

HEMORRHAGIC FEVER VIRUS INFECTION: Notes about the Disease

Hemorrhagic fever virus (HFV) infections are fodder for scary Hollywood science fiction movies. With names like Ebola and Marburg, the diseases inflicted by this group of zoonotic RNA viruses range from mild to quite severe, with death in some cases accompanying widespread vascular damage and hemorrhage.

HFVs are diverse members of four different virus families:

- **Arenaviruses**—These viruses are found in South America (Junin, Machupo, Guanarito, and Sabia viruses) and Africa (Lassa virus). Their natural hosts are rodents, and humans become infected by exposure to aerosolized rodent excreta; person-to-person transmission can occur with close contact.
- **Filoviruses**—The Marburg and Ebola viruses belong to this family. The natural reservoir for this group is unknown, although contact with non-human primates has figured in several outbreaks. Person-to-person contact can be a mode of transmission via contact with body fluids, directly or via contaminated needles and syringes.
- **Bunyaviruses**—Except for the hantaviruses (contracted via exposure to aerosolized rodent excreta), these HFVs are arboviruses [i.e., transmitted by mosquitoes (Rift Valley fever virus) or ticks (Crimean-Congo hemorrhagic fever virus)]. Transmission between humans has occurred by contact or aerosolization of body fluids and contact with infected animal tissue.
- **Flaviviruses**—This is a group of mosquito-(dengue and yellow fever), tick-(Kasanur Forest), and muskrat-(Omsk hemorrhagic fever) borne viruses.

Fortunately, HFV distributions in nature are generally restricted to the geographic areas of their host mammalian or arthropod species. With a couple of exceptions, none of the HFVs are native to North America; the Hantaan viruses (bunyaviruses), and dengue viruses (flaviviruses) are found in the US and are treated separately in this manual, as is yellow fever.

In North Carolina, as elsewhere in the United States, HFVs are of potential public health concern from two sources: importation by a foreign traveler and possible use of a HFV as a bioterrorist (BT) agent. Importations of human cases of Lassa fever have occurred but—perhaps because of the relatively low risk of person-to-person transmission and the basic precautions taken—dissemination beyond the index cases did not occur.¹

Because of the possibility of their use in aerosolized form, HFVs have some potential as BT agents. Marburg and Ebola viruses, with their attendant high case-fatality ratios, might be especially appealing to terrorists. Thus, public health workers should be aware of this and consider HFVs in the event of an outbreak of an undifferentiated febrile illness accompanied by rash, hemorrhagic diathesis, and shock occurring 2-21 days after a suspected terrorist attack.²

1. JA Bryan and RM Zweighaft, "Surveillance and Transport of Patients with Suspect Viral Hemorrhagic Fevers: The United States Experience," in *Ebola Virus Haemorrhagic Fever: Proceedings of an International Colloquium on Ebola Virus Infection and Other Haemorrhagic Fevers*, ed. Pattyn SR (Antwerp, Belgium, 1977), 269-75, www.itg.be/ebola/ebola-69.htm.
2. L. Borio, et al., "Hemorrhagic Fever Viruses as Biological Weapons: Medical and Public Health Management," *JAMA* 287 (2002): 2391-2405, <http://jama.ama-assn.org/cgi/reprint/287/18/2391?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=vhf&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT> .