 2) lead epidemiologist /medical officer at the MoH
❑Notify National Reference Laboratory and the lead epidemiologist / medical officer that the sample shipment will be coming
❑Verify schedule / timetable for the company transporting the sample

(2) Assemble equipment for packaging samples:
Packaging:
❑Absorbent material in sufficient quantity to absorb the entire liquid content, should the primary container(s) leak
❑Leak-proof secondary container
❑Rigid shipping box
❑Cushioning material, e.g. bubble wrap
❑Tape to seal the outer package (if required)
❑Inner lining
If refrigeration of the samples is necessary:
❑Styrofoam container
❑Frozen ice packs

Shipping / Transporting:
❑Receiver's name, address and telephone number
❑Epidemiological questionnaire or line-list which includes patient name, sex, age (birthdate), clinical information, symptoms, date of onset, date specimen collected, type of sample
❑Laboratory form or letter describing the main epidemiological and clinical findings and the lab tests that are required
❑Waterproof Marker

(3) Locate the sample:

Quick Tips for Category A shipments (an infectious substance that when exposed to it can cause permanent disability, life-threatening or fatal disease in healthy people or animals)
✓Ensure the primary and secondary containers are leak-proof
✓Vacutainer(s) in a sealed plastic bag or a screw-capped rigid tube can constitute a leak-proof primary container
✓Do not place any sharps in your package: no needles, no cutters, no blades.
✓Shipping packages can be reused: but the packaging needs to be appropriately disinfected.
✓The minimal dimensions to ship a Category A package is 10cm x 10cm x 10cm.
✓Remember that training to ship Category A samples is a legal requirement and must be renewed every 2 years.

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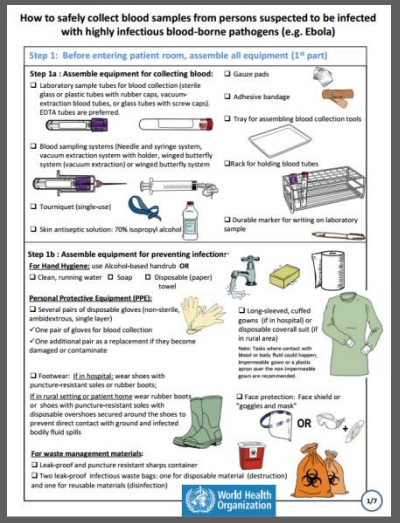
In-Country shipment : How to safely ship human blood samples from suspected Ebola cases within a country by road, rail and sea

How to safely collect blood samples from persons suspected to be infected with highly infectious blood-borne pathogens (e.g. Ebola)


How to safely collect blood samples from persons suspected to be infected with highly infectious blood-borne pathogens (e.g. Ebola)

Step 1: Before entering patient room, assemble all equipment (1st part)

Step 1a : Assemble equipment for collecting blood:
❑ Laboratory sample tubes for blood collection (sterile glass or plastic tubes with rubber caps, vacuum-extraction blood tubes, or glass tubes with screw caps). EDTA tubes are preferred.
❑ Blood sampling systems (Needle and syringe system, vacuum extraction system with holder, winged butterfly system (vacuum extraction) or winged butterfly system
❑ Tourniquet (single-use)
❑ Skin antiseptic solution: 70% isopropyl alcohol
❑ Gauze pads
❑ Adhesive bandage
❑ Tray for assembling blood collection tools
❑Rack for holding blood tubes
❑ Durable marker for writing on laboratory sample

Step 1b : Assemble equipment for preventing infection:
For Hand Hygiene: use Alcohol-based handrub OR
❑ Clean, running water ❑ Soap ❑ Disposable (paper) towel
Personal Protective Equipment (PPE):
❑ Several pairs of disposable gloves (non-sterile, ambidextrous, single layer)
✓One pair of gloves for blood collection
✓One additional pair as a replacement if they become damaged or contaminate
❑ Long-sleeved, cuffed gowns (if in hospital) or disposable coverall suit (if in rural area)
Note: Tasks where contact with blood or body fluid could happen. Impermeable gown or a plastic apron over the non impermeable gown are recommended.
❑ Footwear: If in hospital, wear shoes with puncture-resistant soles or rubber boots;
If in rural setting or patient home wear rubber boots or shoes with puncture-resistant soles with disposable overshoes secured around the shoes to prevent direct contact with ground and infected bodily fluid spills
❑ Face protection: Face shield or "goggles and mask"
OR
For waste management materials:
❑ Leak-proof and puncture resistant sharps container
❑ Two leak-proof infectious waste bags: one for disposable material (destruction) and one for reusable materials (disinfection)

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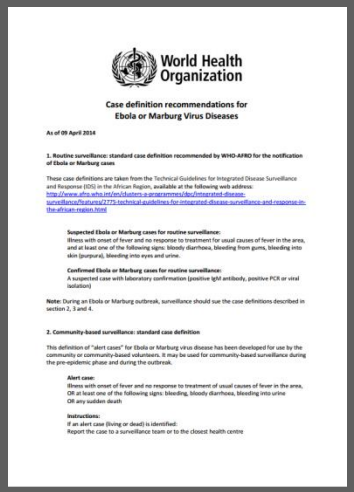
Case definition recommendations for Ebola or Marburg Virus Diseases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Case definition recommendations for Ebola or Marburg Virus Diseases

As of 09 April 2014

1. Routine surveillance: standard case definition recommended by WHO-AFRO for the notification of Ebola or Marburg cases

These case definitions are taken from the Technical Guidelines for Integrated Disease Surveillance and Response (IDS) in the African Region, available at the following web address: http://www.afro.who.int/en/clusters-a-programmes/dpc/integrated-disease-surveillance/features/2775-technical-guidelines-for-integrated-disease-surveillance-and-response-in-the-african-region.html

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

Confirmed Ebola or Marburg cases for routine surveillance:
A suspected case with laboratory confirmation (positive IgM antibody, positive PCR or viral isolation)

Note: During an Ebola or Marburg outbreak, surveillance should use the case definitions described in section 2, 3 and 4.

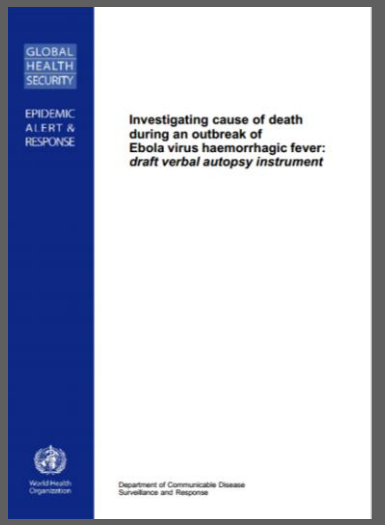
2. Community-based surveillance: standard case definition

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

Alert case:
Illness with onset of fever and no response to treatment of usual causes of fever in the area,
OR at least one of the following signs: bleeding, bloody diarrhoea, bleeding into urine
OR any sudden death

Instructions:
If an alert case (living or dead) is identified:
Report the case to a surveillance team or to the closest health centre

Investigating cause of death during an outbreak of Ebola virus haemorrhagic fever: draft verbal autopsy instrument


GLOBAL HEALTH SECURITY

EPIDEMIC ALERT & RESPONSE

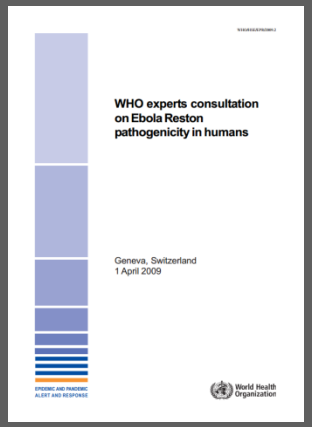
Investigating cause of death during an outbreak of Ebola virus haemorrhagic fever: *draft verbal autopsy instrument*

World Health Organization

Department of Communicable Disease Surveillance and Response

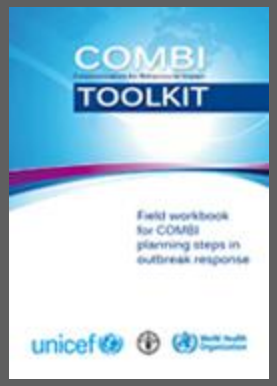
http://who.int/csr/resources/publications/ebola/en/

WHO Resources

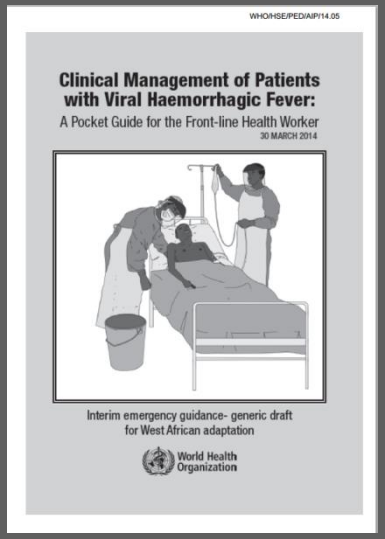


WHO experts consultation on Ebola Reston pathogenicity in humans

Communication for behavioural Impact (COMBI)
A toolkit for behavioural and social communication in outbreak response



Communication for behavioural Impact (COMBI): field workbook for COMBI planning steps in outbreak response



Clinical management of patients with viral haemorrhagic fever
A pocket guide for the front-line health worker

http://who.int/csr/resources/publications/ebola/en/

WHO responds to Ebola virus disease outbreak in West Africa