NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES
Division of the National Health Laboratory Service

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CENTRE FOR EMERGING ZOONOTIC AND PARASITIC DISEASES

Marburg Virus Disease
Frequently Asked Questions

1. What is Marburg virus disease?

Marburg virus disease (MVD) or formerly known as Marburg haemorrhagic fever, is caused by a filovirus named Marburg virus (MARV). This virus is similar to the Ebola virus and the disease can cause hemorrhaging, fever, and other symptoms also similar to Ebola virus disease (Ebola virus disease - NICD). Marburg virus disease was first described in 1967, in the German cities of Marburg and Frankfurt and the Yugoslav capital Belgrade. This virus was discovered among laboratory workers who were exposed to tissues of infected African green monkeys (*Cercopithecus aethiops*) imported from Uganda. Outbreaks of MVD have been few and only reported from Africa (see section 3).

2. Who is at risk for Marburg virus disease and where does it occur?

Human-to-human transmission of MARV is through direct contact with blood and/or bodily fluids of infected persons. MARV does not spread in a similar way as SARS-CoV2 (causative agent of COVID-19). Therefore, healthcare workers, family members or friends in close contact with infected people, other close contacts of confirmed or suspected MVD cases, persons that attended funerals of persons that are suspected or confirmed to have MVD, are at high risk.

MVD is a zoonotic disease which means that it is harbored in nature in an animal host. Research has shown that *the Rousettus aegyptiacus* (Egyptian fruit) bats are natural hosts of the virus. These bats prefer habitation in caves and similar structures such as mines. In previous outbreaks, miners working in caves inhabited by these bats and visitors to these caves were diagnosed with MVD.

3. Where have Marburg virus disease outbreaks been reported?

Following the initial laboratory outbreaks in Germany and Yugoslavia, outbreaks in other countries have been documented (Fig.1).

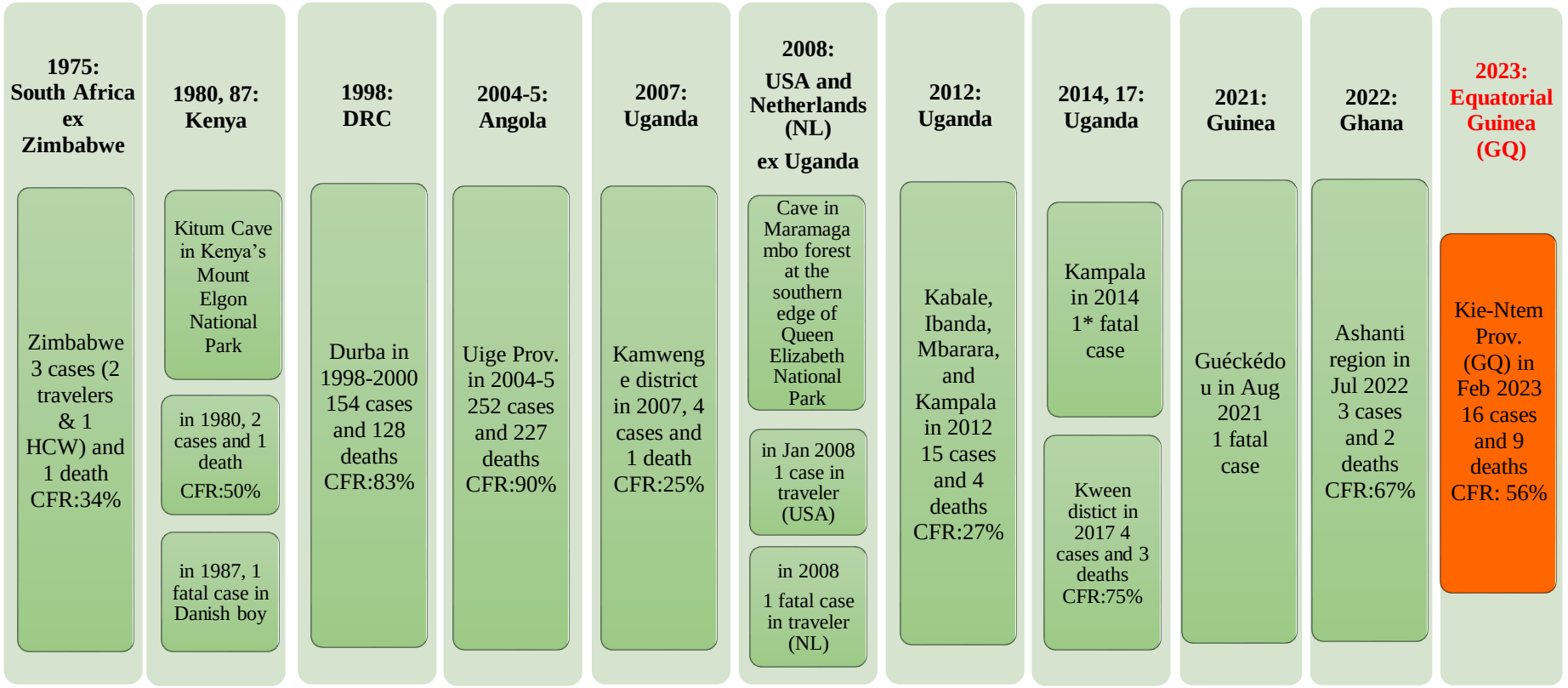

Figure 1. After initial detection, the timeline of Marburg Virus Disease (MVD) outbreak (*laboratory-confirmed case only) (Russian case of 1990 from laboratory contamination not included.)

4. What are the signs and symptoms of Marburg virus disease in humans?

The incubation period for MVD varies between two and 21 days (this is the time following exposure until the first signs and symptoms of the disease develops). Early symptoms include conjunctivitis, pharyngitis, chest/abdominal pain, arthritis, malaise, myalgia, fatigue, nausea, anorexia, oral/throat lesions, persistent diarrhea, vomiting, dehydration, dry throat, epigastric tenderness, or non-itching maculopapular rash (torso and limbs) around day five of onset. Additionally, splenomegaly, non-icteric hepatitis (no jaundice), severe/fatal cases progress to a haemorrhagic state on days 5-8 of illness, including bleeding from needle puncture sites, mouth/gums, haematemesis, melaena, epistaxis, and the following neurological symptoms: aggressive/altered behaviour, confusion, and somnolence (drowsy, tired). The average case-fatality rate of MVD during previous outbreaks has been 50%.

5. How is Marburg virus disease diagnosed?

A healthcare worker may suspect MVD in a patient presenting with a compatible clinical picture and with a history that indicates a risk for exposure. Specialized laboratory blood tests can then be performed to either confirm or exclude the diagnosis of MVD. There is no test available to detect infection while a person is in the incubation period, so MVD can only be diagnosed once signs and symptoms appear, as is the case with most viral infections. Serological testing for IgG and IgM antibodies, RT-PCR detection of the virus (RNA), and virus isolation are all examples of specific laboratory tests. Antigen detection is especially useful when a disease is still in its early stages. It is classified as a pathogen of risk group 4, and most of the specialized investigations described here are conducted in containment laboratories such as laboratories at the National Institute for Communicable Diseases. In South Africa, the virus is classified as a Category 1 Notifiable Medical Condition (NMC), in order for prompt public health responses to follow once a case has been identified.

6. How is Marburg virus disease treated?

Currently there are no registered vaccines or antiviral treatments approved for MVD. In 2020, the European Union approved the use of a recombinant vaccine (called ZAbdeno-Mvabea) for use against Ebola virus disease. This vaccine also includes a MARV antigen (a non-disease-causing part of the virus that can stimulate a protective immune response), and therefore may potentially be used to protect against MVD. This vaccine, has however to date, not been tested for

efficacy against MVD. Following the announcement of the Equatorial Guinea outbreak, the WHO convened an emergency meeting on 14 February 2023 to discuss five vaccine candidates that were effective against MVD based on animal studies, two of which had completed phase I clinical trials and doses could be produced to test in the current Equatorial Guinea outbreak. The issue is that low MVD numbers in outbreaks impede comprehensive vaccine evaluation.

Currently, patients with MVD are managed symptomatically and supportively. This will include rehydration with oral or intravenous fluids – and treatment of specific symptoms, improves survival. The average fatality rate in MVD cases is around 50%. In previous outbreaks, case fatality rates ranged from 24% to 88%, depending on virus strain and case management.

7. How are Marburg virus disease outbreaks prevented?

When MVD is suspected, the patient will be isolated to prevent further spread of the infection. Individuals that may have had contact with an MVD case will be traced and monitored to ensure that any additional cases of MVD can be rapidly detected and measures put in place to limit further spread. Contact with individuals or remains suspected of having MVD should be avoided, and patients and burials should be handled by qualified health care staff and burial teams.

Although the Egyptian Rousettus bats have been implicated as natural hosts, there are many features of the natural biology of the virus that still remains unclear. For example, the mode of transmission from infected bats to humans are not determined. It is recommended that people should avoid or spending only the required amount of time in mines or caves where fruit bats thrive, such as mine workers or tourists on cave excursions where MARV is known to occur. Culling of bats or destructions of roosts of bats are not recommended and strongly discouraged. The prevalence of MARV in Rousettus bats are thought to be limited. Bats play an important ecological role in nature including their role in pest control (eating of insects), pollination and so on.

8. Where can I find more information?

More facts about Marburg virus disease are available from:

Marburg fact sheet (in 6 UN languages): https://www.who.int/news-room/fact-sheets/detail/marburg-virus-disease (accessed on 7 September 2021)

Marburg virus disease health topic: https://www.who.int/health-topics/marburg-virus-disease (accessed on 7 September 2021)

Inquiries on medical/clinical matters in South Africa:

NICD Hotline at 0800 212 552 (for use by healthcare professionals only).

Inquiries on laboratory test results and related issues:

National Institute for Communicable Diseases, Center for Emerging Zoonotic and Parasitic Diseases, Special Viral Pathogens Lab (Tel) +27 11 386 6376 or 38, jacquelinew@nicd.ac.za and naazneenm@nicd.ac.za

The guidelines for submitting samples and requesting tests can be found on the NICD website at www.nicd.ac.za under the 'Diseases A-Z' category.