

## CRIMEAN-CONGO HEMORRHAGIC FEVER (CCHF)

### REPORTING INFORMATION

- **Class A:** Report immediately via telephone the case or suspected case and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report immediately via telephone to the local public health department in which the reporting health care provider or laboratory is located. Local health departments should report immediately via telephone the case or suspected case and/or a positive laboratory result to the Ohio Department of Health (ODH).
- Reporting Form(s) and/or Mechanism:
  - Immediately via telephone.
  - For local health departments, cases should also be entered into the Ohio Disease Reporting System (ODRS) within 24 hours of the initial telephone report to the ODH.
- Key fields for ODRS reporting include: import status (whether the infection was travel-associated or Ohio-acquired), date of illness onset, and all the fields in the Epidemiology module.

### AGENT

Crimean-Congo hemorrhagic fever (CCHF) is caused by infection with a tick-borne virus (*Nairovirus*) in the family *Bunyaviridae*. The disease was first characterized in the Crimea in 1944 and given the name Crimean hemorrhagic fever. It was then later recognized in 1969 as the cause of illness in the Congo, thus resulting in the current name of the disease.

Crimean-Congo hemorrhagic fever is found in Eastern Europe, particularly in the former Soviet Union, throughout the Mediterranean, in northwestern China, central Asia, southern Europe, Africa, the Middle East and the Indian subcontinent.

### CASE DEFINITION

The case definition below is the standard CDC case definition for viral hemorrhagic fevers (VHF).

#### Clinical Description

An illness with acute onset with ALL of the following clinical findings:

- A fever > 40°C, 104°F
- One of more of the following clinical findings:
  - Severe headache
  - Muscle pain
  - Erythematous maculopapular rash on the trunk with fine desquamation 3-4 days after rash onset
  - Vomiting
  - Diarrhea
  - Pharyngitis (arenavirus only)
  - Abdominal pain
  - Bleeding not related to injury
  - Retrosternal chest pain (arenavirus only)
  - Proteinuria (arenavirus only)
  - Thrombocytopenia

#### Laboratory Criteria for Diagnosis

One or more of the following laboratory findings:

- Detection of VHF viral antigens in blood by enzyme-linked Immunosorbent Assay (ELISA) antigen detection

- VHR viral isolation in cell culture for blood or tissues
- Detection of VHF-specific genetic sequence by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) from blood or tissues
- Detection of VHF viral antigens in tissues by immunohistochemistry

### **Criteria for Epidemiologic Linkage**

One or more of the following exposures within the 3 weeks before onset of symptoms:

- Contact with blood or other body fluids of a patient with VHF
- Residence in or travel to a VHF endemic area
- Work in a laboratory that handles VHF specimens
- Work in a laboratory that handles bats, rodents, or primates from endemic areas
- Exposure to semen from a confirmed acute or convalescent case of VHF within 10 weeks of that person's onset of symptoms

### **Case Classification**

Suspect: Case meets the clinical and epidemiologic linkage criteria.

Confirmed: Case meets the clinical and laboratory criteria.

### **SIGNS AND SYMPTOMS**

The onset of CCHF is sudden, with initial signs and symptoms including headache, high fever, back pain, joint pain, stomach pain, and vomiting. Red eyes, a flushed face, a red throat, and petechiae (red spots) on the palate are common. Symptoms may also include jaundice, and in severe cases, changes in mood and sensory perception.

As the illness progresses, large areas of severe bruising, severe nosebleeds, and uncontrolled bleeding at injection sites can be seen, beginning on about the fourth day of illness and lasting for about two weeks.

### **DIAGNOSIS**

Crimean-Congo hemorrhagic fever is diagnosed through antigen-capture enzyme-linked immunosorbent assay (ELISA) testing, real time polymerase chain reaction (RT-PCR), virus isolation attempts, and detection of antibody by ELISA (IgG and IgM). Laboratory diagnosis of a patient with a clinical history compatible with CCHF can be made during the acute phase of the disease by using the combination of detection of the viral antigen (ELISA antigen capture), viral RNA sequence (RT-PCR) in the blood or in tissues collected from a fatal case and virus isolation. Immunohistochemical staining can also show evidence of viral antigen in formalin-fixed tissues. Later in the course of the disease, in people surviving, antibodies can be found in the blood. But antigen, viral RNA and virus are no more present and detectable.

### **EPIDEMIOLOGY**

#### **Occurrence**

Crimean-Congo hemorrhagic fever was first characterized in Crimea in 1944 and given the name Crimean hemorrhagic fever. It was then later recognized in 1969 as the cause of illness in the Congo, thus resulting in the current name of the disease. CCHF occurs in Eastern Europe, particularly in the former Soviet Union, throughout the Mediterranean, in northwestern China, central Asia, southern Europe, Africa, the Middle East and the Indian subcontinent.

#### **Mode of Transmission and Source**

Ixodid (hard) ticks, especially those of the genus, *Hyalomma*, are both a reservoir and a vector for the CCHF virus. Numerous wild and domestic animals, such as cattle, goats, sheep and hares, serve as amplifying hosts for the virus. Transmission to humans occurs

through contact with infected ticks or animal blood. CCHF can be transmitted from one infected human to another by contact with infectious blood or body fluids. CCHF can also occur in hospitals in endemic regions due to improper sterilization of medical equipment, reuse of injection needles, and contamination of medical supplies.

Animal herders, livestock workers, and slaughterhouse workers in endemic areas are at risk of CCHF. Healthcare workers in endemic areas are at risk of infection through unprotected contact with infectious blood and body fluids. Individuals and international travelers with contact to livestock in endemic regions may also be exposed.

### **Incubation Period**

5-12 days

## **PUBLIC HEALTH MANAGEMENT**

### **Case**

#### Investigation

Obtain information about the patient's occupation, history of travel outside the United States, contact with wild animals or lab animals, contact with a suspected or confirmed case of viral hemorrhagic fever, or close contact with an ill individual who traveled to a viral hemorrhagic fever-endemic area.

#### Treatment

Patients receive supportive therapy. Care should include careful attention to fluid balance and correction of electrolyte abnormalities, oxygenation and hemodynamic support, and appropriate treatment of secondary infections. The virus is sensitive in vitro to the antiviral drug ribavirin. It has been used in the treatment of CCHF patients reportedly with some benefit.

#### Isolation

Ohio Administrative Code (OAC) 3701-3-13 (DD) states:

"Viral hemorrhagic fever (VHF): a person with confirmed or suspected viral hemorrhagic fever shall be placed in airborne isolation until no longer considered infectious."

Clinicians evaluating suspect cases should use standard (e.g. hand hygiene), airborne (e.g. N-95 respirator) and contact (e.g. gowns and gloves) precautions.

### **Contacts**

#### Investigation

Currently there is no post-exposure prophylaxis available for individuals exposed to these agents. Investigation of contacts and source of infection: Identify all close contacts in the three weeks after the onset of illness. Initiate quarantine and active surveillance of contacts by having contacts take and maintain record of body temperature twice a day for 3 weeks after last exposure. If temperature is greater than 100.4°F (38.3°C), hospitalize patient immediately and initiate appropriate isolation precautions.

### **Prevention and Control**

Agricultural workers and others working with animals should use insect repellent on exposed skin and clothing. Insect repellents containing DEET (N, N-diethyl-m-toluamide) are the most effective in warding off ticks. Wearing gloves and other protective clothing is recommended. Individuals should also avoid contact with the blood and body fluids of livestock or humans who show symptoms of infection. It is important for healthcare workers to use proper infection control precautions to prevent occupational exposure.

An inactivated, mouse-brain derived vaccine against CCHF has been developed and is used on a small scale in Eastern Europe. However, there is no safe and effective vaccine currently available for human use. Further research is needed to develop these potential vaccines as well as determine the efficacy of different treatment options including ribavirin and other antiviral drugs.

**What is Crimean-Congo hemorrhagic fever?**

Crimean-Congo hemorrhagic fever (CCHF) is caused by infection with a tick-borne virus (*Nairovirus*) in the family *Bunyaviridae*. The disease was first characterized in the Crimea in 1944 and given the name Crimean hemorrhagic fever. It was then later recognized in 1969 as the cause of illness in the Congo, thus resulting in the current name of the disease.

**What are the signs and symptoms of CCHF?**

Signs and symptoms of CCHF include headache, high fever, back pain, joint pain, stomach pain, and vomiting. Red eyes, a flushed face, a red throat, and petechiae (red spots) on the palate are common. Symptoms may also include jaundice, and in severe cases, changes in mood and sensory perception.

As the illness progresses, large areas of severe bruising, severe nosebleeds, and uncontrolled bleeding at injection sites can be seen, beginning on about the fourth day of illness and lasting for about two weeks.

**How is CCHF spread?**

Transmission to humans occurs through contact with infected ticks or animal blood. CCHF can be transmitted from one infected human to another by contact with infectious blood or body fluids.

**Who is most at risk of getting CCHF?**

Animal herders, livestock workers, and slaughterhouse workers in endemic areas are at risk of CCHF. Healthcare workers in endemic areas are at risk of infection through unprotected contact with infectious blood and body fluids. Individuals and international travelers with contact to livestock in endemic regions may also be exposed.

**How is CCHF treated?**

The virus is sensitive in vitro to the antiviral drug ribavirin. It has been used in the treatment of CCHF patients reportedly with some benefit. Primary treatment is supportive therapy. The following basic interventions, when used early, can increase the chances of survival.

- Providing fluids and electrolytes
- Maintaining oxygen status and blood pressure
- Treating other infections if they occur

**How do I protect myself against CCHF?**

Agricultural workers and others working with animals should use insect repellent on exposed skin and clothing. Insect repellents containing DEET (N, N-diethyl-m-toluamide) are the most effective in warding off ticks. Wearing gloves and other protective clothing is recommended. Individuals should also avoid contact with the blood and body fluids of livestock or humans who show symptoms of infection. It is important for healthcare workers to use proper infection control precautions to prevent occupational exposure.