

VIRAL HEMORRHAGIC FEVER

Potential Bioterrorism Agent: Category A

Also known as: VHF

Includes: Lassa, Marburg, Ebola, Crimean-Congo, South American

Responsibilities:

Hospital: Report by phone immediately

Lab: Report by phone immediately, Send isolates to State Hygienic Laboratory (SHL) for confirmation

Physician: Report by phone immediately

Local Public Health Agency (LPHA): Iowa Department of Public Health will lead the follow-up investigation. Follow up will be entered into IDSS.

Iowa Department of Public Health

Disease Reporting Hotline: (800)-362-2736

After Hours: Iowa State Patrol Office at (515) 323-4360 and they will page a member of the on-call CADE staff.

Secure Fax: (515) 281-5698

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Agent

Viral hemorrhagic fevers (VHFs) include numerous zoonotic diseases, all of which cause a hemorrhagic syndrome in humans. VHFs are known to be caused by filoviruses, arenaviruses, bunyaviruses, and flaviviruses. Some of the specific VHFs include Ebola, Marburg, Lassa, Junin (Argentine VHF), Machupo (Bolivian VHF), Sabia (Brazilian VHF), Guanarito (Venezuelan VHF), Crimean Congo hemorrhagic and Rift Valley fever. Because of its extremely high fatality rate and the importation of the virus into the United States in non-human primates, Ebola hemorrhagic fever has been the most publicized in the United States. VHFs have been recognized by the Centers for Disease Control and Prevention (CDC) as being among the top agents of concern for potential bioterrorist weapons.

B. Clinical Description

The onset of viral hemorrhagic fever is usually sudden. The duration of illness can vary from a few days to a couple of weeks. Patients may present with a brief prodrome characterized by nonspecific signs, including fever, headache, malaise, weakness, irritability, dizziness, muscle aches, and nausea and vomiting. As signs progress, they may include low blood pressure, sustained fever, sweats, rash, diarrhea, swelling around the eyes, flushing, and redness of the eyes. As signs become more serious, the patient becomes prostrate and may develop pain in the throat, chest, or abdomen, as well as petechiae and ecchymoses (bruises). Bleeding occurs from mucous membranes (including nosebleeds, and bleeding gums, vomit, urine, stools and sputum), and the patient will often go into shock. Encephalopathy, hepatitis, intention tremors, and reduced white blood cell and platelet levels are frequently seen, and renal failure may occur. Mortality rates for VHFs vary depending on the agent and strain, and can be from 10% to 90%.

C. Reservoirs

Many wild and domestic animals, ticks, and mosquitoes are known to carry some of the VHF agents, although the reservoirs have not been identified for all VHF agents. Rodents are known to be the carriers of Lassa, Junin, Machupo, Guanarito, Crimean Congo hemorrhagic and Rift Valley fever viruses. Forest dwelling fruit bats are believed to be the reservoir for Ebola virus. Mosquitoes, ticks and animals (including rodents, foxes, hares, and groundfeeding birds) are known to carry bunyaviruses that cause VHF. Primates are the only non-human animals known to have been affected by Ebola and Marburg hemorrhagic fever viruses. However, because these infections are associated with a rapid and often fatal illness in these animals, they are not considered reservoirs. Once certain VHF viral infections establish themselves in human populations, rapid person-to-person spread may occur.

D. Modes of Transmission

The mode of transmission for index cases of VHF in any outbreak is animal, tick or mosquito to human. Once a human has acquired infection with a VHF agent, transmission may occur person-to-person. Persons become infected through contact with infectious blood or secretions from infected persons or animals. Individuals have acquired VHFs through sexual contact. Bedding or other fomites may serve as a source of infection. Medical equipment that has not been properly cleaned or sterilized has been responsible for the spread of some VHFs, and laboratory workers manipulating specimens have acquired rare cases. For most VHFs, direct physical contact with infectious blood or secretions is thought to be required for transmission. However, for some VHFs, such as some of the arenaviruses, aerosol spread is considered likely.

E. Incubation period

The incubation periods for VHFs range from 1 to 21 days, with an average of 3 to 10 days. For both Ebola and Marburg viruses, the incubation period is probably 5-10 days.

F. Period of Communicability or Infectious Period

Infected individuals are generally considered infectious for a variable period preceding the onset of symptoms (up to 3 weeks for some VHFs including Ebola) and during the course of clinical symptoms. Virus may remain in the blood and secretions for months after an individual recovers. Contaminated bedding and medical equipment may remain infectious for several days.

G. Epidemiology

Viruses of VHFs are primarily infectious agents in wild animals, birds, mosquitoes and ticks. Individual VHFs occur in different geographic regions. Outbreaks, when they occur, tend to be sporadic. Outbreaks of Ebola virus hemorrhagic fever in imported non-human primates used for research have occurred in the U.S. In one instance, individuals working with infected primates developed antibody to Ebola, suggesting exposure, but the individuals did not become clinically ill. The western Africa countries of Guinea, Sierra Leone, Liberia experienced a large outbreak of Ebola beginning in 2014. Congo has also had sporadic outbreaks. Two imported Ebola cases, including one death, and two locally acquired cases in healthcare workers were reported in the United States in 2014.

H. Bioterrorism Potential

Category A The viruses that cause VHFs are considered potential bioterrorist agents. If acquired and properly disseminated, these viruses could cause a serious public health challenge in terms of ability to limit the numbers of casualties and control other repercussions from such an attack.

2) DISEASE REPORTING AND CASE INVESTIGATION

A. Local Public Health Agency Follow-up Responsibilities:

Case Investigation

- a. The most important thing a LPHA can do upon learning of a suspect or confirmed case of viral hemorrhagic fever, or potential exposure, is to immediately call IDPH, CADE, any time at (800) 362-2736.
- b. Iowa Department of Public Health will lead the follow-up investigation. Call the Center for Acute Disease Epidemiology immediately at (800) 362-2736.

B. Laboratory and Healthcare Provider Reporting Requirements

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and healthcare provider immediately report any suspicion of viral hemorrhagic fever called to your attention by a healthcare provider or laboratory.

The reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736, if calling after business hours, call the Iowa State Patrol Office at (515) 323-4360 and they will page a member of the on-call CADE staff.

Laboratory Testing Services Available

Consult with CADE and the University of Iowa State Hygienic Laboratory (SHL) for any questions about laboratory testing.

C. Local Public Health Agency Follow-up Responsibilities

Case Investigation

- a. **The most important thing a LPHA can do upon learning of a suspect or confirmed case of viral hemorrhagic fever, or potential exposure to viral hemorrhagic fever, if bioterrorism is suspected, is to immediately call IDPH any time at (800) 362-2736.**
- b. Case investigation of viral hemorrhagic fever in Iowa residents will be directed by IDPH. If a bioterrorism event is suspected, IDPH and other response authorities will work closely with LPHAs and provide instructions/information on how to proceed.
- c. Following immediate notification of IDPH, the LPHA may be asked to assist in investigating cases that live within their communities, including gathering the following:
 - 1) The case's name, age, address, phone number, status (hospitalized, at home, deceased), and parent/guardian information, if applicable.
 - 2) The name and phone number of the hospital where the case is or was hospitalized.
 - 3) The name and phone number of the case's attending physician.
 - 4) The name and phone number of the infection prevention staff at the hospital.
 - 5) If the patient was seen by a healthcare provider before hospitalization, or seen at more than one hospital, be sure to document these names and phone numbers as well.

3) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

All efforts to isolate or quarantine cases or their contacts of viral hemorrhagic fevers will depend on exactly which viral hemorrhagic fever is identified and will be directed by the Iowa Department of Public Health.

4) ADDITIONAL INFORMATION

References

CDC. Viral Hemorrhagic Fever website: wwwnc.cdc.gov/travel/yellowbook/2012/chapter-3-infectious-diseases-related-to-travel/viral-hemorrhagic-fevers.htm

Heymann, D., ed., *Control of Communicable Diseases Manual, 20th Edition*. Washington, DC, American Public Health Association, 2015.