



Viral Hemorrhagic Fever: Biological Weapon BACKGROUND

January 2001

Contact: CDC Media Relations 404-639-3286

Biological Weapon

Viral hemorrhagic fevers (VHFs) are illnesses that can cause severe fatal disease in humans. Four VHFs are caused by pathogens considered to be potential bioterrorism agents, including Ebola, Marburg, Lassa, and South American VHF viruses. Ebola and Marburg viruses are in the filovirus family, while Lassa and the South American VHF viruses are in the arenavirus family.

These four VHFs are not native to the United States, and an outbreak of these diseases in this country that cannot be linked to travel to a disease-endemic area should arouse suspicion of a bioterrorist event.

These VHFs can result from the inhalation of aerosolized virus (as in a bioterrorist attack), although this mode of transmission is **not** common for person-to-person spread of disease in a typical outbreak setting.

The Diseases

1. Filoviruses (Ebola and Marburg)

- Outbreaks of Ebola hemorrhagic fever among humans have been documented in sub-Saharan Africa. Four different strains of Ebola virus are known, of which three have caused illness in humans.
- Marburg hemorrhagic fever was first identified in Germany and Yugoslavia among persons handling infected African green monkeys. Naturally occurring human cases have also been documented in sub-Saharan Africa.
- While the natural modes for acquiring Ebola and Marburg viruses are not known, they are suspected to be zoonotic (transmitted from animals to people). Ebola and Marburg viruses can be transmitted person to person through contact with blood or body secretions of infected patients.
- The incubation period for Ebola and Marburg viruses ranges from several days to 3 weeks following exposure.
- Clinical signs of Ebola and Marburg VHFs include fever, fatigue, stomach pain, and muscle aches. Patients with severe cases may have chest pain and show signs of bleeding under the skin, in internal organs, and from body openings.
- The case-fatality rate for Ebola hemorrhagic fever is 36-88% and may be strain-dependent. Marburg hemorrhagic fever has a reported case-fatality rate around 25%.

2. Arenaviruses (Lassa and South American VHFs)

- Lassa fever occurs in parts of West Africa.
- South American VHFs include hemorrhagic fevers caused by Junin virus (Argentina), Machupo virus (Bolivia), Guanarito virus (Venezuela), and Sabia virus (Brazil).
- In nature, these infections are caused by direct contact with infected rodents or their urine and droppings. Some persons may be infected by inhaling tiny particles from air

- contaminated with rodent excretions. The agents may be spread from person to person by direct contact with blood or body secretions from infected patients.
- The incubation period for the Lassa and Junin viruses is typically 1-3 weeks.
 - In addition to the symptoms typical of Ebola and Marburg VHFs (see above), Lassa fever often results in neurological symptoms, including hearing loss, tremors, and encephalitis as well as signs of respiratory distress. South American VHFs can cause severe hemorrhagic fever, and a spotted rash may be a prominent feature.
 - Lassa virus infections cause mild or undetectable illness in most infected people, but about 20% of people develop severe disease. Overall case-fatality rates are about 1%, but 15-20% of persons hospitalized with Lassa fever may die. Pregnant women are more at risk for severe Lassa infection. The South American VHFs such as Junin have case-fatality rates of 15-30%.

Treatment

Currently, there is no effective treatment for Ebola or Marburg infections. Patients infected with Lassa virus may be treated with an antiviral drug called ribavirin, although this drug is not licensed for use in the United States. Immune serum has been used to treat some cases of Junin virus infection, but this method of treatment has not been approved for use in this country.

A vaccine has been developed for Junin virus, but it is not licensed for use in the United States.

Patients will require extensive supportive care, specifically appropriate maintenance of fluids and electrolytes, and careful monitoring of blood pressure.

Care must be taken to avoid contact with body fluids from infected patients (including blood, saliva, urine, and feces). In hospital and clinic settings, strict barrier nursing procedures should be used for suspected VHF patients. Gowns and gloves should be worn by medical staff attending patients, and the use of face masks should be considered to prevent small-droplet exposure. VHF patients should be separated from other patients in the hospital.

Close personal contacts or medical personnel exposed to blood or body secretions from VHF patients should be monitored for fever or other symptoms during the established incubation period.

Immediate notification of a suspected case of VHF to local or state health departments and CDC is essential for rapid diagnosis, investigation, and control activities.

Additional information about biological agents is available online at <http://www.bt.cdc.gov/bioagents.asp>