



# Marburg virus disease (MVD)

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## Key facts

To better understand public health terms included in this Disease Tool (e.g. What is a case definition? or What is an infectious agent?), consult our page on [Key concepts on epidemiology](#).

## Importance

Outbreaks and sporadic cases have been reported in Angola, Democratic Republic of the Congo, Kenya, South Africa (in a person with recent travel history to Zimbabwe) and Uganda. In 2008, two independent cases were reported in travellers who visited a cave inhabited by *Rousettus* bat colonies in Uganda. In 2021 there was a confirmed case for the first time in Guinea, amidst an ongoing Ebola outbreak. The average MVD case fatality rate is around 50 per cent. Case fatality rates in outbreaks have ranged from 24 per cent to 88 per cent, depending on virus strain and case management. Early supportive care with rehydration and symptomatic treatment improves survival. People can get MVD through direct contact with an infected animal (zoonotic disease) or a sick or dead person infected with Marburg virus.

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## Case definition

A **case definition** is a set of uniform criteria used to define a disease for public health surveillance. It enables public health officials to classify and count cases consistently.

*The following are standard case definitions to allow national health authorities to interpret data in an international context. However, during an outbreak case definitions may be adapted to the local context and the Red Cross Red Crescent should use those agreed/established by national health authorities. NB: Consider that during community-based surveillance, **volunteers** should use broad (simplified) case definitions (referred to as community case definitions) to recognize most or all possible cases, provide relevant risk communication and appropriate actions and encourage them to seek care. Other actors such as **healthcare workers or investigators** studying the cause of a disease, on the other hand, can use more specific case definitions that may require laboratory confirmation.*

Case definitions are the same for both Ebola and Marburg:

### Routine surveillance

**Suspected case:** 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 case:** A suspected case with laboratory confirmation (positive IgM antibody, positive

Polymerase chain reaction (PCR) or viral isolation).

### Community-based surveillance

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

If the Red Cross Red Crescent is doing community-based surveillance, a community case definition should be agreed upon with the relevant health authority.

WHO case definition source of information: [https://apps.who.int/iris/bitstream/handle/10665/146397/WHO\\_EVD\\_CaseDef...](https://apps.who.int/iris/bitstream/handle/10665/146397/WHO_EVD_CaseDef...)

<https://www.who.int/news-room/fact-sheets/detail/marburg-virus-disease>

## Risk factors

- Infection when caring for those suffering from the disease may occur through close contact with patients when infection control precautions are not strictly practised.
- Mourners at burial ceremonies that involve direct contact with the body of the deceased, and those involved in preparing bodies for or conducting funeral rites are at increased risk.
- Prolonged exposure to mines or caves inhabited by fruit bat colonies.
- Eating bushmeat that is not thoroughly cooked before consumption during outbreaks.
- Preparing bushmeat during outbreaks.
- Unsafe sex presents an additional risk. WHO recommends that male survivors of Marburg virus disease practise safer sex for 12 months from onset of symptoms or until their semen twice tests negative for Marburg virus.
- Overcrowded areas where it is impossible to avoid close physical contact, where person-to-person spread is easily possible.
- Poor access to or practice of sanitation and hygiene measures.

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## Attack rate (AR)

The **attack rate** is the risk of getting a disease during a specific time period (such as during an outbreak).

- Around 23 per cent for family members sleeping in the same room with the patient.
- Around 81 per cent for those providing direct care when infection control precautions are not strictly practised.

## Groups at increased risk of severe illness (most vulnerable)

- Infants, young children.
- Older people with weakened immune systems.

- Immunosuppressed persons such as those receiving chemotherapy, transplant recipients or HIV carriers.
- People with chronic diseases such as renal disease, cancer, chronic liver and lung disease and diabetes.

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## Infectious agent

**Infectious agents** are bacteria, viruses, fungi, prions and parasites. A disease caused by an infectious agent or its toxic products is defined as an infectious disease.

*Marburg virus.*

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## Reservoir / host

A **reservoir of infection** is a living organism or material in or on which an infectious agent lives and/or usually multiplies. Reservoirs include humans, animals and the environment.

A **susceptible host** is a person at risk of being infected. The level of susceptibility depends on age, sex, ethnicity and genetic factors, specific immunity also depends on other factors that affect an individual's ability to resist infection or to limit its ability to cause infection.

A **zoonotic disease** or **zoonosis** is an infectious disease that has jumped from a non-human animal to humans.

### Zoonotic disease:

- Reservoir: fruit bats (*Rousettus aegyptiacus* bats)
- Hosts: non-human primates, monkeys, pigs, humans.

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## How disease is spread (modes of transmission)

Categorisation of **modes of transmission** varies from one agency to another. In addition, some infectious agents can be transmitted by more than one mode. A list of modes of transmission can be found in the key concepts to serve as guidance to better understand the diseases included in this website.

### Contact transmission:

- Close contact with the blood, secretions, organs or other bodily fluids of infected persons and materials such as bedding contaminated with the infected fluid.
- Contact with the body of the deceased during burial ceremonies.
- Contact with fruit bats and probably apes and monkeys.

### **Sexual transmission:**

- Sexual contact with a man who has recovered from MVD up to 12 months after recovery.

### **Vehicle-borne transmission:**

- Transmission through contact with objects (like needles and syringes) that have been contaminated with blood or other body fluids from a person who is sick with MVD or the body of a person who has died from MVD.

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## **Incubation period**

This time from when infection occurs to the onset of symptoms is called the **incubation period**. It is a range of days and it can be different for each disease.

Average five to ten days (range 2—21 days).

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## **Period of infectiousness**

**Period of infectiousness** is the time interval during which an infected person can transmit the infection to other susceptible persons.

People remain infectious as long as their blood contains the virus. Recovering patients are no longer contagious to others once they test negative, and their return home or transfer to a general hospital is safe. Sperm may still be contagious for a period of 12 months after a patient's recovery. Case reports reveal that Marburg virus might persist in the eyes in some people who have recovered from Marburg virus disease as well as in breast milk or amniotic fluid of pregnant women. This can become extremely dangerous because the virus might emerge many months after an epidemic had ended, triggering another outbreak. Further research is needed to confirm these findings.

## **Clinical signs and symptoms**

- Starts abruptly with fever, severe headache, malaise, muscle pain, nausea, vomiting and diarrhoea, progressing to severe watery diarrhoea, abdominal pain and cramping, nausea and vomiting.
- Sometimes followed by a rash and/or bleeding under the skin and from the nose, vagina and/or gums, blood with vomitus and in the stools.
- In severe cases patients may have confusion, irritability and aggression.

## **Other diseases with similar clinical signs and symptoms**

Other haemorrhagic fevers (Ebola fever, Rift Valley fever, Lassa fever, Crimean-Congo fever, dengue fever, yellow fever), malaria, typhoid fever, measles, meningitis.

## Diagnosis

- Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing.
- Polymerase chain reaction (PCR).
- IgM-capture ELISA can be used to confirm a case of MVD within a few days of symptom onset.

## Vaccine or treatment

***Please refer to the appropriate local or international guidelines for clinical management. All clinical management including the administration of any treatment should be conducted by health professionals.***

- Prompt isolation of probable and confirmed cases is required.
- Cases require intensive supportive care, as patients are frequently in need of intravenous fluids or oral rehydration with solutions containing electrolytes.
- No specific treatment or vaccine is yet available for MVD.

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## Immunity

There are two types of immunity:

- **Active immunity** results when exposure to an agent triggers the immune system to produce antibodies to that disease.
- **Passive immunity** is provided when a person is given antibodies to a disease rather than producing them through his or her own immune system.

No information available.

## Which interventions are most effective for prevention and control?

*The following is a list of activities considered for Red Cross Red Crescent volunteers to take part in. It is not an exhaustive list of all prevention and control activities for the specific disease.*

- Communicate risks about the disease or epidemic, not only to share information on prevention and mitigation measures, but also to encourage informed decision-making, positive behaviour change and maintenance of trust in the Red Cross Red Crescent response. This includes the identification of rumours and misinformation around disease—frequent during health emergencies—to manage them appropriately.

Volunteers should use the most context-appropriate communication techniques (ranging from social media to face-to-face interactions).

- Community education and engagement activities to encourage the adoption of protective behaviours:
  - Avoid physical contact with patients and people who may have Marburg virus disease.
  - Quarantine or daily follow-up for close contacts.
  - Social distancing in communities.
  - Frequent handwashing in communities.
  - Post-recovery condom use for male survivors.
- Isolation of confirmed patients in treatment units. Any suspect case should not be managed at home but should be transferred to a health facility immediately. During the transfer, health workers should wear personal protective equipment.
- Use of personal protective equipment by healthcare workers caring for patients and by those conducting safe and dignified burials.
- Social mobilization, risk communication, community engagement and community-based health promotion activities to encourage adoption of preventive measures. The population should be well informed about the nature of the disease, signs and symptoms, high-risk activities, and where to seek help to avoid further transmission and community stigmatization, and to encourage positive health seeking behaviours (early presentation at treatment centres).
- Contact tracing and follow-up.
- Safe and dignified burials and decontamination of homes and health facilities where positive cases have spent time while contagious.
- Wildlife to human transmission can be reduced by handling wildlife with appropriate clothing and cooking animal products thoroughly before consumption (eating raw meat should be avoided).
- Activities to improve infection prevention and control practices in local health facilities and by traditional health practitioners, including but not limited to patient screening, waste management, hand hygiene and IPC clinical training
- Community-based surveillance
- Mental health and psychosocial support for patients, survivors, families and responders

### **Which interventions have NO evidence and are therefore NOT recommended?**

- Spraying of humans and the environment with chlorine is a practice implemented in haemorrhagic fever epidemics such as past Ebola epidemics, but for which there is no evidence as a recognized outbreak control measure. In fact, it is documented that in the West Africa Ebola virus disease outbreak deliberate exposure of humans to chlorine resulted in detrimental health effects, such as skin, respiratory and eye conditions. Other negative effects may be to create a false sense of security among those sprayed; in some cultures, it may create fear and subsequent resistance not only to spraying but also to other necessary outbreak response activities.

## **Epidemic characteristics and RCRC indicators and targets**

*The first table below includes data that should be gathered from health authorities and relevant non-governmental actors to understand the progress and characteristics of the epidemic in the specific country and area of intervention. The second table includes a list of suggested indicators that can be used for monitoring and evaluating Red Cross Red Crescent activities; wording of indicators may be adapted to specific contexts. Target values for a specific indicator*

can vary widely from one context to another and therefore managers should define them based on the specific population, area of intervention and programmatic capacity. Exceptionally, some indicators in this website may include target values when these are globally agreed as a standard; e.g. 80 per cent of individuals who slept under an insecticide-treated net (ITN) the previous night—the normative World Health Organization benchmark for universal coverage with ITNs.

### Epidemic characteristics and progression

Number of new health areas affected

Number of confirmed and probable Marburg cases

Case fatality rate

### Red Cross Red Crescent activities

Please refer to [this PDF](#) document for a set of suggested key performance indicators (KPIs) for response operations to haemorrhagic fever diseases (Ebola Virus Disease (EVD) and Marburg Virus Disease (MVD)). Indicators should be selected depending on: the pillar that is supported in a given outbreak response; specific-context needs; and available capacity to conduct the corresponding monitoring activities. The document covers: safe and dignified burials, mental health and psychosocial support, community engagement and accountability, infection prevention and control and contact tracing activities.

### See also:

- For Community Engagement and Accountability (CEA) indicators for activities accompanying ECV actions, please refer to: IFRC *CEA toolkit (Tool 7.1: Template CEA logframe, activities and indicators)*. Available at: <https://www.ifrc.org/document/cea-toolkit>
- IFRC (2020) *Safe and Dignified Burial: An Implementation Guide for Field Managers*. Available at: <https://www.ifrc.org/document/safe-and-dignified-burial-implementation-guide-field-managers>

## Impact on other sectors

| Sector               | Link to the disease   |
|----------------------|---|
| <b>WASH</b>          | As the virus is spread through direct contact with infected body fluids, safe handling of fluids and correct hygiene is needed to decrease transmission rates.  |
| <b>Food security</b> | Avoiding handling or eating bush meat is critical to avoid any potential infection that could spread from animals like Marburg virus. Food security for families of people in isolation, survivors of MVD and families of the deceased may require support. |

| Sector   | Link to the disease   |
|--|---|
| <b>Nutrition</b>   | Malnutrition increases the risk of severe illness and death.  |
| <b>Shelter and settlements (including household items)</b> | <p>Functional sanitation facilities like handwashing possibilities are important to decrease transmission risk.</p> <p>The indispensable contact tracing is a particular challenge in crowded settings. Isolation of suspect and confirmed cases requires stand-alone facilities or support to existing health facilities to create safe isolation spaces that are dignified for MVD patients and safe for other nearby patients.</p>   |
| <b>Psychosocial support and mental health</b>              | <p>Marburg virus is a poorly understood disease with no specific treatments available, which strongly affects the mental health of patients, relatives and concerned healthcare and response workers. Psychological reactions may include fear of social stigma, anxiety, depression and worry about the outcome, post-traumatic stress disorder (PTSD), among others.</p> <p>Isolation, contact tracing and social distancing in communities are highly stressful situations for concerned communities and psychosocial support may be needed for people with MVD-related experiences.</p>   |
| <b>Education</b>   | <p>When schools do not have clean running water and handwashing possibilities, these can add transmission risks in places where there are outbreaks ongoing. Children may then be at risk of getting the disease if attending classes, or at risk of losing out on education if staying at home. Schools and education centres play a crucial part in educating children and adults about transmission risks and preventive measures. Schools and other facilities dedicated to children and youth can offer an important space for them to engage, mobilize and raise awareness around health education issues. With support, trust and appropriate capacity-building, young people can be effective advocates for the adoption of preventive measures during an epidemic and are those best placed to mobilize their peers.</p> |
| <b>Livelihoods</b>   | <p>MVD leads to reduction in productivity as people may not be able to work due to disease, recovery or isolation. Close contacts may be quarantined or stigmatized. This can lead to a loss of income due to the reduction in work activity and to the diversion of resources to seek medical treatment.</p> <p>As MVD is a stigmatized disease, some people choose not to use businesses run by recovered patients, like restaurants and shops, because of an unfounded fear of getting the disease through casual contact with the survivor. As a result, many survivors lose their livelihoods.</p>   |

## Resources:

- Kuthyar, S., Anthony, C. L., Fashina, T., Yeh, S., & Shantha, J. G. (2021). World Health Organization High Priority Pathogens: Ophthalmic Disease Findings and Vision Health Perspectives. *Pathogens (Basel, Switzerland)*, 10(4), 442. <https://doi.org/10.3390/pathogens10040442>
- WHO (2021) *Marburg virus disease*. Fact Sheets. Available at: <https://www.who.int/news-room/fact-sheets/detail/marburg-virus-disease>