World Health Organization

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Marburg virus disease

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Key facts

- **Marburg virus disease (MVD), formerly known as Marburg haemorrhagic fever, is a severe, often fatal illness in humans.**
- **The average MVD case fatality rate is around 50%. Case fatality rates have varied from 24% to 88% in past outbreaks.**
- **Early supportive care with rehydration, and symptomatic treatment improves survival.**
- **There are currently no approved vaccines or antiviral treatments for MVD, but a range of vaccines and drug therapies are under development.**
- ***Rousettus aegyptiacus*, a fruit bat of the *Pteropodidae* family, is considered the natural host of Marburg virus. The Marburg virus is transmitted to people from fruit bats and spreads among humans through human-to-human transmission.**
- **Community engagement is key to successfully controlling outbreaks.**

Overview

Marburg virus (MARV) and Ravn virus (RAVV) of the species *Orthomarburgvirus marburgense* are the causative agents of Marburg virus disease (MVD). The disease has a case fatality ratio of up to 88%, but it can be much lower with good and early patient care.

Both viruses are part of the *Filoviridae* family (filovirus) to which *Orthoebolavirus* genus belongs. Though caused by different viruses, Ebola and Marburg diseases are clinically similar. Both diseases are rare but have the capacity to cause outbreaks with high fatality rates.

MVD was initially detected in 1967 after two simultaneous outbreaks in Marburg and Frankfurt in Germany, and in Belgrade, Serbia. These outbreaks were associated with laboratory work using African green monkeys (*Cercopithecus aethiops*) imported from Uganda. Subsequently, outbreaks and sporadic cases have been reported in Angola, the Democratic Republic of the Congo, Equatorial Guinea, Ghana, Guinea, Kenya, South Africa (in a person with recent travel history to Zimbabwe), Tanzania and Uganda. In 2008, two independent cases were reported in travellers who had visited a cave inhabited by *Rousettus aegyptiacus* bat colonies in Uganda. In September 2024, Rwanda reported the country's first outbreak and Tanzania declared another outbreak in January 2025.

Transmission

Initially, human MVD infection results from prolonged exposure to mines or caves inhabited by Rousettus fruit bat colonies.

Once introduced in the human population, Marburg virus can spread through human-to-human transmission via direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids.

Healthcare workers have frequently been infected while treating patients with MVD. This has occurred through close contact with patients when infection control precautions are not strictly practiced. Transmission via contaminated injection equipment or through needle-stick injuries is associated with more severe disease, rapid deterioration, and possibly a higher fatality rate.

Burial ceremonies that involve direct contact with the body of the deceased can also contribute to the transmission of Marburg virus.

People cannot transmit the disease before they have symptoms and remain infectious as long as their blood contains the virus.

Symptoms of Marburg virus disease

The incubation period (interval from infection to onset of symptoms) varies from 2 to 21 days.

MVD begins abruptly, with high fever, severe headache and severe malaise. Muscle aches and pains are a common feature. Severe watery diarrhoea, abdominal pain and cramping, nausea and vomiting can begin on the third day. Non-itchy rash have been reported in patients between 2 and 7 days after onset of symptoms.

From day 5 of the disease, patients may develop haemorrhagic manifestations, including fresh blood in vomitus and faeces, and bleeding from the nose, gums and vagina. Bleeding at venepuncture sites (where intravenous access is obtained to give fluids or obtain blood samples) can also be observed. Involvement of the central nervous system can result in confusion, irritability and aggression. Orchitis (inflammation of one or both testicles) has been reported occasionally in the late phase of disease.

In fatal cases, death occurs most often between 8 and 9 days after symptom onset, usually preceded by severe blood loss and shock.

Diagnosis

It can be difficult to clinically distinguish MVD from other infectious diseases such as malaria, typhoid fever, shigellosis, meningitis and other viral haemorrhagic fevers. Confirmation that symptoms are caused by Marburg virus infection are made using the following diagnostic methods:

- **antibody-capture enzyme-linked immunosorbent assay (ELISA)**
- **antigen-capture detection tests**
- **reverse transcriptase polymerase chain reaction (RT-PCR) assay**
- **virus isolation by cell culture in maximum containment laboratories.**

Samples collected from patients are an extreme biohazard risk; laboratory testing on non-inactivated samples should be conducted under maximum biological containment conditions. All non-inactivated biological specimens should be packaged using the triple packaging system when transported nationally and internationally.

Treatment and vaccines

Early intensive supportive care including rehydration and treatment of specific symptoms, can improve survival.

Currently there are no vaccines or antiviral treatments approved for MVD.–

There are candidate monoclonal antibodies (mAbs) and antivirals, along with candidate vaccines that can be evaluated in clinical trials.

Marburg virus in animals

Rousettus aegyptiacus bats are considered natural hosts for Marburg virus. There is no apparent disease in these fruit bats. As a result, the geographic distribution of Marburg virus may overlap with the range of *Rousettus* bats.

African green monkeys (*Cercopithecus aethiops*) imported from Uganda were the source of infection for humans during the first MVD outbreak.

Experimental inoculations in pigs with different *Orthoebolavirus* species indicated that pigs are susceptible to filovirus infection and shed the virus. Therefore, pigs should be considered as a potential amplifier host during MVD outbreaks. Precautionary measures are needed in pig farms in Africa to avoid pigs becoming infected through contact with fruit bats.

Prevention and control

Community engagement is key to successfully controlling any outbreaks. Outbreak control relies on using a range of interventions, such as case management, surveillance and contact tracing, good laboratory service, infection prevention and control in health facilities, safe and dignified burials and social mobilization.

Raising awareness of risk factors for MVD and protective measures that individuals can take is an effective way to reduce human transmission.

Risk reduction messaging should focus on several factors:

- **Reducing the risk of bat-to-human transmission arising from prolonged exposure to mines or caves inhabited by fruit bat colonies. People with visiting or working in in mines or caves inhabited by fruit bat colonies, people should wear gloves and other appropriate protective clothing (including masks). During outbreaks all animal products (blood and meat) should be thoroughly cooked before consumption.**
- **Reducing the risk of human-to-human transmission in the community arising from direct or close contact with infected patients, particularly with their body fluids. Close physical contact with MVD patients should be avoided. Patients suspected or confirmed for MVD should be isolated in a designated treatment centre for early care and to avoid transmission at home.**
- **Communities affected by MVD should make efforts to ensure that the population is well informed, both about the nature of the disease itself and about necessary outbreak containment measures.**
- **Outbreak containment measures include safe and dignified burial of the deceased, identifying people who may have been in contact with someone infected with MVD and monitoring their health for 21 days, separating the healthy from the sick to prevent further spread and providing care to confirmed patient and maintaining good hygiene and a clean environment need to be observed.**

Controlling infection in healthcare settings

Healthcare workers should always take standard precautions when caring for patients, regardless of their presumed diagnosis. These include basic hand hygiene, respiratory hygiene, use of personal protective equipment (to block splashes or other contact with infected materials), safe injection practices and safe and dignified burial practices.

Healthcare workers caring for patients with suspected or confirmed MVD should apply extra infection control measures to prevent contact with the patient's blood and body fluids and contaminated surfaces or materials such as clothing and bedding.

Laboratory workers are also at risk. Samples taken from humans and animals for investigation of Marburg virus infection should be handled by trained staff and processed in suitably equipped laboratories.

Care for MVD survivors

All survivors, their partners and families should be shown respect, dignity and compassion. WHO does not recommend isolation of male or female convalescent patients whose blood has been tested negative for Marburg virus. MVD survivors might suffer from both clinical and psychological sequelae. WHO encourages affected countries to consider the establishment of a survivor care programme to alleviate sequelae, support to community reintegration and offer counselling and biological testing.

Marburg virus is known to persist in immune-privileged sites in some people who have recovered. These sites include the testicles and the inside of the eye. Extrapolating from data on other filoviruses, the virus may persist in the placenta, amniotic fluid and foetus of women infected while pregnant and in breast milk of women infected while breastfeeding. Relapse-symptomatic illness in the absence of re-infection in someone who has recovered from MVD is a rare event but has been documented. Reasons for this phenomenon are not yet fully understood.

Marburg virus transmission via infected semen has been documented up to seven weeks after clinical recovery. To mitigate the risk of potential transmission via exposure to infected semen, a semen testing programme should be implemented to:

- **offer counselling to male MVD survivors and their sexual partners, as needed, to inform them on potential risk and support them adhering to safer sex practices (including condom provision and good hand and personal hygiene); and**
- **offer monthly semen testing until obtention of two consecutive negative test results.**

After obtention of two consecutive negative test results, MVD survivors can safely resume normal sexual practices with minimized risk of Marburg virus transmission. In the absence of semen testing programme, male survivors should follow safer sex practices for 12 months.

WHO response

WHO aims to prevent MVD outbreaks by maintaining surveillance for MVD disease and supporting at-risk countries to develop preparedness plans. The following document provides overall guidance for control of Ebola and Marburg disease outbreaks:

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

When an outbreak is detected WHO responds by supporting surveillance, community engagement, case management, laboratory services, infection prevention and control, logistical support and training and assistance with safe burial practices.

Table: Chronology of major Marburg virus disease outbreaks

Year	Country	Cases	Deaths	Case fatality rate
2024	Rwanda	66	15	23%
2023	Tanzania	9	6	67%
2023	Equatorial Guinea	40	35	88%
2022	Ghana	3	2	67%
2021	Guinea	1	1	100%
2017	Uganda	3	3	100%
2014	Uganda	1	1	100%
2012	Uganda	15	4	27%
2008	Netherland (ex-Uganda)	1	1	100%
2008	United States of America (ex-Uganda)	1	0	0%
2007	Uganda	4	2	50%
2005	Angola	374	329	88%
1998 to 2000	Democratic Republic of the Congo	154	128	83%
1987	Kenya	1	1	100%
1980	Kenya	2	1	50%
1975	South Africa	3	1	33%
1967	Yugoslavia	2	0	0%
1967	Germany	29	7	24%