Ebola Virus Disease: Awareness and Precautions for Peace Operations Personnel

Produced in Collaboration with

The World Health Organization (WHO)

Series Editor

Ramona Taheri

World Health Organization

Peace Operations Training Institute®

PELP
PARTNERSHIP FOR E-LEARNING ON PEACE OPERATIONS

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A medical practitioner measures a local resident's temperature using an infrared thermometer. 8 August 2019. UN Photo by Martine Perret.

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Foreword

In this Statement by the President of the Security Council at the 8590th meeting of the Security Council, held on 2 August 2019, in connection with the Council's consideration of the item entitled "Peace and security in Africa", the President of the Security Council made the following statement on behalf of the Council:[1]

> "The Security Council reiterates its grave concern about the most recent outbreak of the Ebola virus in the Democratic Republic of Congo (DRC). It takes note that the World Health Organization (WHO) has declared the Ebola outbreak in the DRC a Public Health Emergency of International Concern (PHEIC).
>
> "The Security Council highlights the urgency of the Ebola response, because the disease could spread rapidly, including to neighbouring countries, possibly having serious humanitarian consequences and impacting regional stability.
>
> "The Security Council reiterates its appreciation for the efforts of the government of the DRC, WHO and other UN agencies, the United Nations Organisation Stabilisation Mission in the DRC (MONUSCO), the African Union, humanitarian organisations, international donors and all supporting the response to contain the disease and treat Ebola patients, noting the challenging operating environment.
>
> "The Security Council emphasizes the need for continued cooperation and coordination with the DRC to address the Ebola outbreak, as well as with the States in the region, as appropriate.
>
> "The Security Council stresses the need for government and civil society in affected and at-risk countries to work urgently with relevant partners to improve their preparedness for preventing, detecting and responding to possible cases, as well as to implement optimal vaccine strategies that have maximum impact on curtailing the outbreak. The Security Council notes with appreciation the contribution of the relevant non-governmental organizations to the response to the outbreak and their involvement in the coordination of the response, in support of national authorities.
>
> "The Security Council welcomes the efforts of David Gressly as the UN Ebola Emergency Response Coordinator to create the enabling environment for the WHO led public health response in support of the government of the DRC, and the commitment of the UN Secretary General to addressing and containing the Ebola outbreak, including by providing sufficient resources to the Coordinator.

1) United Nations Security Council, "Statement by the President of the Security Council", S/PRST/2019/6, 2 August 2019. Available from: <https://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/S_PRST_2019_6.pdf>.

"The Security Council reiterates its serious concern regarding the security situation in the areas affected by the Ebola outbreak, in particular the attacks on humanitarian and medical personnel exclusively engaged in medical duties, which is severely hampering the response efforts and facilitating the spread of the virus in the DRC and the wider region; and calls for an immediate cessation of hostilities by all armed groups.

"The Security Council condemns in the strongest terms all attacks against and threats intentionally directed against medical personnel and humanitarian personnel exclusively engaged in medical duties, including the killings of health workers, as well as attacks on their means of transport and equipment, hospitals and other medical facilities, bearing in mind the need to ensure that those responsible are held accountable and brought to justice by relevant authorities. They recalled the provisions of resolution 2286 (2016) in that regard.

"The Security Council demands that safe and unhindered access be ensured for humanitarian and medical personnel exclusively engaged in medical duties, to patients and others in need; and also stresses that response teams and medical facilities must be respected and protected, and that they must not be a target, in accordance with international law.

"The Security Council highlights the need for a comprehensive and community-based approach, by building trust among the population, especially those most at risk, to facilitate an effective response. The Security Council also encourages the promotion of a comprehensive and sustained response beyond the current outbreak, support health facilities and basic needs and services for the affected populations in DRC and the region, in order to prevent or minimize any potential future outbreak.

"The Security Council emphasizes the importance of strengthening international support and engagement, including full and timely financial contributions to the response, technical assistance, scientific cooperation and human resources to bring the disease permanently and successfully under control."

David Gressly, United Nations Emergency Ebola Response Coordinator (EERC), and a team of Ebola response partners visited the Nduko health area in the Musienene health zone, where a vaccination team offered services to the local population. Mr. Gressly and the team took the opportunity to discuss security issues in the area. Upon arrival to the area, Mr. Gressly has his temperature checked by medical staff. This region is where the Ebola epidemic started in mid-2018.

Note to Students

- This learning course is intended to provide the most basic information needed to deploy safely during a response to an Ebola disease outbreak.
- All deployees, however experienced, are advised to read and reflect on the course materials and other sources of information that are provided here.
- Depending on your role and assignment in the response, you may be required to take further self-learning or face-to-face trainings.
- The information herewith is provided in good faith based on the latest technical and operational guidance available at the time of publication. Updated trainings and briefings will be made available as new information becomes available.
- For more information on training and learning related to Ebola response and readiness, contact: <outbreak.training@who.int>.[2]

Communication and community engagement are essential to stop and prevent the spread of Ebola. A group of women from the Somamu association in the Mukuna area meet with families each day to encourage them to seek early treatment, explain the mode of transmission of the disease, and ask if they are in good health or if anyone is sick in their community. Pictured are three women from the association providing feedback on the new leaflets about Ebola that are going to be distributed to the community. 7 August 2019. UN Photo by Martine Perret

2) Reproduced, with permission of the publisher, from ePROTECT: Basic Occupational Health and Safety Training. (Geneva, World Health Organization, 2018. Available from: <https://openwho.org/courses/knowledge-resources-ebola>).

Method of Study

This self-paced course aims to give students flexibility in their approach to learning. The following steps are meant to provide motivation and guidance about some possible strategies and minimum expectations for completing this course successfully:

- Before you begin studying, first browse through the entire course. Notice the lesson and section titles to get an overall idea of what will be involved as you proceed.
- The material is meant to be relevant and practical. Instead of memorizing individual details, strive to understand concepts and overall perspectives in regard to the United Nations system.
- Set personal guidelines and benchmarks regarding how you want to schedule your time.
- Study the lesson content and the learning objectives. At the beginning of each lesson, orient yourself to the main points. If possible, read the material twice to ensure maximum understanding and retention, and let time elapse between readings.
- At the end of each lesson, take the End-of-Lesson Quiz. Clarify any missed questions by rereading the appropriate sections, and focus on retaining the correct information.
- After you complete all of the lessons, prepare for the End-of-Course Examination by taking time to review the main points of each lesson. Then, when ready, log into your online student classroom and take the End-of-Course Examination in one sitting.

» ***Access your online classroom at <www.peaceopstraining.org/users/user_login> from virtually anywhere in the world.***

- Your exam will be scored electronically. If you achieve a passing grade of 75 per cent or higher on the exam, you will be awarded a Certificate of Completion. If you score below 75 per cent, you will be given one opportunity to take a second version of the End-of-Course Examination.
- A note about language: This course uses English spelling according to the standards of the Oxford English Dictionary (United Kingdom) and the United Nations Editorial Manual.

Key Features of Your Online Classroom »

- Access to all of your courses;
- A secure testing environment in which to complete your training;
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- The ability to download your Certificate of Completion for any completed course.

LESSON 1

Outbreaks, Transmission, and Symptoms

Ebola Virus Disease (EVD) is a rare but severe, often fatal illness in humans.

In this lesson »

Lesson Objectives »

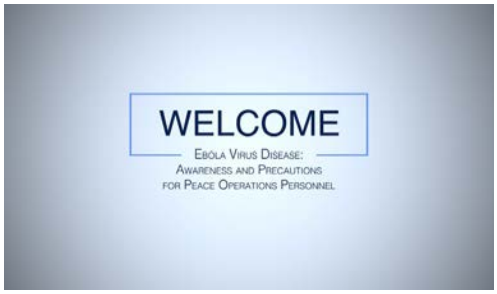
- Have an increased understanding of the 2014 EVD outbreak and those that have followed.
- Learn how EVD spreads and who is most at risk of infection.
- Recognize the clinical symptoms and diagnosis of EVD.

Ebola survivors attend a weekly meeting of the Ebola Survivors' Association at the General Hospital in the town of Beni in the North Kivu region of the Democratic Republic of the Congo (DRC). Since its creation in January 2019, the association has grown from a small group of 23 survivors to over 100 survivors, offering support as well as a forum to share experiences and challenges that are faced by survivors when they return home to their communities. At the time, the Ebola outbreak was the largest ever in the DRC. 14 November 2019. UN Photo by Victoria Hazou.

Introduction

Review the following key facts about EVD:

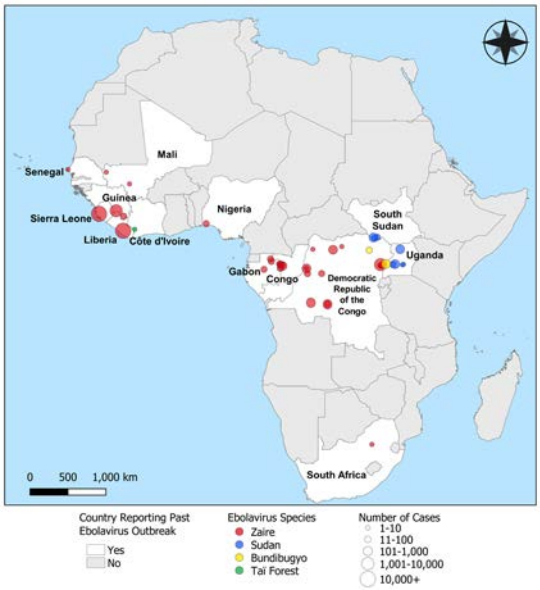
- Ebola virus disease (EVD) is caused by *Zaire ebolavirus* (EBOV), a species of the *Filoviridae* family.
- EVD is a rare but severe, often fatal illness in humans.
- The virus is first transmitted to humans from wild animals and then spreads in the human population through human-to-human transmission.
- The average EVD case-fatality rate is around 50 per cent. Case fatality rates have varied from 25 per cent to 90 per cent in past outbreaks.
- Community engagement is key to successfully controlling outbreaks.



View a video introduction to this course. Available from: <https://youtu.be/u6seijP_FSw>.

- Good outbreak control relies on applying a package of interventions, namely, case management, infection prevention and control practices, surveillance and contact tracing, a good laboratory service, safe and dignified burials, and social mobilization.
- Vaccines to protect against Ebola Virus Disease have been developed and used to help control the spread of EVD outbreaks in Guinea and the Democratic Republic of the Congo (DRC).[1]
- The Ervebo licensed vaccine is available through the International Coordinating Group (ICG) on Vaccine Provision secretariat.[2] The Ervebo vaccine is only protective against the *Zaire ebolavirus* species.
- Early supportive care with rehydration, i.e., symptomatic treatment, improves survival.[3] Two monoclonal antibodies (Inmazeb and Ebanga) were approved for the treatment of *Zaire ebolavirus* infection in adults and children by the US Food and Drug Administration in late 2020.

Figure 1: Distribution of EVD in Africa since Discovery in 1976



The above map shows the distribution of the Ebola virus in Africa since its discovery in 1976. Source: Center for Disease Control and Prevention, 27 January 2023. Available from: <https://www.cdc.gov/vhf/ebola/history/distribution-map.html>.

Section 1.1 General Information on Ebola viruses

The Ebola virus (EBOV) from the *Zaire ebolavirus* species causes an acute, serious illness that is often fatal if untreated. Ebola virus disease (EVD) was first identified in 1976 during an outbreak in Yambuku, DRC. The latter occurred in a village near the Ebola River, from which the disease takes its name.

The 2014–2016 EVD outbreak in West Africa was the largest Ebola outbreak since the virus was first discovered. The outbreak started in Guinea and then moved across land borders to Sierra Leone and Liberia.

The Filoviridae virus family includes three genera: *Cuevavirus*, *Marburgvirus*, and *Ebolavirus*. Within the *Ebolavirus* genus, six species have been identified: *Zaire*, *Bundibugyo*, *Sudan*, *Taï Forest*, *Reston*, and *Bombali*.[4] *Bundibugyo*, *Sudan*, and *Zaire ebolavirus* have been associated with large and deadly outbreaks of viral haemorrhagic fever (VHF), characterized by high person-to-person transmission and a case fatality rate ranging from 25 to 90 per cent.

1) Vaccine trials were implemented in the Democratic Republic of the Congo, Guinea, Liberia, and Sierra Leone. World Health Organization and Health Emergencies Programme, "Introduction to Ebola disease", 2020. Available from: <https://openwho.org/courses/knowledge-resources-ebola/items/4qmupW7if0hyfAvI9nZUnH>.
2) World Health Organization, "International Coordinating Group (ICG) on Vaccine Provision". Available from: <https://www.who.int/groups/icg>.
3) Symptomatic treatment intends to relieve symptoms but does not affect the underlying cause of an illness.
4) Reproduced, with permission of the publisher, from Global Alert and Response, Geneva, World Health Organization, 2021 (WHO, "Ebola virus disease", 23 February 2021).

Outbreaks: 2014–2023

Guinea, Liberia, and Sierra Leone (2014–2016)

The 2014–2016 outbreak in West Africa was the largest Ebola outbreak since the virus was first discovered. This was the thirteenth outbreak of EVD since its discovery. There were more cases and deaths in this outbreak than in all others combined. The outbreak quickly spread from Guinea to neighbouring countries Sierra Leone and Liberia. By July 2014, it had reached the capital cities of these three countries, and in August 2014, the World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern (PHEIC).

Over the course of the epidemic, the disease spread to seven additional countries: Italy, Mali, Nigeria, Senegal, Spain, the United Kingdom (UK), and the United States (US). Secondary infections occurred in Italy, Mali, Nigeria, and the US.

In June 2016, the outbreak was declared over. More than 28,600 people were infected, and 11,325 died.[5]

Équateur Province, DRC (2014)

On 24 August 2014, the DRC declared an outbreak of EVD in Boende, Équateur Province, DRC. The outbreak was declared over on 20 November 2014. A total of 66 EVD cases, including 38 confirmed and 28 probable cases, were reported. There were 49 deaths, including 21 among confirmed cases and 28 among probable cases.

Bas-Uélé Province, DRC (2017)

On 11 May 2017, an EVD outbreak was detected in the Bas-Uélé province of the DRC. The outbreak was declared over on 01 July 2017. A total of eight cases, including five confirmed and three probable cases, were reported. There were four deaths, including one among confirmed cases and three among probable cases.

This outbreak was quickly contained thanks to joint efforts by the government of the DRC, WHO, and many different partners.

The effective response to this outbreak was achieved through the timely alert by local authorities of suspect cases, immediate testing of blood samples thanks to strengthened national laboratory capacity, the early announcement of the outbreak by the government, rapid-response activities by local and national health authorities with the robust support of international partners, and speedy access to flexible funding. Coordination support on the ground by the WHO Health Emergencies Programme was critical, and an incident management system was set up within 24 hours of the outbreak being announced. WHO deployed more than 50 experts to work closely with the government and partners.[6]

Équateur Province, DRC (2018)

On 8 May 2018, an EVD outbreak was detected in the Équateur province of the DRC. The outbreak was declared over on 24 July 2018. A total of 54 cases, including 38 confirmed and 16 probable cases

5) Reproduced, with permission of the publisher, from Global Alert and Response, Geneva, World Health Organization, 2021 (WHO, "Ebola virus disease: Outbreak 2014–2016, West Africa". Available from: <https://www.who.int/emergencies/situations/ebola-outbreak-2014-2016-West-Africa>).

6) Reproduced, with permission of the publisher, from Global Alert and Response, Geneva, World Health Organization, 2021 (WHO, "Ebola: Democratic Republic of Congo, 2017". Available from: <https://www.who.int/emergencies/situations/ebola-outbreak-2017---drc>).

were reported. There were 33 deaths, including 17 among confirmed cases and 16 among probable cases.

Unlike previous Ebola outbreaks in the country, this one involved four separate locations, including an urban centre with river connections to the capital and neighbouring countries, as well as remote rainforest villages. There were initial concerns that the disease could spread to other parts of the DRC and neighbouring countries.

Ituri, North Kivu, and South Kivu Provinces, DRC (2018–2020)

The world's second-largest Ebola outbreak on record was reported on 1 August 2018 and was declared over on 25 June 2020. A total of 3,470 cases, including 3,317 confirmed and 153 probable cases were reported. There were 2,287 deaths, including 2,134 among confirmed cases and 153 among probable cases. The nearly two-year-long outbreak was particularly challenging because it took place in an active conflict zone.

Led by the government and the Ministry of Health of the DRC and supported by WHO and partners, the response involved training thousands of health workers, registering 250,000 contacts, testing 220,000 samples, providing patients with equitable access to advanced therapeutics, vaccinating over 303,000 people with the highly effective rVSV-ZEBOV-GP vaccine, and offering care for all survivors after their recovery.

The response was bolstered by the engagement and leadership of the affected communities. Thanks to their efforts, this outbreak did not spread globally. More than 16,000 local front-line responders worked alongside the more than 1,500 people deployed by WHO. Support from donors was essential, as was the work of United Nations partner agencies, national and international non-governmental organizations (NGOs), research networks, and partners deployed through the Global Outbreak Alert and

Beni, North Kivu region, DRC. Community representatives visit a family on the outskirts of Beni to raise awareness about Ebola. 18 January 2019. Photo: World Bank/Vincent Tremeau.

Response Network. Hard work to build up preparedness capacities in neighbouring countries also limited the risk of the outbreak expanding.[7]

Équateur Province, DRC (2020)

On 1 June 2020, an EVD outbreak was detected in the Équateur province of the DRC. The outbreak was declared over on 18 November 2020. A total of 130 cases, including 119 confirmed and 11 probable cases were reported. There were 55 deaths, including 44 among confirmed cases and 11 among probable cases.

Genetic sequencing analysis by the DRC National Institute of Biomedical Research (INRB) found two genetically distinct Zaire ebolaviruses in circulation during this outbreak. One was related to the Ebola virus from the outbreak in 2018 linked to viral persistence in a survivor, and the other — a new *Zaire ebolavirus* —represented a spillover from the animal reservoir.

The outbreak took place in communities scattered across dense rainforests as well as crowded urban areas, creating logistical challenges; the leadership of the government and local communities, supported by WHO and partners, were instrumental in overcoming them.[8]

North Kivu Province, DRC (2021)

The Ministry of Health of the DRC declared an outbreak of EVD on 7 February 2021 after the laboratory confirmation of one case in Butembo, North Kivu Province. The outbreak was declared over on 3 May 2021. A total of 12 cases were reported, including 11 confirmed cases and one probable case. There were six deaths, five among confirmed cases and one among the probable case.

Genetic sequencing analysis indicates that this outbreak is linked to the two-year-long outbreak in North Kivu and Ituri provinces from 2018 to 2020 and viral persistence in a survivor.

The response was coordinated by the Provincial Department of Health in collaboration with WHO and partners. WHO had nearly 60 experts on the ground and, as soon as the outbreak was declared, helped local workers to trace contacts, provide treatment, engage communities, and vaccinate nearly 2,000 people at high risk, including over 500 front-line workers.

Nzérékoré Region, Guinea (2021)

The Ministry of Health of the Republic of Guinea announced an outbreak of EVD on 14 February 2021 after a cluster of cases was reported in the sub-prefecture of Gouécké, Nzérékoré Region. This was the first time the disease had been reported in Guinea since the previous outbreak ended in 2016. On 19 June 2021, the outbreak was declared over. A total of 23 cases, including 16 confirmed and seven probable cases were reported. There were 12 deaths, including five among confirmed cases and seven among probable cases.

Shortly after the infections were detected, national health authorities, with support from WHO and partners, mounted a swift response, tapping into the expertise gained in fighting recent outbreaks in Guinea and the DRC.

7) Reproduced, with permission of the publisher, from Global Alert and Response, Geneva, World Health Organization, 2021 (WHO, "Ebola outbreak — Democratic Republic of the Congo: North Kivu, Ituri 2018–2020". Available from: <https://www.who.int/emergencies/situations/Ebola-2019-drc->).

8) Reproduced, with permission of the publisher, from Global Alert and Response, Geneva, World Health Organization, 2021 (WHO, "Ebola outbreak — Democratic Republic of the Congo 2020: Équateur Province". Available from: <https://www.who.int/emergencies/situations/ebola-health-update---%C3%A9quateur-province-democratic-republic-of-the-congo-2020>).

WHO helped ship around 24,000 Ebola vaccine doses and supported the vaccination of nearly 11,000 people at high risk, including over 2,800 front-line workers.

Genetic sequencing found that the virus circulating in 2021 was closely related to the virus circulating back in 2014, suggesting a link to viral persistence in a survivor. Guinean health authorities reactivated a programme for survivors to provide long-term monitoring and after-care support.[9]

North Kivu Province, DRC (2021)

On 8 October 2021, the Ministry of Health of the DRC announced that a new laboratory-confirmed case of Ebola virus disease (EVD) had been detected in Beni Health Zone in North Kivu Province. The outbreak was declared over on 16 December 2021. A total of 11 cases were reported, including eight confirmed cases and three probable cases. There were nine deaths, six among confirmed cases and three among probable cases.

Full genome sequencing, performed by the INRB in Kinshasa, from the initial confirmed case indicates that this outbreak was not the result of a spillover from an animal reservoir but was linked to viral persistence in a survivor from the 2018–2020 outbreak.

Équateur Province, DRC (2022)

On 23 April 2022, the Ministry of Health of the DRC declared an EVD outbreak in the country after a case was confirmed in Mbandaka, Équateur Province. The outbreak was declared over on 4 July 2022. A total of five cases were reported, including four confirmed cases and one probable case. There were five deaths.

Full genome sequencing was performed at the INRB in Kinshasa, and the results indicate that this outbreak represents a new spillover from the animal population.[10]

North Kivu Province, DRC (2022)

On 21 August 2022, the Ministry of Health (MoH) of the DRC announced that a new laboratory-confirmed case of Ebola Virus Disease (EVD) had been detected in the Beni health zone in the province of North Kivu. The outbreak was declared over on 27 September 2022. A single confirmed case was reported and resulted in death.

Full genome sequencing indicated that this case is linked to the 2018–2020 outbreak and viral persistence in survivors.

Mubende district, Uganda (2022)[11]

The health authorities in Uganda declared an outbreak of Sudan virus disease (SVD) after a case of the Sudan ebolavirus was confirmed in the Mubende district in the central part of the country. As of 16 December 2022, a total of 164 cases were reported, including 142 confirmed cases and 22 probable cases. There were 77 deaths (55 among confirmed cases and 22 among probable cases).

9) Reproduced, with permission of the publisher, from "Ebola outbreak in Guinea declared over", 2021 /<https://www.afro.who.int/news/ebola-outbreak-guinea-declared-over>).

10) Reproduced, with permission of the publisher, from Disease Outbreak News, Geneva, World Health Organization, 2022, (WHO, "Ebola virus disease — Democratic Republic of the Congo", 28 April 2022. Available from: <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON377>).

11) Reproduced, with permission of the publisher, from World Health Organization, 2022, (WHO, "Uganda declares Ebola Virus Disease outbreak", 20 September 2022. Available from: <https://www.afro.who.int/countries/uganda/news/uganda-declares-ebola-virus-disease-outbreak>).

Section 1.2 Modes of Transmission

It is thought that fruit bats of the Pteropodidae family are natural Ebola virus hosts. Ebola is introduced into the human population through close contact with the blood, secretions, organs, or other bodily fluids of infected animals such as fruit bats, chimpanzees, gorillas, monkeys, forest antelope, or porcupines found ill or dead or in the rainforest.

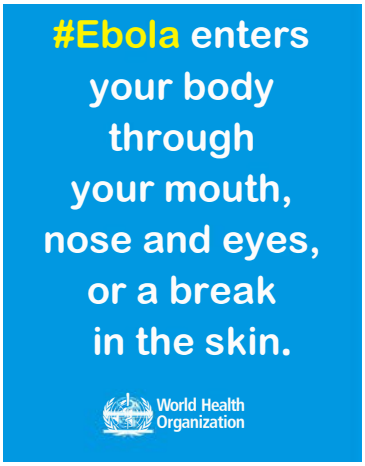
Health-care workers have frequently been infected while treating patients with suspected or confirmed EVD. This occurs through close contact with patients when infection control precautions are not strictly practised.

Burial ceremonies involving direct contact with the deceased's body can also contribute to the transmission of Ebola. People remain infectious as long as their blood contains the virus.

How is EVD transmitted?

The virus spreads from person to person through:

- Direct contact (through broken skin or mucous membranes) with the blood, secretions, organs, or other bodily fluids of infected people. Among infected bodily fluids, the most infectious are blood, faeces, and vomit; and
- Contact with surfaces and materials (e.g., bedding, clothing, etc.) contaminated with these fluids.



Transmission can occur through needlestick injuries when managing a sick patient or a clinical specimen.

EVD is not spread through casual contact. The risk of infection with the Ebola virus is minimal for someone who has not been in close contact with the bodily fluids of someone sick with or deceased from EVD. People are not infectious until they develop symptoms. The virus multiplies within the body before symptoms develop, and individuals become contagious when symptoms appear.[12]

EVD is not an airborne virus

EVD is not an airborne infection. WHO is unaware of any studies documenting the airborne transmission of EVD. On the contrary, good-quality studies from previous Ebola outbreaks show that all cases were infected by direct close contact with symptomatic patients.[13]

Section 1.3 Who is Most at Risk?

During an outbreak, those at higher risk of infection are:

- Health-care workers;
- Family members or others in close contact with infected people; and
- Mourners who have direct contact with the bodies of the deceased as part of burial ceremonies.[14]

12) Reproduced, with permission of the publisher, from ePROTECT Ebola. Geneva, World Health Organization, 2018. Topic: How is EVD transmitted? Slides 11–13.

13) Reproduced, with permission of the publisher, from Media centre, Geneva, World Health Organization, 2014 ("What we know about transmission of the Ebola virus among humans"; <http://www.who.int/mediacentre/news/ebola/06-october-2014/en/>).

14) Reproduced, with permission of the publisher, from Media centre, Geneva, World Health Organization, 2021 ("Frequently asked questions on Ebola virus disease vaccine", WHO. Available from: <https://www.afro.who.int/health-topics/ebola-virus-disease/faq-vaccine>).

Health workers put on their personal protective equipment (PPE) before treating people suspected of having Ebola at the Ebola Transition Center in the DRC. 2019. © World Bank/Vincent Tremeau.

Why are health-care workers at greater risk of catching Ebola?

Health-care workers are at greater risk of infection if they are not wearing the correct PPE or are not applying IPC measures when caring for patients. All health-care providers working at all levels of the health system — hospitals, clinics, and health posts — should be fully informed about the disease and its mode of transmission and should follow recommended precautions strictly.[15]

Why are mourners at burial ceremonies considered at risk of contracting Ebola?

Levels of the Ebola virus remain high after death; thus, the bodies of those who have died from EVD must be handled only by people wearing appropriate PPE and be buried immediately. WHO advises that the bodies of people who may have died from EVD should be handled only by trained burial teams, who are equipped to properly bury the dead, safely and with dignity.[16]

Persistence of Ebola virus in the biological fluids of survivors

People who have recovered from the disease may experience after-effects for some time after the acute phase of the disease. In addition, the Ebola virus can persist in the immune-privileged sites (testis, brain) of people who have recovered from the disease. In a limited number of instances, sexual transmission from a male survivor to his sexual partner has been documented.

To support survivors and mitigate the risk of transmission linked to viral persistence, WHO recommends that a care programme be initiated as early as possible during an outbreak.

15) Reproduced, with permission of the publisher, from Media centre, Geneva, World Health Organization, 2021 ("Frequently asked questions on Ebola virus disease vaccine", WHO. Available from: <https://www.afro.who.int/health-topics/ebola-virus-disease/faq-vaccine>).

16) Reproduced, with permission of the publisher, from Media centre, Geneva, World Health Organization, 2021 ("Frequently asked questions on Ebola virus disease vaccine", WHO. Available from: <https://www.afro.who.int/health-topics/ebola-virus-disease/faq-vaccine>).

Male Ebola survivors and their sexual partners should receive counselling to ensure safer sexual practices until their semen has twice tested negative. Survivors should be provided with condoms and abstain from all types of sex or observe safer sex through correct and consistent condom use until their semen has twice tested negative. Male survivors should practice good hand and personal hygiene by immediately and thoroughly washing with soap and water after any physical contact with semen, including after masturbation. During this period, used condoms should be handled safely and safely disposed of to prevent contact with seminal fluids. Having tested negative, male survivors and their partners can safely resume normal sexual practices. If semen testing is not available, male survivors should practice safer sex and hygiene for 12 months from the onset.

All survivors and their partners and families should be shown respect, dignity, and compassion.[17]

Section 1.4 Clinical Symptoms

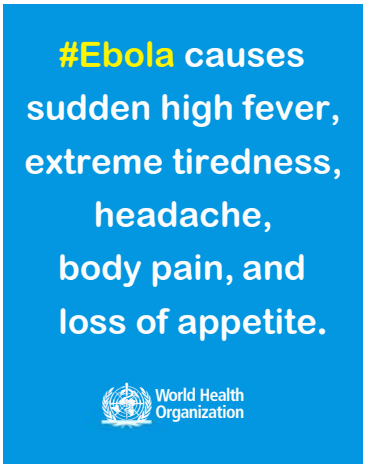
The incubation period — that is, the interval from infection with the virus to onset of symptoms — is from two to 21 days. A person infected with Ebola cannot spread the disease until they develop symptoms.

Early symptoms of EVD can be sudden and include:

- Fever;
- Fatigue;
- Muscle pain;
- Headache; and
- Sore throat.

This is followed by:

- Vomiting;
- Diarrhoea;
- Rash;
- Symptoms of impaired kidney and liver function; and
- In some cases, both internal and external bleeding (for example, oozing from the gums or blood in the stools).



A lab technician wearing PPE prepares to enter the isolation ward at a government-run hospital in Kabala, Sierra Leone, to take a blood sample from a suspected Ebola case. 18 December 2014. UN Photo by Martine Perret.

17) Reproduced, with permission of the publisher, from Media centre, Geneva, World Health Organization, 2021 ("Frequently asked questions on Ebola virus disease vaccine", WHO).

Section 1.5 Diagnosis

It can be difficult to clinically distinguish EVD from other infectious diseases, such as malaria, typhoid fever, and meningitis. Confirmation that symptoms are caused by Ebola virus infection is made using laboratory-based diagnostic methods. Samples collected from patients are an extreme biohazard risk; laboratory testing on non-inactivated samples should be conducted under maximum biological containment conditions. All biological specimens should be packaged using the triple packaging system when transported nationally and internationally.[18]

Consider malaria and other testing

It is important to be aware that malaria, as well as other pathogens (see below), are included in the differential diagnosis for EVD. Differential diagnoses may vary depending on diseases endemic in the specific country context, and the possibility of infection with other pathogens should be considered.

- Malaria;
- Typhoid fever;
- Shigellosis;
- Cholera;
- Leptospirosis;
- Lassa fever;
- Dengue haemorrhagic fever;
- Rickettsioses;
- Relapsing fever;
- Meningitis;
- Hepatitis;
- HIV;
- Tuberculosis; and
- Other viral haemorrhagic fevers such as Crimean-Congo Haemorrhagic fever, other filoviruses and Rift Valley Fever.

Conclusion

A confluence of environmental and socioeconomic factors can increase the risk of new outbreaks of EVD in countries where the virus is present in animal reservoirs. Improved capacities in detection, laboratory confirmation, and increased surveillance may explain the increased frequency of detecting EVD outbreaks[19].

18) Reproduced, with permission of the publisher, from Global Alert and Response, Geneva, World Health Organization, 2021 (WHO, "Ebola virus disease", 23 February 2021).

19) Reproduced, with permission of the publisher, from Disease Outbreak News, Geneva, World Health Organization, 2022, (WHO, "Ebola virus disease — Democratic Republic of the Congo, 29 September 2022. Available from: <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON411>).

Effective outbreak control relies on applying a package of interventions, including case management, surveillance and contact tracing, an optimal laboratory service, infection prevention and control measures in health-care and community settings, safe and dignified burials, community engagement, and social mobilization. Community engagement is essential to successfully controlling outbreaks. Raising awareness of risk factors for Ebola infection and protective measures that individuals can take is an effective way to reduce human transmission.[20]

Ebola outbreaks remain rare events but can occur in at-risk areas, such as conflict zones. Once introduced into the human population, transmission occurs through close contact with the bodily fluids of sick or deceased patients. While peace operation missions do not have a mandate to stop the spread of disease, nor are peace operations personnel equipped to address a major biological outbreak, in some contexts, peace operations personnel may intervene in providing humanitarian assistance and the protection of civilians. In most contexts, outbreak response is led by health authorities with the support of WHO and other partners. However, peace operations personnel may play a supporting role in providing logistical support, humanitarian relief, and a security presence, as well as in disseminating lifesaving information on Ebola prevention. Further information would be provided during the outbreak response.

Secretary-General António Guterres visits the Democratic Republic of the Congo to take stock of and mobilize additional support for the response to the Ebola outbreak. Mr. Guterres (left) visits Camp-de-vie in Mangina, a residence of Ebola medical workers. 1 September 2019. UN Photo.

20) Reproduced, with permission of the publisher, from Disease Outbreak News, Geneva, World Health Organization, 2022, (WHO, "Ebola Disease caused by Sudan virus — Uganda", 26 September 2022. Available from: <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON410>).

End-of-Lesson Quiz »

1. Ebola virus disease (EVD) in humans is:

A. Rare but mild
B. Common but severe
C. Common but mild
D. Rare but severe

2. Where did the largest EVD outbreak ever occur since the discovery of the virus?

A. East Africa
B. West Africa
C. West Asia
D. South America

3. Which animals are thought to be the natural Ebola virus hosts?

A. Stray dogs
B. Rats
C. Fruit bats
D. Mosquitos

4. Which of the following best characterizes the transmission of EVD?

A. Transmission occurs through direct contact with the bodily fluids of an infected patient.
B. Transmission occurs through droplet infection.
C. Transmission occurs through casual contact.
D. Transmission occurs through airborne infection.

5. Which of the following groups is at high risk of becoming infected with EVD?

A. Front-line workers
B. Family members of infected people
C. Mourners who handle the dead at funerals of people who have died from EVD
D. All of these

6. The clinical symptoms of EVD:

A. Always develop gradually
B. Never resemble symptoms of other diseases
C. Include fever and fatigue
D. Develop after the sufferer is already contagious

7. TRUE or FALSE: There is no incubation period for EVD. The onset of symptoms is always immediate.

A. True
B. False

8. Against which species of Ebola does the Ervebo vaccine provide protection?

A. Bombali ebolavirus
B. Sudan ebolavirus
C. Bundibugyo ebolavirus
D. Zaire ebolavirus

Answer Key provided on the next page.

End-of-Lesson Quiz »

Answer key

1. D
2. B
3. C
4. A
5. D
6. C
7. B. False
8. D