

Hepatitis E

PROTOCOL CHECKLIST

- Enter available information into Merlin upon receipt of initial report
- Review background on disease, case definition, and laboratory testing
- Contact provider
- Interview patient
 - Review disease facts
 - Modes of transmission
 - Incubation period
 - Symptoms
 - Ask about exposure to relevant risk factors
 - Contact with ill persons
 - Travel
 - Consumption of raw foods
 - Restaurant meals
 - Food at public gatherings
 - Sources of drinking water
 - Occupational exposures
 - Identify contacts
 - Refer symptomatic contacts to a health care provider
 - Determine whether the patient is part of an outbreak
 - Exclude cases or symptomatic contacts from food preparation
 - Provide information on how to prevent further transmission
 - Practice proper hand hygiene
 - Proper food handling and preparation
 - Access to safe drinking water
 - Address patient's questions or concerns
- Follow-up on special situations, including outbreaks or patients in sensitive situations
- Enter additional data obtained from interview into Merlin

Hepatitis E

1. DISEASE REPORTING

A. Purpose of reporting and surveillance

1. To identify persons with HEV infection, determine the source, and prevent further transmission.
2. To identify HEV outbreaks and other undiagnosed cases
3. To determine the epidemiology of HEV in Florida

B. Legal reporting requirements

Laboratories and physicians are required to report HEV to the local county health department (CHD) within one working day of identification/diagnosis.

C. County health department investigation responsibilities

1. Begin investigation within one business day of receiving report from a provider or laboratory.
2. Contact patient and/or provider to complete case interview.
3. Report all confirmed and probable cases in Merlin.
4. Report liver enzyme results for all cases when available.

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agent

The Hepatitis E virus (HEV) is a spherical, non-enveloped, positive strand RNA virus. HEV is classified in the genus *Hepevirus* of the family Hepeviridae. There are four genotypes (HEV1-4) of HEV, which belong to a single serotype.

B. Description of illness

Globally, HEV is the most common cause of acute hepatitis. However, in the United States HEV is uncommonly identified as the cause of acute hepatitis. Infection is most often asymptomatic, but can cause acute illness with symptoms including jaundice, malaise, anorexia, fever, abdominal pain, and arthralgia. Symptoms generally last for one to two weeks. The disease is more common in adults than children and is most severe in pregnant women. Pregnant women are most likely to experience fulminant hepatitis. Mortality rates for HEV infected pregnant women can reach 10% to 25% during the third trimester. Chronic HEV infections are rare and most often reported in recipients of solid organ transplants and in people with severe immunodeficiency.

C. Reservoirs

Humans and other animals are the reservoir of HEV. Possible non-human reservoirs include wild pigs, deer and rodents.

D. Modes of transmission

Hepatitis E virus is usually spread by the fecal-oral route. The most common source of infection is fecally-contaminated drinking water. In developed countries, sporadic outbreaks have occurred following consumption of uncooked or undercooked pork or deer meat. Person-to-person transmission of HEV appears to be much less efficient than with hepatitis A virus, but it has been shown to occur in sporadic and outbreak settings. Mother-to-infant transmission occurs frequently in endemic countries and accounts for a significant proportion of infant mortality in those countries. See map for endemic countries: <http://www.cdc.gov/hepatitis/HEV/HEVfaq.htm>

E. Incubation period

The incubation period for HEV is approximately two to eight weeks.

F. Period of communicability

The period of communicability has not been clearly determined. Virus excretion in stool has been demonstrated up to 14 days after the onset of jaundice.

G. Treatment

Hepatitis E usually resolves on its own without treatment. Physicians should offer supportive therapy. Patients are typically advised to rest, get adequate nutrition and fluids, and avoid alcohol. For some patients antiviral therapy with ribavirin or interferon may be recommended.

H. Prophylaxis

There is no pre- or post-exposure prophylaxis.

I. Vaccination

There is no FDA-approved vaccine for HEV available in the United States. China has produced the first vaccine to prevent HEV infection, although it is not yet available globally.

J. Hepatitis E in Florida

Hepatitis E is endemic in the United States, with up to 21% seroprevalence, however, symptomatic HEV infection is uncommon and generally occurs among people who acquire HEV while traveling to highly endemic countries. Hepatitis E prevalence is highest in Asia and Africa.

In 2011, there were seven cases of HEV reported in Florida. Five of the seven infections were acquired outside the United States. In the previous five years, there were a combined total of five cases reported in the state.

3. CASE DEFINITION

A. Clinical description

An acute viral illness with:

- a) Discrete onset of symptoms,
AND
- b) Either jaundice **or** elevated liver enzymes.

Symptoms most commonly include fatigue, abdominal pain, loss of appetite/anorexia, nausea, vomiting or dark urine (tea colored).

B. Laboratory criteria for diagnosis

- Positive IgM anti-HEV,
OR
- Positive HEV RNA (PCR),
OR
- Positive total anti-HEV (both IgM and IgG).

One of the above, and meets the following criteria:

- IgM anti-HAV negative,
AND
- IgM anti-HBc negative (if done) or HBsAg negative,
AND
- Anti-HCV negative (if done).

C. Case classification

Confirmed: A case that meets the clinical case definition and is laboratory confirmed.

Probable: A case that has a discrete onset of symptoms, lacks jaundice or elevated liver enzymes, but is laboratory confirmed.

4. LABORATORY TESTING

A. Criteria for diagnosis

Testing for IgM and IgG anti-HEV is available only through some research and commercial reference laboratories. Definitive diagnosis should be made by demonstrating viral HEV RNA in serum or stool by PCR testing, which is only available at the CDC.

B. Services available at the BPHL

The Bureau of Public Health Laboratories (BPHL) does not currently offer tests for HEV. Suspected cases of HEV must be brought to the attention of Bureau of Epidemiology

(DCBE) staff. DCBE staff will coordinate shipping of samples to the CDC for serology and HEV RNA testing.

C. Testing requests

1. Contact the regional laboratory liaison to facilitate testing the sample at the CDC.
http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/_documents/investigationunitmap_11-22-13color.pdf

D. Interpretation of results:

Because anti-HEV assays are not approved by the FDA and their performance characteristics are not well defined, results should be interpreted with caution, particularly in patients lacking a discrete onset of symptoms or with no recent history of travel. Because the virus circulates in the body for one to two weeks after symptom onset, the inability to detect HEV in serum or stool does not eliminate the possibility that the person was infected with HEV.

HEV antibodies (anti-HEV): indicates past or present infection with HEV

anti-HEV immunoglobulin G (anti-HEV IgG): indicates past or recent HEV infection, or a false positive

anti-HEV immunoglobulin M (anti-HEV IgM): indicates current or recent HEV infection, or a false positive

HEV RNA PCR: detects the presence of absence of HEV RNA, the method of choice for diagnosis with HEV infection

5. CASE INVESTIGATION

A. Contact the physician or hospital

1. Confirm HEV infection has been diagnosed in the reported patient and symptoms are consistent with acute hepatitis.
2. Obtain as much information as possible about the patient, such as:
 - a. Contact information
 - b. Demographic information (e.g., DOB, gender, race, ethnicity)
 - c. Date of onset
 - d. Symptoms
 - e. Laboratory tests performed
 - f. Recent travel
3. Ask what information has been given to the patient, including whether the patient knows about the diagnosis.

4. Notify the physician that you will be contacting the patient as DOH follows up on all cases of HEV to assess risk factors, to better characterize the occurrence of HEV in Florida and to take necessary steps to prevent additional cases. Also, review infection control recommendation and address any concerns in regards to the CHD contacting the case.

B. Interview the case

1. Complete an interview as soon as possible after the case is reported to optimize recall.
 - a. Make at least three phone call attempts to reach the patient; calls should be made at different times of the day with at least one call being made in the evening.
 - b. If phone calls are unsuccessful, mail a letter to the patient requesting that he/she contact the CHD and/or conduct a home visit or leave a letter for the patient.
 - c. If the patient is unable to provide information, interview a proxy (e.g., a spouse, parent) to gather further information.
2. Once contact is made, education about HEV infection should be provided and an interview should be conducted to obtain any further information not already gathered from the provider or hospital. A viral Hepatitis Case Report Form is available to guide the investigation and assist in follow-up: http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/_documents/crf-hepatitis-viral.pdf.
3. Pertinent items to cover during the interview include:
 - a. Education
 - b. Demographic information (e.g., DOB, gender, race, ethnicity)
 - c. Identification of possible exposures and risks during exposure period (two to eight weeks prior to onset of symptoms)
 - i. Close contact (e.g., household member, sexual partner, shared a meal) with any person who had an illness compatible with HEV. Obtain each person's name and contact information.
 - ii. Contact with diapered children, children in childcare or other setting for preschool children, or with staff of these facilities.
 - iii. Travel outside the United States in the two to eight weeks before symptom onset (obtain travel dates, trip locations, and food history).
 - iv. Any food sources such as restaurants, other food services, or social gatherings/group settings where the patient ate a meal in the two to eight weeks before symptom onset date (obtain names, dates, and locations).
 - v. Sources of drinking water at home, at work, and during trips in the two to eight weeks before symptom onset date (obtain dates and trip locations).
 - vi. Consumption of any raw or partially cooked shellfish, pork, or deer meat in the two to eight weeks before symptom onset date (obtain dates and names of sources).
 - vii. Injection and non-injection drug use.
 - viii. Receipt of blood products or organ transplants.
 - d. Identify an outbreak by asking if any additional persons may have been the source of infection, or if there are other potentially infected persons, or contacts and potential secondarily infected persons. These persons can include personal contacts who were known or thought to be currently ill with similar symptoms and onset dates, and personal contacts with significant opportunity for fecal-oral exposure during the

period of communicability (one to two weeks before onset of symptoms until about 14 days after jaundice or symptom onset). These contacts can include:

- i. Household contacts
 - ii. Sexual contacts
 - iii. Persons who have eaten food prepared or handled by patient
 - iv. Child care contacts
 - v. Persons who have shared illicit drugs with the patient
 - vi. Others with ongoing close personal contact with the patient (e.g., family, friends, coworkers, patients, etc.)
- e. Any person with compatible illness should be reported and investigated in the same manner.
- i. Is the person in a sensitive situation?
 - 1) Food handler
 - 2) Child care worker
 - 3) Child care attendee
 - 4) Healthcare worker

C. Environmental assessment

An environmental assessment is indicated if a commercial food service facility, childcare center, or public water supply appears to be implicated as the source of infection.

D. Merlin data entry

Create a case in Merlin under disease code **HEPATITIS E-07053**. Enter available data, being sure to include all required fields on the Basic Data screen, complete the Case Symptoms screen, and attach all relevant laboratory results. Please note that liver function test results should be entered as a laboratory result. The extended data screen should also be completed in Merlin. Travel history, if relevant, should be entered as well.

6. CONTROLLING FURTHER SPREAD

A. Patient/Household education on prevention recommendations

1. Hepatitis E epidemiology and clinical manifestations
 - a. Modes of transmission
 - b. Incubation period
 - c. Symptoms (noting that persons may be infectious without being ill)
2. Control of infected patients
 - a. Improve personal hygiene and sanitation.
 - i. Patients should wash hands frequently, especially after bathroom visits and touching any soiled item. Caregivers should wash hands frequently, especially after changing diapers or touching any soiled item. Hand washing should be performed for at least ten seconds using soap and running water. Lather and rinse the palms, backs of hands, between fingers, under fingernails, and around wrists.
 - ii. Ensure sanitary disposal of all wastes.
 - iii. Frequently clean and disinfect bathrooms. Diaper changing areas and soiled toys of an infected person should also frequently be cleaned and disinfected.

- b. Isolation
 - i. Patients and caregivers should enforce strict enteric precautions (e.g., avoid close contact with others, hand hygiene, proper waste disposal) during the first two weeks of illness.
 - ii. Patients should not prepare food for others until two weeks after onset of illness.
- 3. General prevention
 - a. Improved sanitation and personal hygiene
 - i. Frequent hand washing, especially after using the bathroom, changing diapers, play time, handling of pets or soil, touching any soiled item, and before food preparation and eating
 - ii. Drink only safe water supplies
 - iii. Always wash raw fruits and vegetables
 - iv. Avoid consumption of raw or undercooked pork or deer meat

B. Isolation of cases

In addition to standard precautions, contact precautions are recommended for diapered and incontinent patients for the duration of illness.

C. Management of contacts

1. Provide education.
2. Symptomatic contacts of a confirmed patient should be referred to a health care provider and tested for HEV.

D. Infection control recommendations

1. Hospitalized cases should be treated using standard precautions.
2. Environmental cleaning of contaminated surfaces
 - a. The virus is inactivated by high temperature (85° C or 185° F) and by some disinfectants including a 1:100 dilution of household bleach in water or cleaning solutions containing quaternary ammonium and/or HCl.

E. Environmental measures

1. Food handlers
2. Childcare facilities
3. If a contaminated public or private water supply is implicated as the source of infection, notify the CHD environmental health service and request assistance.
4. If the patient's home is served by a failing sewage system, notify the CHD environmental health services for assistance in preventing exposure of others to the sewage effluent.

7. MANAGING SENSITIVE SITUATIONS

A. Identifying a sensitive situation

As defined by *Florida Administrative Code 64D-3.028*, a sensitive situation is a setting in which the presence of a case would increase significantly the probability of spread of the diagnosed or suspected disease or condition and would, therefore, constitute a public health hazard. Examples of such settings are schools, childcare facilities, hospitals and other patient care facilities, food storage, food processing establishments or other food outlets.

B. Food handlers

If HEV infection is diagnosed in a food handler, the following actions should be taken:

1. Exclude the patient from the food service facility for two weeks after onset of symptoms.
2. Notify CHD environmental health services for assistance.
3. Notify the facility employer and/or manager and provide education regarding the epidemiology of HEV virus and the importance of hand hygiene and glove use.
4. Visit the food facility.
 - a. Provide education to food handling staff as needed.
 - b. Evaluate all food handlers for recent HEV infection.
 - c. Ensure sick staff exclusions.
 - d. Ensure personal control measures (e.g., hand washing).
 - e. Ensure environmental control measures (e.g., no bare hand contact with prepared food, glove use).
5. Ask the facility employer and/or manager or other designee to monitor all food handlers at risk for HEV infection for one incubation period (64 days) after the last exposure to the case.

C. Childcare Settings

If HEV infection is diagnosed in a childcare worker, a child attendee, or two or more households of childcare attendees, the following actions should be taken:

1. Exclude any ill staff or attendees with HEV infection from the facility for one week after onset of symptoms.
2. Notify the CHD environmental health services for assistance.
3. Notify the childcare center director and provide education regarding the epidemiology of HEV infection and the importance of hand hygiene, environmental cleaning, and keeping the food preparation area separate from the diapering area. Diaper changers should not prepare foods; and water for formula or juices should not come from the bathroom or hand-washing faucet.
4. Visit the childcare facility.

- a. Provide education to the childcare workers and parents as needed.
 - b. Evaluate anyone with a gastrointestinal illness or jaundice within the past two to eight weeks and determine his or her immune status. Ensure sick staff and child exclusions.
 - c. Ensure personal control measures (e.g., hand washing).
 - d. Ensure environmental control measures (e.g., toy cleaning, food preparation, bathroom cleaning).
5. Ask the facility director and/or manager or other designee to monitor all staff and attendees at risk for HEV virus infection for one incubation period (60 days) after the last exposure to the case.
 6. To identify infections quickly, surveillance should be conducted by the CHD for hepatitis-like illness among households connected to the facility for one incubation period (60 days) after onset of last case. All households of attendees should be provided with basic information about HEV and hygiene, and instructed to contact the CHD immediately if anyone develops a hepatitis-like illness.

D. Hospitals

Standard precautions should be emphasized when a patient with jaundice or known or suspected HEV infection is admitted to the hospital. Contact precautions are recommended for diapered or incontinent individuals for the duration of the illness.

8. IMPORTANT LINKS

A. Viral Hepatitis Case Report Form:

http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/_documents/crf-hepatitis-viral.pdf

B. CDC Hepatitis E Page

<http://www.cdc.gov/hepatitis/HEV/index.htm>

C. WHO Hepatitis E Page

<http://www.who.int/mediacentre/factsheets/fs280/en/index.html>

9. REFERENCES

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