Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

Marburg Virus Disease

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ECHO
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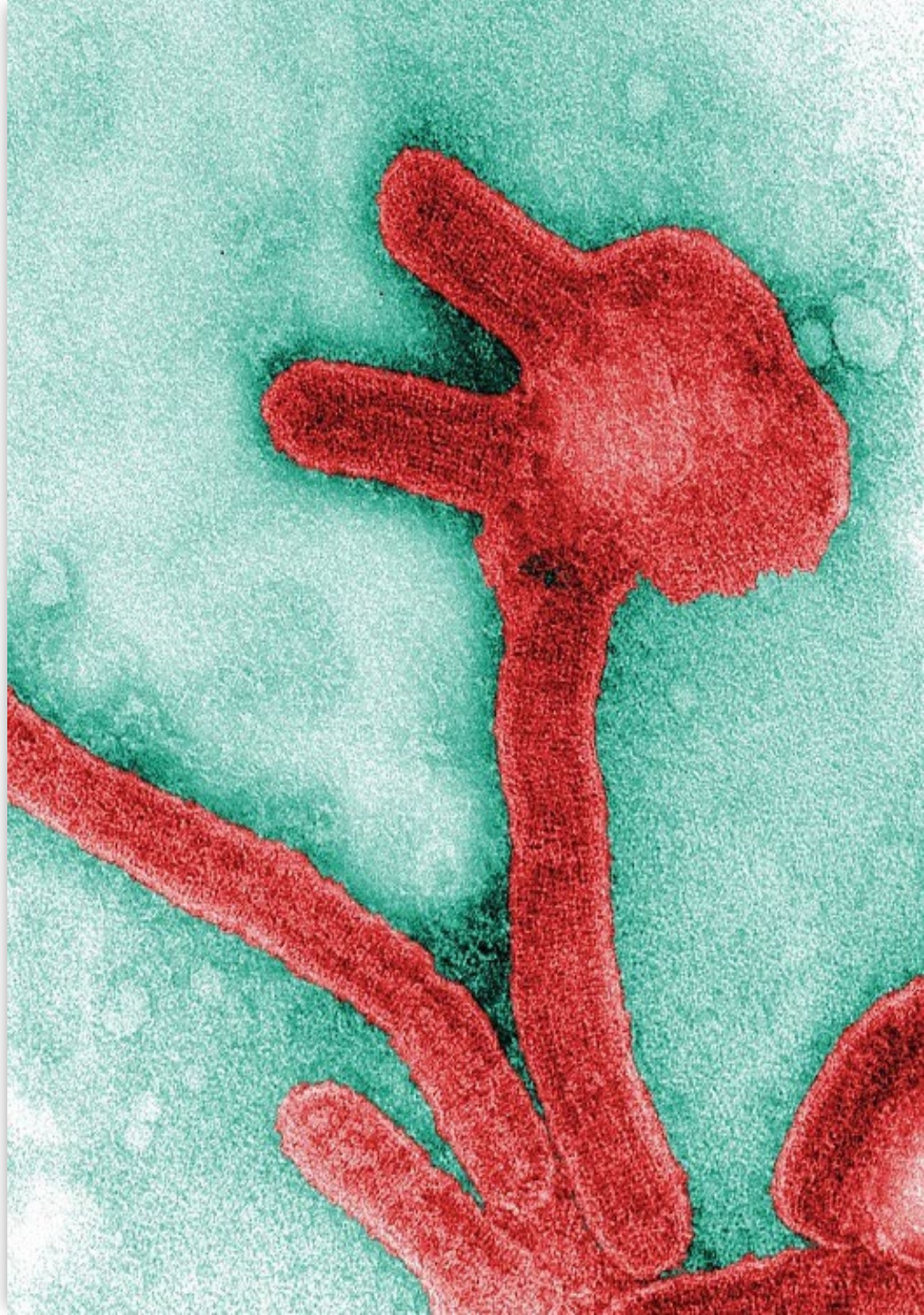
Marburg Virus Disease (MVD)

- Serious disease in humans caused by infection with one of two viruses with the genus Orthomarburgvirus:
  - Marburg virus (species *Orthomarburgvirus marburgense*)
  - Ravn virus (species *Orthomarburgvirus marburgense*)
- Mortality rate 23-90% in the absence of early diagnosis and supportive care
- Egyptian fruit bats (*Rousettus aegyptiacus*) is the natural reservoir



Marburg Virus Disease Outbreaks

- 17 Marburg outbreaks since the 1967*
- Last 5 outbreaks occurred in countries who have never previously reported cases
  - Guinea 2021
  - Ghana 2022
  - Equatoria Guinea 2023
  - Tanzania 2023
  - Rwanda 2024
- One imported case of MVD to the U.S. (2008)
  - Traveler developed illness four days after returning from Uganda
  - Visited a cave in Uganda that was implicated in prior MVD cases

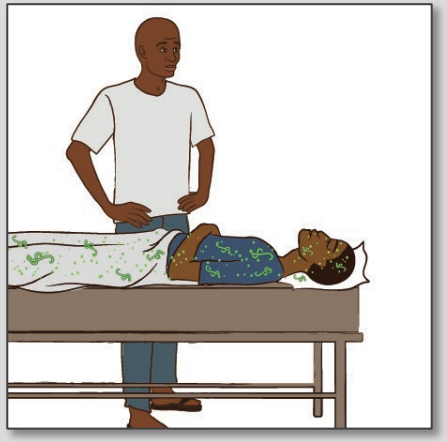
*Excluding lab accidents

Signs and Symptoms

- Signs and symptoms of MVD include:
  - Fever
  - Headache
  - Fatigue
  - Muscle pain/Joint pain
  - Anorexia
  - Sore throat
  - Abdominal pain
  - Rash
  - Diarrhea
  - Vomiting
  - Conjunctivitis
  - Unexplained bleeding/bruising*
- Fever is not universally present
- No sign or symptom is pathognomonic

POINT OF INFECTION

Infection occurs after exposure to a person who is sick or has died of Marburg.



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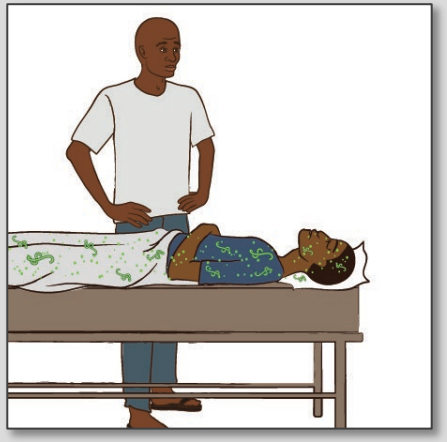
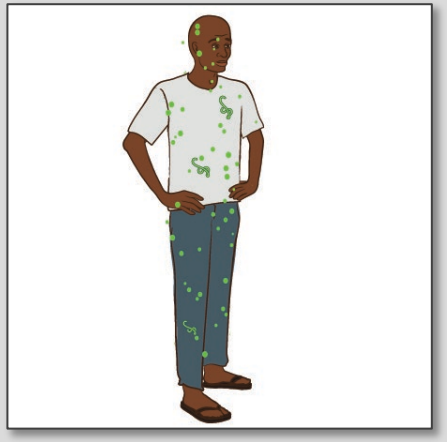


INCUBATION PERIOD

- It can last from 2-21 days (usually 4-17 days)
- Person feels well and has no symptoms
- No transmission of the virus
- Not viremic



NOT CONTAGIOUS

EXPOSURE TO VIRUS

DAY 0 OF ILLNESS

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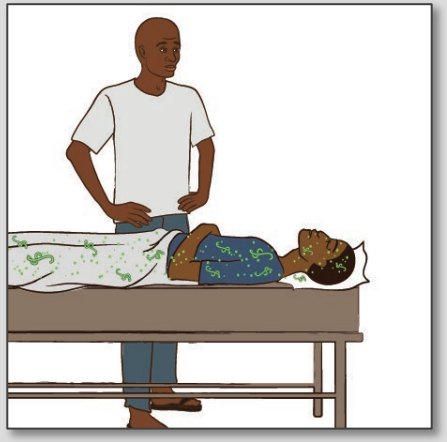

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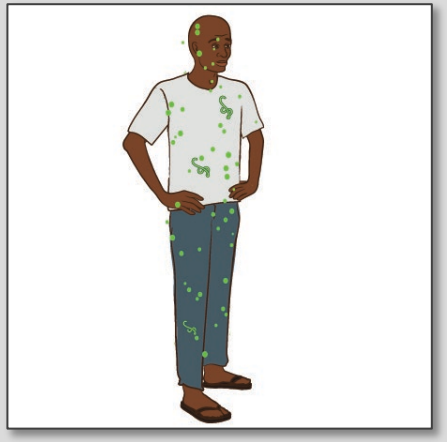
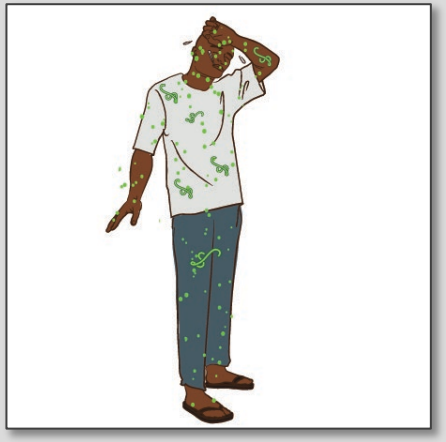


DRY PHASE

- Fever
- Fatigue
- Headaches
- Joint pain
- Muscle pain
- Back pain
- Sore throat
- Viremia develops



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CONTAGIOUS

EXPOSURE TO VIRUS

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DAY 4 OF ILLNESS

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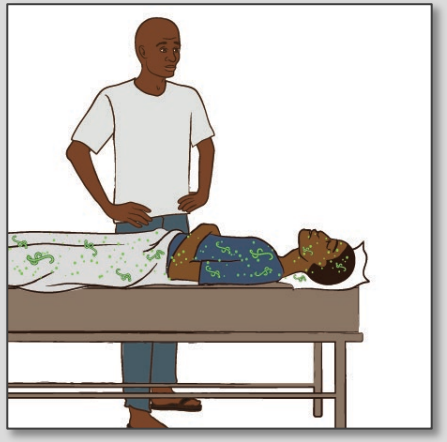

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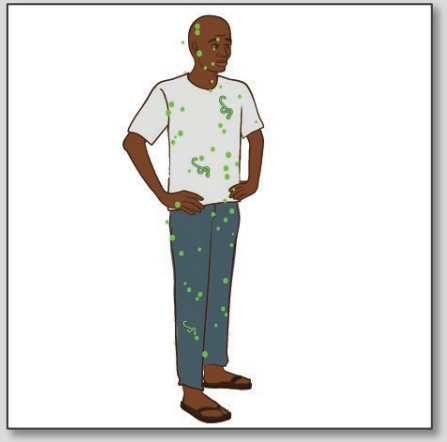

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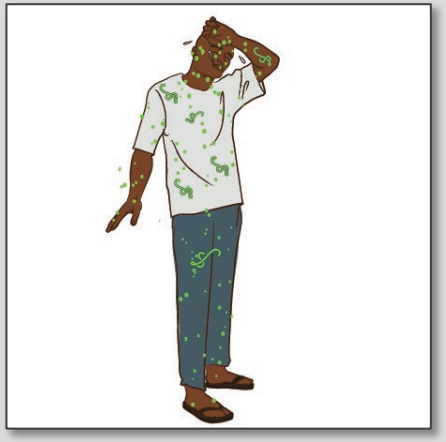
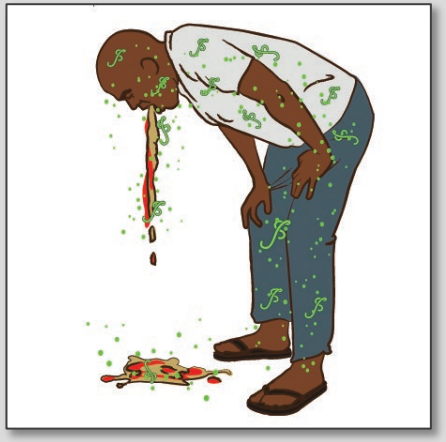


WET PHASE

- Diarrhea
- Nausea/vomiting
- Rash
- Bleeding produced in some cases
- Hiccups
- Eye redness



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CONTAGIOUS

MORE CONTAGIOUS

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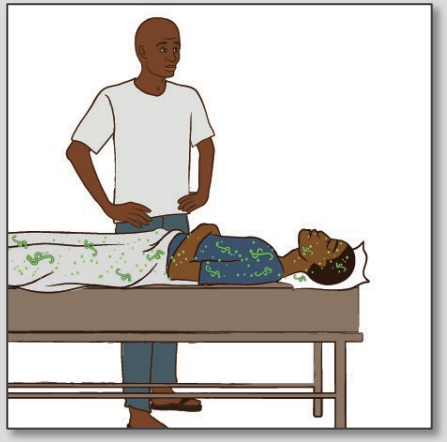

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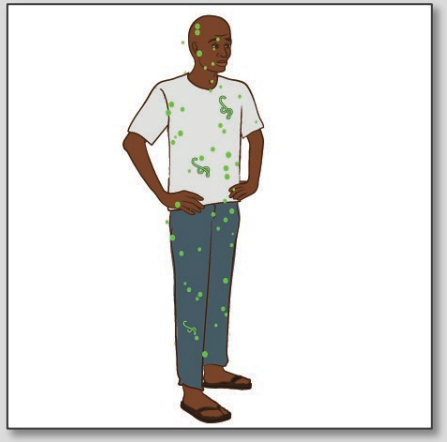

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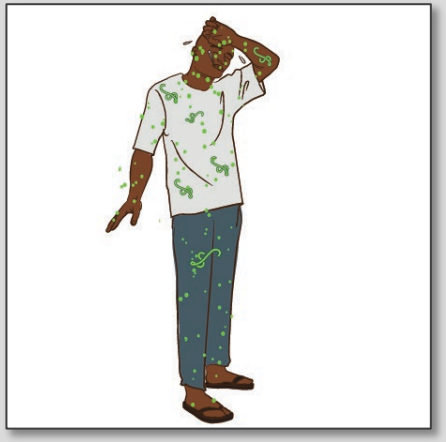

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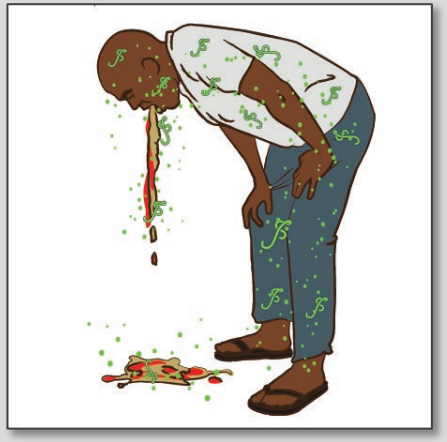
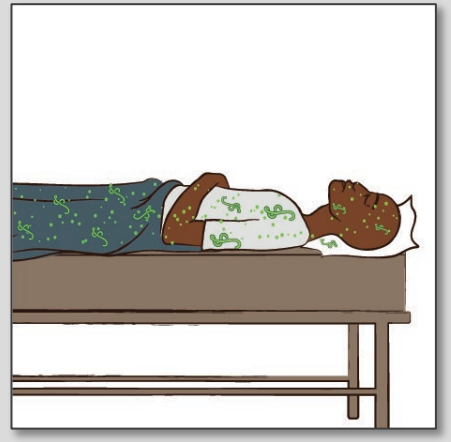


- The patient is more contagious as the disease progresses.
- In fatal cases, death occurs on average 7 to 10 days after the onset of symptoms.
- The amount of Marburg virus is highest at the time of death.



NOT CONTAGIOUS

CONTAGIOUS

MORE CONTAGIOUS

MOST CONTAGIOUS

EXPOSURE TO VIRUS

DAY 0 OF ILLNESS

DAY 4 OF ILLNESS

DAYS 7-10 OF ILLNESS

Person-to-Person-Transmission

- In infected individuals, the virus can be found in all body fluids:
  - Blood
  - Feces/Vomit
  - Urine
  - Tears
  - Breast milk
  - Amniotic fluid
  - Vaginal secretions
  - Sweat
  - Saliva
  - Semen
- Contact (through broken skin or mucous membranes) with the body fluids of a person that is sick or has died of MVD
- Not spread through airborne transmission
- Asymptomatic transmission (aside from sexual transmission) is not a recognized feature of MVD

Marburg Virus Persistence

- Marburg virus has been detected in the following immune privileged sites
  - Testicles (semen)
  - Aqueous humor (eye)
- Sexual transmission of Marburg virus from male MVD survivors has been documented

Diagnostic Testing

- Biofire FilmArray NGDS Warrior Panel is an FDA 510(k)-cleared reverse transcription polymerase chain reaction assay
  - Panel can detect Orthoebolaviruses, Orthomarburgviruses, *Coxiella burnetii, Francisella tularensis, Yersinia pestis, Bacillus anthracis*
  - 39 laboratories within the Laboratory Response Network and 13 Regional Special Pathogens Treatment Centers can test under CLIA using this platform
- Confirmation testing under CLIA is available at CDC

Vaccine

- No FDA-approved vaccine
- cAd3-Marburg vaccine
  - Recombinant chimpanzee adenovirus Type 3 vector expressing the wild-type Marburg virus glycoprotein (Angola strain)
  - Replication incompetent
- Phase 2 open-label trial using the cAd3-Marburg vaccine is underway in Rwanda

Treatment

- No FDA-approved treatment
- Several treatments in development
  - MBP091 is an experimental single monoclonal antibodies derived from Marburg survivors
  - Remdesivir, an antiviral, has been used under compassionate use protocols

Recommendations for Clinicians: Infection Control

- If you are concerned your patient may have MVD, isolate the patient in a private room at the healthcare facility
- Follow CDC guidance on PPE selection and wear, including donning/doffing
- Where possible, use dedicated (and disposable) medical equipment, limiting use of needles and other sharps
- Procedures that can increase environmental contamination with infectious material or create aerosols should be minimized
- If performing aerosol-generating procedures, follow guidance to reduce exposures (e.g., limit to essential personnel, utilize an airborne infection isolation room (AIIR) if available)

Recommendations for Clinicians

- Collect travel history for all patients presenting with a clinical picture suggestive of an infectious etiology
- If you are concerned your patient may have MVD, first contact your state/local, tribal, or territorial health department and follow jurisdictional protocols for patient assessment
- As a resource for public health departments, CDC's Viral Special Pathogens Branch is available 24/7 for consultations by calling CDC Emergency Operations Center (770-488-7100)

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov