



PHOTO: WHO/UGANDA

The burial team burning the bedding and clothes of one of the confirmed MVD cases in Kween district, eastern Uganda.

## INTERNATIONAL HEALTH EMERGENCY RESPONSE PLAN

### MARBURG VIRUS DISEASE

#### Overview

On 17 October 2017, the Ugandan Ministry of Health notified WHO of a confirmed outbreak of Marburg virus disease (MVD) in Kween district, eastern Uganda. The outbreak was officially declared by the Ministry of Health on 19 October 2017.

As of 7 November, four cases of MVD have been reported – two confirmed (dead), one probable (dead) and one suspected. Other patients, previously reported as suspected cases, have since tested negative for the virus.



## Current situation



**25 September 2017**

A male patient, approximately 35, dies of probable Marburg virus disease



**11 October 2017**

The sister of the probable Marburg virus patient, 50, dies of the disease (case confirmed)



**26 October 2017**

The brother of the probable Marburg virus patient, 39, dies of the disease (case confirmed)

The first reported probable case was an approximately 35-year-old male who worked as a game hunter and lived near a cave populated by Rousettus bats. On 20 September, he was admitted to Kapraron Health Center IV with high fever, vomiting and diarrhoea, which did not respond to antimalarial treatment. As his condition deteriorated, he was transferred to Kapchorwa Hospital on 25 September 2017, where he died the same day. No samples were collected. He was given a traditional burial on 27 September, which was attended by an estimated 200 people.

The man's sister, 50, had nursed him and participated in the burial rituals. She subsequently became ill and was admitted to Kapraron Health Center IV on 5 October 2017 with fever and bleeding. On 10 October, she was transferred to Kapchorwa Hospital, where she died on the evening of 11 October. She was also given a traditional burial, on 13 October. Posthumous samples were collected on 11 October and sent to the Uganda Virus Research Institute (UVRI). On 17 October, Marburg virus infection was confirmed at UVRI by RT-PCR diagnostic test, and the Ministry of Health was immediately notified.

The third case was the brother of the first two cases. He helped transport his sister to hospital and participated in the burial rituals. He subsequently became symptomatic on 18 October. The man initially refused to be admitted, and he, along with several family members, was treated by two traditional healers, one in Kween district, Uganda, and another near Kitale town in Trans Nzoia county, Kenya. On 25 October, he was admitted to Kween Treatment Centre, and died there, on 26 October. That same day he was confirmed to have MVD. A safe and dignified burial team encountered some resistance from the community during his burial.

The current outbreak remains localized in the two districts of Kapchorwa and Kween. The affected districts are about 300 kilometres northeast of Kampala, on the northern slopes of Mount Elgon National Park, a rural, mountainous area bordering Kenya. The caves in Mount Elgon are a major tourist attraction, and shelter large colonies of Rousettus cave-dwelling fruit bats, which are known to transmit the Marburg virus. The potential transmission of MVD between the colonies and to humans, as well as the cross-border movement of people between the affected district and Kenya, increases the risk of cross-border spread.



DATE	EVENT
20 September 2017	Index case, an approximately 35-year-old male, is admitted to Kaproron Health Center IV, and later transferred to Kapchorwa Hospital
25 September 2017	Index case dies at Kapchorwa Hospital
3 October 2017	Second case, a 50-year-old female (sister of the index case) is admitted to Kaproron Health Centre IV and later transferred to Kapchorwa Hospital
11 October 2017	Second case dies at Kapchorwa Hospital
13 October 2017	Second case buried at a traditional funeral
17 October 2017	Analysis at UVRI laboratory confirms Marburg virus infection in the second case (via posthumous sample). Uganda Ministry of Health informed.
18 October 2017	Third case, a 39-year-old male (the brother of the two previous cases), becomes symptomatic and refuses hospital admission. Instead, he travels through Kween and Bukwo districts in Uganda, as well as Trans Nzoia and West Pokot counties in Kenya. President of Uganda is notified and a National Taskforce activated.
19 October 2017	National rapid response team is dispatched. WHO carries out risk assessment and activates the Incident Management System.
20 October 2017	WHO team arrives in the field.
25 October 2017	Third case is admitted to Kween Marburg treatment centre and tests positive for MVD
26 October 2017	Third case dies
27 October 2017	Safe and dignified burial for the third case
29 October 2017	Kenya Ministry of Health and WHO are notified of a possible close contact of the third case in Trans Nzoia county, Kenya
30 October 2017	Kenya National Taskforce Committee activated
31 October 2017	Blood samples drawn from possible close contact in Trans Nzoiz county test negative for MVD
7 November 2017	Emergency Response Plan completed

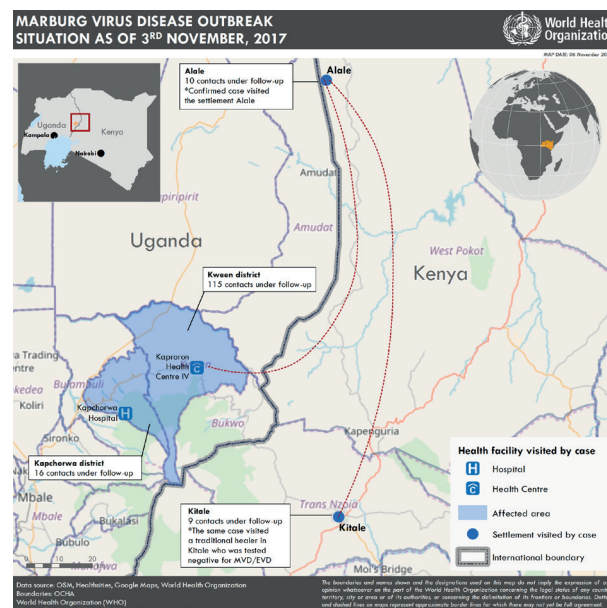


## CURRENT RESPONSE

The initial response by the Government of Uganda and partners was rapid. The Ministry of Health notified WHO on 18 October, and the first national response team was deployed within 24 hours. Although Ugandan health authorities acted rapidly, and outbreak control measures continue to be swiftly implemented, the initial focus of the outbreak is in a remote, mountainous part of the country. There is only basic infrastructure, further hampered by the rainy season. There are many potential contacts in extended families and at healthcare facilities. Awareness of MVD is limited. Some existing traditional beliefs and practices – including burials – have made the response challenging. In addition, hospitalized cases were initially handled in general wards without strict infection prevention and control measures, and some suspected cases refused to be hospitalized.

The Government of Uganda has set up an Incident Management System (IMS) organized across seven nationally determined operational pillars:

1. Coordination
2. Epidemiology, surveillance and laboratory
3. Case management and infection prevention and control (including safe and dignified burials)
4. Social mobilization, risk communications and community engagement
5. Psychosocial support
6. Environment and ecology
7. Logistics (including supplies)





## HISTORICAL CONTEXT

Marburg virus disease spreads among humans by 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 by these fluids. MVD causes severe viral haemorrhagic fever in humans and is often fatal.

Uganda has managed recurring Ebola and Marburg virus disease outbreaks, predominantly in western Uganda. Since it is transmitted to people from fruit bats, Marburg cases have historically been reported among miners and travellers who visited caves inhabited by bat colonies. MVD outbreaks have been documented during:

- 2007 – Four cases, including two deaths in Ibanda district, western Uganda
- 2008 – Two unrelated cases in travellers returning to the Netherlands (one death) and USA (zero deaths) respectively, after visiting caves in western Uganda
- 2012 – 15 cases, including four deaths in Ibanda and Kabale districts, western Uganda
- 2014 – One case, including one death in a healthcare professional from Mpigi district, central Uganda



## RISK OF SPREADING

The combination of a highly mobile population, the possibility of primary transmission from infected vectors, inadequate infection prevention and control measures, and traditional practices that can amplify transmission vectors means there is a continued risk of MVD spreading within Uganda and across the border to Kenya. Any delays in the availability of resources for the response and preparedness activities will elevate the risk of spread outside the currently affected districts.

## OBJECTIVES

The overall goal is to end the outbreak of MVD and reduce mortality and morbidity. Working closely with national partners and the Global Outbreak Alert and Response Network (GOARN), WHO is supporting the ministries of health to: a) stop the spread of the virus; b) care for those infected; and c) provide coordination and technical and operational response.



## RESPONSE OBJECTIVES AND TARGETS

- Full case investigation of all verified alerts within 24 hours
- All contacts of confirmed, probable and suspected cases followed up at least once every 24 hours for 21 days
- Infection prevention and control protocols followed for all suspected and confirmed cases
- Laboratory results available for all suspected and probable cases within 24 hours
- Case fatality ratio lower than 50% for all confirmed cases admitted to Marburg treatment centres (MTC)
- Safe and dignified burial for all patients who die of suspected and confirmed MVD
- No stock-outs of essential supplies or personal protective equipment (PPE)
- External situation report describing the epidemiological situation and response operations published weekly
- Coordination meeting of Marburg response pillars at district emergency operations centres (EOC) at least three times per week

## RESPONSE STRATEGY

### A: STOPPING THE SPREAD

#### 1. SURVEILLANCE AND LABORATORY SUPPORT FOR CASE INVESTIGATION, CONTACT TRACING AND FOLLOW-UP

Rapid detection and isolation of new cases key to stopping the current outbreak. It requires teams of epidemiologists and contact tracers to be in the field, supported by a laboratory service able to provide rapid, safe and accurate testing of samples. Daily engagement with contacts complements social mobilization, providing psychosocial support and making admission of symptomatic patients for care more acceptable. It also increases the availability of the information needed to guide the response. Putting such teams and services in place will:

- Strengthen surveillance, information management and case investigation in the affected and surrounding districts
- Strengthen contact tracing capacity and follow-up in the affected and surrounding areas



- Improve sample transportation for rapid and safe specimen collection and transport from peripheral areas to national laboratories
- Establish as-needed mobile field laboratory/ies in the affected districts

## 2. COMMUNITY ENGAGEMENT AND SOCIAL MOBILIZATION

Experience has shown that closely involving the affected communities is key in quickly preventing further transmission of MVD. Listening to and understanding the concerns of communities and individuals, and providing them with appropriate and well-adapted information maximizes the effectiveness of all aspects of the response. Regular engagement and exchanges with communities will increase the acceptability of early isolation to prevent transmission and uncover additional information to inform the response. This will allow partners to:

- Expand community engagement teams and social mobilization teams, building on existing capacities to promote sustainability
- Consult and develop tailored approaches with thought leaders – community leaders, religious leaders, teachers, traditional healers, traditional burial practitioners and media
- Provide psychological and social support to affected families and communities in the affected areas
- Disseminate and broadcast public risk communications in the affected and surrounding communities
- Support communication initiatives related to any R&D activity (post-exposure prophylaxis, treatment, etc.)

## 3. SAFE AND DIGNIFIED BURIAL AND DECONTAMINATION

The bodies of patients who have died from MVD remain infectious, and must be handled by teams trained to ensure safe transportation and to provide a safe and dignified burial. Safe and dignified burials minimize the risk of further transmission in the community, and also help to ensure community engagement and support for the response. The burial team collaborates closely with the social mobilization team to engage with local traditional burial practitioners to create awareness and promote standard infection prevention and control practices. Support from partners will help to:



- Support safe and dignified burial teams in the affected districts
- Support household decontamination teams in the affected districts and compensation packages for affected households

## B: CARING FOR THOSE AFFECTED

### 4. CASE MANAGEMENT

All patients should have access to quality care, including symptom relief and palliative care. Responders should support the national and individual decisions to have access to investigational medicines, and should provide information about risk and harm, as well as good clinical practice and prospective data collection. In the context of caring for patients with MVD, stringent infection prevention and control precautions are essential to minimize the risk of further nosocomial transmission to others, including health workers and other patients. Activities aim to:

- Establish triage and isolation capacity in primary health facilities in the affected districts
- Evaluate transportation options and, as appropriate, safely transport suspected and confirmed cases to MTCs
- Establish an MTC and provide standard of care and, if feasible, investigational lifesaving therapeutics/ treatments in each affected district
- Monitor the trend of health service attendance (OPD, ANC, delivery, etc.) and institute appropriate action to address perceived gaps
- Support the provision of psychosocial services to affected health workers, patients with or recovering from suspected or confirmed MVD, their families and communities as needed
- Promote and support the implementation of standard precautions in health care for the management and care of all other patients at all healthcare facilities, both by healthcare workers and by traditional healers in Kween and Kapchorwa districts, as well as in Bukwo, Amudat, Nakapiripirit and Bulambuli in Uganda, and in Trans Nzoia and West Pokot counties in Kenya
- Improve infection prevention and control measures and access to WASH facilities in communities and at all health-care facilities in the affected and surrounding districts





## C: COORDINATION, TECHNICAL AND OPERATIONS SUPPORT

### 5. COORDINATION AND OPERATIONS SUPPORT

Key infrastructure, procedures, and technical and operational support mechanisms must be put in place and supported on a daily basis to enable and coordinate all aspects of the MVD response. This will ensure the following essential actions can take place:

- Set up and support the Ministry of Health's field EOCs in the affected districts
- Establish forward logistics hubs and pre-position supplies in the affected districts
- Manage the transportation fleet to ensure access and safe transportation of staff in the affected districts
- Strengthen field security and staff safety, including planning and capacity for emergency medivac measures from the affected districts
- Support cross-border coordination on alert, contact tracing and response, particularly in the bordering areas of Kenya

In Uganda and Kenya, the Ministry of Health is coordinating the response through the National Task Force and two district task forces. In Uganda, WHO and partners are supporting the Ministry's National Task Force and district task forces in Kween and Kapchorwa, as well as coordinating with national stakeholders and GOARN partners. Different partners have stepped up their support to the ministries of health in the fight against MVD. In Uganda, Médecins Sans Frontières (MSF) has deployed a case management team to Kween district. In both countries, WHO has established incident management system (IMS) teams to provide additional assistance through each of the WHO country offices, and to ensure coordination with international partners, including the deployment of technical, operational and logistics experts.



## 6. RAPID RELEASE OF EMERGENCY TREATMENT AND RESEARCH AND DEVELOPMENT

The Government of Uganda, together with WHO, MSF, the United Nations Children's Fund (UNICEF), and the International Federation of Red Cross and Red Crescent Societies (IFRC) are currently assessing whether post-exposure prophylaxis (PEP) is feasible and appropriate, and reviewing treatment options.

Favipiravir is a licensed medicine in Japan, Republic of Korea and China for treatment of influenza, which was also used during the 2014-15 Ebola outbreak in West Africa based on its efficacy in *in vitro* and *in vivo* studies. The dose used for Ebola is higher than the dose used for influenza treatment but well tolerated without severe adverse effects among human subjects. Studies in non-human primates have shown promising results against Marburg virus when used as a post-exposure intervention. As such, this drug is being considered for use as a post-exposure prophylaxis in front-line responders with high-risk exposure. In addition, two therapeutics (Favipiravir and Gilead GS-5734) are also under consideration for treatment of confirmed cases in the event the outbreak continues.

Partners stand ready to support the Government to roll out potential innovative therapeutics interventions if and when needed. WHO and partners will support the Ministry of Health to:

- Fast-track development and approval of PEP and treatment clinical study protocols, or monitoring mechanisms in case of compassionate use
- Ensure capacity to conduct a PEP and/or treatment clinical study when needed as part of a rapid response to MVD
- Ensure access and delivery of experimental medicines when adequate and possible
- Conduct ethnographic research to understand how traditional beliefs and practices contribute to the spread of MVD



## SCENARIOS

The overall emergency response will be implemented in accordance with the prevailing epidemiological situation. In order to be prepared for whatever eventuality unfolds, three scenarios have been developed that each describe possible realities.

- a. Rapid containment:** A rapid and comprehensive emergency response in the currently affected districts of Kween and Kapchorwa, as well as prevention in Bukwo, Trans Nzoia and West Pokot, combined with effective community engagement, social mobilization, surveillance and early warning mechanisms prevents the spread of MVD to surrounding areas, and the transmission chain is interrupted. The outbreak ends by the end of 2017, after three further 21-day transmission cycles or approximately two months.
- b. Escalation of the outbreak with limited rural spread:** Current MVD transmission chains are missed or there are failures in the implementation of infection prevention and control measures in the community or at health facilities. The virus spreads and infects people in surrounding districts near Mount Elgon (Bukwo, Amudat, Nakapiripirit and Bulambuli) and in Trans Nzoia and West Pokot counties across the border in Kenya. Between three to four times the number of people infected under the rapid containment scenario contract MVD (40 per month).
- c. Full-scale outbreak with urban spread:** MVD spreads outside the Mount Elgon area as a result of infected people moving along transport routes. People in nearby urban areas such as Mbale, Uganda (92 863), and Kitale, Kenya (approximately 75 000-100 000), are infected, and the virus spreads to Kampala (1 507 114). Approximately 150 people per month across a wide area are infected with MVD.

The shift from the scenario of rapid containment to escalation of the outbreak to surrounding rural areas could eventuate if any of the following occur:

- Contacts cannot be identified or followed up in time
- High-risk contacts resist follow-up
- Patients who meet the case definition resist admission to treatment centres
- Infection prevention and control measures fail at any point within the community, at health centres and treatment centres, or during burials



While such escalation can be mitigated by building community support for the response through community engagement and social mobilization, and by creating positive incentives, each of these risk factors has already occurred more than once, so the likelihood of an escalating scenario should be assessed as ‘possible’.

The shift to a full-scale outbreak with urban spread could be triggered by larger-scale breaches in any of the risk factors above, and would be made more likely if populations are unable or unwilling to adapt behaviours in accordance with risk communications. It could also result from just one symptomatic person travelling to a more densely populated urban area. These risks can be partially mitigated by ensuring excellent community engagement and that infection prevention and control measures are implemented at all risk points (e.g. from health centres to traditional healers to drivers who might transport passengers). With the current limited human and financial resources, this scenario should be assessed as ‘possible’.

**PLANNING ASSUMPTIONS FOR EACH SCENARIO**

<b>RAPID CONTAINMENT</b>	<b>RURAL ESCALATION</b>	<b>FULL-SCALE URBAN</b>
3 DISTRICTS	6 DISTRICTS	10 DISTRICTS
Kween and Kapchorwa, plus Bukwo	2 initial districts plus Bukwo and 3 neighbouring districts	Including larger municipalities, with cases across Uganda and in Kenya
10 CASES/MONTH	40 CASES/MONTH	150 CASES/MONTH
5 close contacts per case (i.e. immediate family, no large-scale events)	5 close contacts per case	10 close contacts per case (more densely populated urban areas)
4 contacts per tracer	4 contacts per tracer	4 contacts per tracer



## Annex 1 - Budget

The budget outlined below covers the anticipated emergency response to MVD for a three-month period from October to December 2017. It is based on the first, rapid containment scenario, and assumes there is a need to mount a full response across two affected districts of Uganda throughout this period plus surveillance and social mobilization in surrounding districts, including in Kenya.

The availability of resources will determine the success of the response. Regular monitoring will occur through the National Task Forces which will supervise the district/country-level response, produce regular situation reports, monitor progress and address gaps. An after-action review will document lessons and identify critical challenges to improve future responses.

	TOTAL COSTS US\$
<b>A. STOPPING THE SPREAD</b>	<b>584 405</b>
1.1 District surveillance and investigation teams x 6	59 295
1.2 Contact tracing teams x 26	78 000
1.3 Community engagement and social mobilization teams x 125	237 500
1.4 Decontamination teams x 6	57 060
1.5 Safe and dignified burial teams x 6	78 270
1.6 Laboratories x 1	14 280
1.7 Risk communication x 6	60 000
<b>B. CARING FOR THOSE AFFECTED</b>	<b>344 130</b>
2.1 Marburg treatment centres x 2	207 280
2.2 Health centres (treatment, referral, IPC) x 15	89 850
2.3 Psychosocial support x 1	47 000
<b>C. COORDINATION, TECHNICAL AND OPERATIONS SUPPORT</b>	<b>2 130 000</b>
3.1 Emergency Operations Centre – National level x 1	585 000
3.2 Emergency Operations Centre – District level (full) x 2	1 505 000
3.3 Emergency research and development x 1	40 000
<b>GRAND TOTAL</b>	<b>3 058 535</b>



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