# Marburg Virus Disease

11/06/2024

## REPORT CONFIRMED OR SUSPECT CASES IMMEDIATELY

Suspected cases should be reported to the local health department where the patient resides. If patient residence is unknown, report to your own local health department. Contact information is available at: http://localhealth.nj.gov.

If the individual does not live in New Jersey, report the case to the New Jersey Department of Health at: (609) 826-5964.

In cases of immediately reportable diseases or other emergencies – if the local health department cannot be reached – the New Jersey Department of Health maintains an emergency after-hours phone number at: (609) 392-2020.

# 1 THE DISEASE AND ITS EPIDEMIOLOGY

## Etiologic Agent

Marburg virus disease (MVD) is caused by infection with a zoonotic *orthomarburgvirus,* which includes both Marburg and Ravn viruses. Marburg viruses are enveloped, single -stranded RNA viruses in the *Filoviridae* family (which also includes Ebola viruses).

## Reservoir

The reservoir host of Marburg virus is thought to be a type of bat native to Africa called the Egyptian fruit bat, or *Rousettus aegyptiacus*. Bats infected with Marburg virus do not show obvious signs of illness. Information on virus maintenance and transmission within bat populations is lacking. In addition, it is not clear how transmission from bats to humans occurs.

## Mode of Transmission

Transmission to humans has resulted from prolonged exposure to mines or caves inhabited by Rousettus bat colonies, or from exposure to infected non-human primates. MVD is then spread from person-to-person through direct contact (through broken skin or mucus membranes) with blood or body fluids (e.g., urine, saliva, sweat, feces, vomit, breast milk, semen) of a person who is sick with or has died from MVD. All bodily fluids and clinical specimens from MVD patients should be considered potentially infectious. Transmission can occur through direct contact with surfaces and materials (e.g., clothing, bedding, medical equipment, needles, syringes) contaminated with these fluids. Burial ceremonies that involve direct contact with the body of the deceased can also contribute to transmission of Marburg virus. Marburg virus transmission via infected semen has been documented up to seven weeks after clinical recovery.

Marburg virus is not known to spread via airborne transmission. However, if an infected individual coughs or sneezes, those respiratory droplets can spread the virus to a person who touches contaminated surfaces and then touches their eyes, nose, or mouth. The majority of person-to-person spread occurs through contact in household or healthcare settings where infection prevention and control measures are not adhered to.

## Incubation Period

2 to 21 days

## Clinical Description

MVD is clinically similar to other serious viral hemorrhagic fevers (VHFs) such as Ebola and causes a severe multisystem illness. The onset of MVD is usually abrupt and includes non-

specific symptoms such as fever, chills, myalgia, fatigue, odynophagia (pain when swallowing), vomiting, and diarrhea. Patients with MVD may also develop a maculopapular rash. MVD and other related VHFs may initially be confused with more common travel-associated infectious diseases (e.g., malaria, typhoid fever, dengue) or other viral illnesses. As MVD progresses, the intensity of the symptoms increases (usually around Day 5-7) and patients may develop worsening gastrointestinal symptoms, multisystem involvement and hemorrhagic complications, with hypotension, shock and organ failure occurring. The case fatality rate for MVD infections has been reported as 23-90% with most fatal cases expiring during the second week of illness. Among those who survive, recovery can be slow and marked by a variety of complications.

***Initial signs and symptoms of MVD may include:***

- Fever
- Chills
- Headache
- Myalgia
- Malaise

***Subsequent Symptoms (usually within 2-5 days):***

- Nausea/Vomiting
- Chest pain
- Sore throat
- Abdominal pain
- Diarrhea
- Maculopapular rash (may occur later as well)

***Severe illness (approximately 5-7 days onward):***

Symptoms become increasingly severe and can include hemorrhagic manifestations such as petechiae, mucosal and gastrointestinal bleeding and bleeding from venipuncture sites. Disease may progress further to shock, coma, multi-organ failure and death.

Treatment

Clinical management of MVD should focus on supportive care, which includes balancing the patient's fluids and electrolytes, maintaining oxygen status and blood pressure, replacing lost blood and clotting factors, and treatment for any complicating infections. Experimental treatments (e.g., monoclonal antibody) are under development.

Infectious Period

Marburg virus is not transmitted prior to symptom onset, but persons are considered infectious as long as the virus is detectable in blood. Virus may be detectable in an infected patient's

blood at the time of fever and symptom onset, but in some patients, it may not be reliably detectable during the first three days of illness.

Marburg virus is known to persist in immune-privileged sites in some people who have recovered from MVD. These sites include the testicles and the inside of the eye. In women who have been infected while pregnant, the virus persists in the placenta, amniotic fluid, and fetus. In women who have been infected while breastfeeding, the virus may persist in breast milk.

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. More surveillance data and research are needed on the risks of sexual transmission, and particularly on the prevalence of viable and transmissible virus in semen over time.

## Epidemiology

In 1967, two outbreaks of VHF occurred simultaneously in Marburg, Germany, and in Belgrade, Serbia (historically Yugoslavia) among laboratory workers in Europe working with tissues of African green monkeys imported from Uganda, as well as among medical personnel who cared for the laboratory workers. Nine people of the 37 cases died, with some cases spreading through household or healthcare-associated contact. Marburg virus was named after the German city where it was first characterized.


MVD appears in sporadic outbreaks throughout sub-Saharan Africa. Many past outbreaks started with male mine workers in bat-infested mines. The virus then spread within their communities through cultural practices, within families, and among healthcare staff.

It is possible that isolated cases occur as well but go unrecognized. Cases of MVD in people have occurred outside Africa but are infrequent. Refer to the CDC History of Marburg Disease Outbreaks for a chronological list of prior outbreaks.

# 2 CASE DEFINITION

**NJDOH is using the 2024 VHF case definition approved by CSTE with information pertinent to Marburg virus.**

Case definitions enable public health to classify and count cases consistently across reporting jurisdictions and should not be used by healthcare providers to determine how to meet an individual patient's health needs.

Clinical Criteria:

Acute onset of one or more of the following clinical findings*:

- Subjective OR measured fever ≥38°C/100.4°F
- Headache
- Muscle and/or joint pain
- Weakness and fatigue
- Cough/difficulty breathing
- Pharyngitis
- Loss of appetite
- Chest pain
- Skin rash
- Red eyes
- Abdominal pain
- Vomiting
- Diarrhea
- Intractable hiccups
- Encephalitis or other neurological manifestations
- Unexplained bleeding or bruising not related to injury or menstruation

* This list of signs and symptoms is not exhaustive and may be nonspecific.

Laboratory Criteria

Any one of the following:

- Detection of Marburg-specific* nucleic acid in blood or other body fluids, blood products, or tissues using a diagnostic molecular test (e.g., NAAT, genome sequencing);
- Detection of Marburg-specific* IgM by ELISA;
- Detection of a four-fold rise in Marburg-specific* IgG titer from an acute sample to a convalescent sample;
- Marburg viral isolation in cell culture for blood, blood products (e.g., serum), or tissues

Epidemiological Linkage Criteria:

In the past 21 days:

- Contact with a person who had known or suspected MVD or any object contaminated by their body fluids without use of or confidence in proper adherence to, or experiences a breach in, recommended infection prevention and control (IPC) precautions, including personal protective equipment (PPE) use;
- Handled specimens that contain or might contain replication competent Marburg virus without use of or confidence in proper adherence to, or experiences a breach in, recommended IPC precautions, including PPE use;
- Handled bats, rodents, or primates that are or may be infected with Marburg virus without use of or confidence in proper adherence to, or experiences a breach in, recommended IPC precautions, including PPE use;
- Exposure to body fluids (i.e., urine, saliva, sweat, vomit, breast milk, amniotic fluid, semen, aqueous humor, or cerebral spinal fluid) from a person who clinically recovered from MVD without use of or confidence in proper adherence to, or experiences a breach in, recommended IPC precautions, including PPE use;
- Residence in or travel to a Marburg endemic area or area with active transmission AND an experience with any of the following scenarios for potentially unrecognized Marburg exposures:
    - Contact with someone who was sick or died;
    - Visiting or work in a healthcare facility;
    - Breach in PPE and/or IPC precautions;
    - Visiting a traditional healer;
    - Attend or participate in funerals or burials;
    - Contact with animals;
    - Consumption of or handling raw meat;
    - Spent time in a mine or cave;
    - Any other scenario for previously unrecognized Marburg exposure as determined in consultation with subject matter experts at CDC.

Vital Records Evidence

A person whose death certificate lists Marburg virus as an underlying cause of death or a significant condition contributing to death.

Case Classification

- CONFIRMED: Case meets laboratory criteria.

- POSSIBLE: Case meets clinical criteria AND epidemiologic linkage criteria OR meets vital records evidence.

# 3 LABORATORY TESTING

Diagnostic Testing

RT-PCR is the standard diagnostic method because of its ability to detect low levels of Marburg virus RNA. Within a few days after symptom onset, MVD can be diagnosed by antigen-capture enzyme-linked immunosorbent assay (ELISA) testing, immunoglobulin M (IgM) ELISA, RT-PCR, or virus isolation. Later in the course of disease or during recovery, serologic testing of IgM and immunoglobulin G (IgG) antibodies may be performed because people who recover from infection may develop antibodies that can last for up to two years after infection. Immunohistochemistry, RT-PCR, and viral isolation can be performed on post-mortem tissue specimens.

A negative RT-PCR test result for Marburg virus from a blood specimen collected less than 72 hours after symptom onset does not necessarily rule out Marburg virus infection because viral levels may not be high enough early in the course of illness. If the patient is still symptomatic after 72 hours, repeat testing is recommended.

Marburg Virus Testing in New Jersey

Healthcare providers must immediately report all suspected cases of MVD to the local health department where the patient resides. Testing for Marburg virus by Real-Time RT-PCR can be performed at the New Jersey Department of Health Public Health and Environmental Laboratories (PHEL) upon approval from NJDOH Communicable Disease Service. Positive Marburg virus RT-PCR results are considered presumptive until confirmed by CDC.

**Testing is only recommended for persons who meet both clinical and epidemiological risk criteria for MVD**, as determined by NJDOH/CDS. If testing for Marburg virus is indicated, PHEL will provide instructions on specimen collection and transport.

***Laboratory Resources:***

- New Jersey Public Health and Environmental Laboratories Technical Guidance
- CDC Laboratory Testing for Patients with a Suspected VHF or High-Consequence Disease

# 4 PURPOSE OF SURVEILLANCE AND REPORTING

- To provide information on the temporal, geographic, and demographic occurrence of MVD to identify and describe risk factors for infection and facilitate the prevention and control.
- To ensure rapid detection of pathogens on the Tier I Select Agent and CDC Category A bioterrorism agent list.
- To ensure rapid intervention and an informed public health response early in the course of illness to minimize morbidity and to prevent human-to-human spread of infection.

# 5 CASE INVESTIGATION

If there is a clinical suspicion of MVD, the patient should immediately be isolated (refer to Section 7 Infection Control) and a medical evaluation and exposure risk assessment should be completed as quickly as possible to ensure patient care is not compromised.

Investigation Guidelines

After being notified of a patient under suspicion for MVD, the LHD should collect clinical and exposure risk information. The Marburg Investigation Summary can be used to collect initial information via telephone from the healthcare provider. The Marburg Investigation Summary can be found on the NJDOH Marburg website.

Once initial information is obtained, the LHD should immediately notify CDS by telephone and submit the completed Marburg Investigation Summary along with all test results via encrypted email to CDSEVD.SME@doh.nj.gov. If email is unavailable, the information should be faxed to 609-826-4874.

CDS will review the information in consultation with the LHD and/or healthcare provider and if the patient meets criteria for a "Person Under Investigation – PUI", a Marburg virus case should be created in the New Jersey Communicable Disease Reporting and Surveillance System (CDRSS).

Person Under Investigation (PUI) Criteria

A person who has both MVD-compatible signs or symptoms AND epidemiologic risk factors would meet the criteria of a PUI, defined as:

1. Elevated body temperature or subjective fever or symptoms as outlined in the Marburg Investigation Summary; **AND**

2. An epidemiologic risk factor within 21 days before the onset of symptoms.

Epidemiologic Risk Factors/Exposure Risks

Exposure risks are outlined in the Marburg Investigation Summary but include situations where the patient may have had direct contact with the blood or body fluids or contaminated objects of a person with suspected or confirmed MVD, or where they may have been exposed to the Marburg virus from interactions with animals that may have been infected with or carry Marburg virus. Examples include:

- Contact with blood or body fluids (urine, saliva, sweat, feces, sputum, vomit, breast milk, tears, semen) or contaminated objects (such as clothes, bedding, needles, and medical equipment) of someone ill with suspected or confirmed MVD, or who died of MVD without wearing appropriate PPE
- Participation in funeral rituals, including preparation of bodies for burial or touching a corpse at a traditional burial ceremony without wearing appropriate PPE
- Working in a laboratory where MVD human specimens are handled without wearing appropriate PPE
- Handling wild animals or carcasses that may be infected with Marburg virus (e.g., non-human primates, fruit bats, duikers) or spending time in a cave or mine where infected fruit bats may be living.
- Contact with semen from a man who has recovered from MVD (e.g., through oral, vaginal, or anal sex)
- Experiencing a breach in infection prevention and control precautions that result in the potential for percutaneous, mucous membrane, or skin contact with the blood or body fluids of a patient with MVD while carrying out any of the above activities

Key CDRSS Fields Specific for Marburg

| CDRSS Screen | Required Information |
|---|---|
| **Patient Personal Information** | • Ensure name, sex, date of birth, race, ethnicity and citizenship (if available) are entered.<br>• If not a US resident, select NON-US RESIDENT under Residency |
| **Addresses** | • Enter address, phone number and email address |
| **Clinical Status** | • Enter illness onset date, date of initial healthcare evaluation, hospitalization (as part of this investigation), pre-existing conditions and mortality information. |
| **Industry and Occupation** | • Indicate the patient's occupation and industry/work setting |
| **Laboratory and Diagnostic Test Information** | • Enter diagnostic test results (other than results listed in the risk assessment section) in the comments section |

| CDRSS Screen | Required Information |
|---|---|
| **Medical Facility and Provider Information** | • For admitted/hospitalized patients, ensure patient status is marked as INPATIENT and admission and discharge dates are entered. |
| **Risk Assessment (Contacts/ travelers only)** | • Complete risk assessment within 24 hours of notification<br>• If risk assessment indicates monitoring is necessary, enter symptom status also in corresponding monitoring day in the Symptom Monitoring section |
| **Symptom Monitoring** | • Enter monitoring details as indicated by risk assessment<br>• Contact NJDOH CDS at 609-826-5964 or CDSEVD.SME@doh.nj.gov immediately if symptoms of Marburg are reported. |
| **Contact Tracing** | • Enter names of household and other contacts |
| **Risk Factors (PUIs only)** | • Describe other potential exposures and what (if any) PPE was used in the comments |
| **Signs/Symptoms (PUIs only)** | • Inquire if the patient had each sign/symptom and update the response to Yes, No or Unknown accordingly. "Not Asked" should not be left as a default response. Enter onset and resolution dates, if known. |
| **Treatment** | • Document medications received with duration/dates of treatment. |
| **Case Comments** | • Document all attempts to contact person under monitoring or PUI<br>• Indicate if the patient lives with any pets; specify the number and type of animal(s) |

# 6 HEALTHCARE RESOURCES: IDENTIFY, ISOLATE, & INFORM

Most patients presenting to a New Jersey healthcare facility do not have MVD. However, since the clinical presentation (especially early in the course of illness) is similar to other more common febrile illnesses (as well as other viral hemorrhagic fevers), it is important to **identify** patients who might have MVD (or other VHFs) by systematically assessing both symptoms and epidemiologic exposure criteria. As a matter of routine practice, healthcare facilities should obtain a travel or exposure history in triage before completing a full patient evaluation so that infection control precautions and patient placement can begin promptly if MVD or another travel-associated communicable disease is under consideration.

If clinical and epidemiological/exposure risk criteria suggest the possibility that the patient may have MVD, the patient should be **isolated** according to Infection Control guidance and the provider should IMMEDIATELY **inform** the facility's Infection Control team AND the local health

department. A directory of LHDs is available at http://localhealth.nj.gov. If the LHD cannot be reached, clinicians should call NJDOH/CDS at 609- 826-5964 during business hours and 609-392-2020 after business hours. Be prepared to provide the information contained in the Marburg Investigation Summary to public health authorities, along with relevant laboratory and other diagnostic test results.

Upon review of the clinical and epidemiologic linkage/risk factor information by public health and healthcare partners, a determination will be made if the patient meets the public health criteria as a MVD Person Under Investigation (PUI), at which point additional consultation and guidance will be provided regarding patient care, testing, transport if indicated, and infection control.

***Clinical and Epidemiological Assessment Resources:***

- CDC History of Marburg Outbreaks
- CDC Travelers' Health website
- CDC Guide for Clinicians Evaluating an Ill Person for VHF or Other High-Consequence Disease
- CDC Guidance for Laboratory Testing for Patients with a Suspected VHF or High-Consequence Disease
- CDC Guidance on Performing Routine Diagnostic Testing for Patients with Suspected VHFs or Other High-Consequence Disease

# 7 INFECTION CONTROL IN HEALTHCARE FACILITIES

CDC recommends a combination of measures to prevent transmission of Marburg virus in hospitals in addition to routine infection prevention and control practices. Healthcare personnel can be exposed to Marburg virus by touching a patient's body fluids, contaminated medical supplies and equipment, or contaminated environmental surfaces. Infection control measures for MVD are the same as for other similar VHFs such as Ebola and include patient placement, personal protective equipment (PPE), environmental infection control, use of dedicated (preferably disposable) equipment for the provision of care when possible, limiting use of sharps and needles as much as possible and handling them with extreme care, and minimizing aerosol generating procedures when able.

Patient Placement

Patients who are suspected to have MVD should be placed in a single room with a private bathroom with the door closed. If available, an airborne infection isolation room (AIIR) should be used. A log of all people who enter the room should be maintained.

Personal Protective Equipment

Healthcare personnel should follow the latest CDC guidance for PPE. It is essential that the correct PPE be used in the proper manner when caring for patients with suspected or confirmed MVD. Healthcare workers caring for such patients must have received comprehensive training and demonstrated competency in performing all relevant infection control practices and procedures including properly donning and doffing PPE and must demonstrate competency as assessed by their employer. The correct selection of PPE depends on the patient's clinical condition.

- When a patient who is **suspected** to have MVD is **clinically stable and does not have bleeding, vomiting, or diarrhea**, CDC's guidance PPE: Clinically Stable Patients Suspected to have VHF should be followed. Healthcare providers should at a minimum wear:
    - Single-use (disposable) fluid-resistant gown that extends to at least mid-calf or single-use (disposable) fluid-resistant coveralls without integrated hood
    - Single-use (disposable) full face shield
    - Single-use (disposable) facemask
    - Single-use (disposable) gloves with extended cuffs. Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.

- When a patient is **confirmed** to have MVD, **or is suspected to have MVD and is clinically unstable, or may require invasive or aerosol-generating procedures, or has bleeding, diarrhea or vomiting**, CDC's guidance PPE: Confirmed Patients and Clinically Unstable Patients Suspected to have VHF should be followed. Recommended PPE includes a single use impermeable gown (extending to at least mid-calf) or coveralls, head and neck cover, face and eye protection, disposable exam gloves with extended cuffs (two pairs of gloves should be worn), single-use disposable boot covers, single-use disposable apron, and a PAPR or fit-tested N95 respirator. PPE must fully cover skin and clothing and prevent any exposure of the eyes, nose, and mouth.

    - An onsite manager should supervise personnel providing care to these patients at all times. A trained observer must also supervise each step of every PPE donning/doffing procedure to ensure established PPE protocols are completed correctly.
    - Individuals unable or unwilling to adhere to infection control and PPE use procedures should not provide care for patients with MVD.

Environmental Cleaning and Disinfection

Marburg virus is transmitted through direct contact with infected blood or body fluids/substances (e.g., urine, feces, vomit) or through exposure to objects (e.g., needles, bed linens, PPE) that have been contaminated with infected blood or body fluids. Limited laboratory studies under favorable conditions indicate that Marburg virus may remain viable on solid surfaces for several days.

***Environmental Cleaning Resources***:

- Interim Guidance for Environmental Infection Control in Hospitals
- EPA registered disinfectants for Emerging Viral Pathogens: List Q

Environmental services staff should wear recommended PPE to protect against direct skin and mucous membrane exposure of cleaning chemicals, contamination, and splashes or spatters during environmental cleaning and disinfection activities.

Additional Infection Control Recommendations

Full infection control guidance can be found at https://www.cdc.gov/viral-hemorrhagic-fevers/hcp/infection-control/index.html. Adherence to all guidance is crucial to preventing further transmission within the healthcare setting. All personnel involved in the care of PUIs should be properly trained in all applicable infection prevention and control measures. In addition, healthcare personnel might need to take additional infection control steps if a PUI or patient with confirmed MVD has other conditions or illnesses caused by specific infectious diseases, such as tuberculosis.

# 8 CONTACT MONITORING AND MANAGEMENT

If a MVD case is identified in New Jersey, CDS will work with the LHD and relevant healthcare facilities to identify persons exposed to the case patient and to assess level of risk. CDS will provide a risk assessment questionnaire to identify and interview potential exposures in both community and healthcare settings.

*Examples of exposure risks for contacts are listed below. Supplemental contact monitoring guidance may be provided based on specific scenarios.*

Assessing Exposure Risk

Marburg virus exposures are categorized by the level of transmission risk. Examples of exposures and their corresponding risk of transmission are defined below. Additional exposures may be identified based on case or outbreak-specific scenarios.

- **High risk exposure**:
    - Percutaneous (i.e., piercing the skin), mucous membrane (e.g., eye, nose, or mouth), or skin contact with blood or body fluids[1] of a person with known or suspected MVD

[1] Body fluids include but are not limited to feces, saliva, sweat, urine, vomit, sputum, breast milk, tears and semen.

- Physical contact with a person who has a confirmed or suspected MVD, without the use of recommended personal protective equipment (PPE)[2]
- Providing health care to a patient with known or suspected MVD without use of recommended personal protective equipment (PPE)[2], or experiencing a breach in infection control precautions that results in the potential for percutaneous, mucous membrane, or skin contact with the blood or body fluids of a patient with MVD while working in a MVD treatment hospital or associated facility (e.g., laboratory) or while taking care of a patient with MVD
- Direct contact with, or the occurrence of a breach in infection control precautions while handling a dead body in a MVD outbreak area, or the body of a person who died of MVD, had an illness compatible with MVD, or who died of unknown cause after any potential exposure to Marburg virus
- Living in the same household as a person with symptomatic known or suspected MVD

- **Additional situations with potential risk due to unrecognized exposure (degree of risk may vary based on epidemiologic information for a specific outbreak):**
  - Sharing a room or vehicle within 3 feet of a potentially infectious patient, without direct contact with potentially infectious material
  - Providing routine medical care while using personal protective equipment appropriately
  - Routine cleaning and laundry of contaminated linens and surfaces while using personal protective equipment appropriately
  - Transport of a potentially infectious patient without direct contact with potentially infectious material
  - Handling of clinical specimens while using personal protective equipment appropriately
  - Visiting a health care facility or traditional healer in a MVD outbreak area
  - Attending a funeral or burial in a MVD outbreak area
  - Performing burial work in a MVD outbreak area

- **Low risk:**

  No known exposure is identified, and there is a low potential of unidentified exposure

- **Very low, but not zero risk exposure:**
  - No known exposure is identified, but potential/very low risk may exist (e.g., travel to a county with Marburg virus transmission, but not in a known outbreak area).

[2] Recommended PPE should be sufficient to prevent skin or mucous membrane exposure to blood or body fluids.

Contact Monitoring and Quarantine

Persons who are asymptomatic but have a known Marburg virus exposure should be monitored for 21 days after last exposure for the development of fever and/or other symptoms and evaluated medically if symptoms develop.

Persons with a high-risk exposure to Marburg virus who are asymptomatic may be placed under voluntary or required quarantine for the duration of their monitoring period. The decision whether to quarantine contacts will be made on a case-by-case basis in consultation with NJDOH/CDS.

LHDs should create a Marburg case in CDRSS for contacts under monitoring and implement symptom monitoring for fever and other MVD-compatible symptoms for 21 days from their last exposure to a MVD case. LHDs should provide the contact with an FDA approved thermometer if needed. CDS will provide specific guidance on the mode and frequency of monitoring based on exposure risk level.

Healthcare facilities should develop policies for monitoring, management, and sick leave of healthcare personnel with potential MVD exposures. Healthcare workers who do not have a known high-risk exposure, but who may have an unrecognized exposure to Marburg virus should be evaluated by their occupational health program who will coordinate with CDS to determine recommended post-exposure management, including work restrictions and symptom monitoring.

If a healthcare provider who has been caring for a patient suspected or confirmed to have MVD (even in the absence of an identified high-risk exposure) develops symptoms of Marburg they should immediately stop working and notify their supervisor and occupational health, who should then notify the LHD.

# 9 TRAVELER MONITORING

Guidance for Sponsoring Organizations

In response to an outbreak, CDC may provide guidance to organizations who sponsor healthcare workers that travel to areas with active Marburg virus transmission to include exit screening and monitoring once travelers leave the outbreak area. Sponsoring organizations should notify NJDOH/CDS of healthcare workers returning to New Jersey and to coordinate monitoring.

Activation of Enhanced Entry Screening

If the risk of international spread of Marburg virus is elevated, CDC's Division of Global Migration Health (DGMH) may institute enhanced entry screening of incoming travelers, which may include re-routing travelers to designated airports and assessing travelers for MVD symptoms and exposure risk. If traveler monitoring is indicated, CDS will work with LHDs to

institute traveler monitoring as described in general terms below (CDS will provide specific guidance based on specific scenarios and CDC recommendations).

1. DGMH will notify CDS of travelers needing public health monitoring who live in and/or are staying in New Jersey during the monitoring period.

2. CDS will create a Marburg case in CDRSS, including traveler contact information and known details concerning the presence/absence of MVD signs/symptoms and exposure risk.

    a. CDS will also contact the LHD by telephone concerning travelers with known high-risk exposures.

3. The LHD should contact travelers within 24 hours of CDRSS case creation to evaluate/verify exposure risk, assess their health status, give instructions for symptom monitoring, and provide a phone number where the LHD can be reached 24/7.

    a. LHDs should follow CDS outbreak-specific traveler monitoring guidance for monitoring and movement restrictions based on risk level. Travelers should be monitored for 21 days from exposure and/or departure date from an area with active Marburg virus transmission, including on holidays and weekends, if indicated.

4. The LHD should advise all travelers identified through enhanced entry screening to notify the LHD if fever and/or other MVD-compatible symptoms develop. Travelers should not wait until their scheduled report time to notify the LHD of symptom onset.

    a. Collect information on symptoms, onset, severity, and progression, document them in CDRSS, and contact CDS for assistance.

5. The LHD should advise travelers under monitoring to notify them if they plan to travel to another jurisdiction during the 21-day period. LHDs should obtain travel dates, itineraries, passport number (for international travel), and address/contact information at the destination, and contact NJDOH/CDS to coordinate transfer of monitoring.

# 10 PREVENTION

Vaccine

There is no approved vaccine for MVD but there is a vaccine candidate under investigational use.

International Travel

Prior to international travel, travelers should review posted travel notices and follow public health recommendations. Travelers to an area affected by a Marburg virus outbreak, should:

- Practice careful hygiene. Wash hands with soap and water or an alcohol-based hand sanitizer and avoid contact with blood and body fluids (e.g., urine, feces, saliva, sweat, urine, vomit, breast milk, and semen) of persons who are ill.
- Do not handle items that may have come in contact with an infected person's blood or body fluids (e.g., clothes, bedding, needles, medical equipment).
- Avoid funeral or burial rituals that require handling the body of someone who has died from MVD.
- Avoid contact with bats and non-human primates or blood, fluids, and raw meat prepared from these animals.
- Avoid healthcare facilities where MVD patients are being treated. The U.S. embassy or consulate is often able to provide advice on facilities.
- Avoid contact with semen from a man who has had Marburg until testing verifies that the Marburg virus is gone from his semen.

Seeking Medical Care

Persons with potential exposure to Marburg virus who develop symptoms compatible with MVD within 21 days should notify the local health department and/or healthcare facility/provider **prior to arriving at the healthcare facility** to prevent potential transmission to others.

# 11 MANAGING SPECIAL SITUATIONS

Bioterrorism

CDC considers VHFs, including Marburg virus, to be potential Category A bioterrorism agents. This category level includes priority agents that pose a risk to national security. If acquired and properly disseminated, VHFs could cause a serious public health challenge in terms of the ability to limit the numbers of casualties and control other repercussions from such an attack. If a bioterrorism event is suspected, NJDOH and other response authorities will work closely with local officials to provide additional guidance and instructions.

# 12 ADDITIONAL INFORMATION

- NJDOH Marburg website: https://www.nj.gov/health/cd/topics/marburg.shtml
- CDC: Marburg Virus Disease

# 13 REFERENCES


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