

HEPATITIS C

REPORTING INFORMATION

- **Class B2:** Report by the end of the business week after 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 to the local public health department in which the reporting health care provider or laboratory is located.
- Reporting Form(s) and/or Mechanism: [Viral Hepatitis Case Report form, Ohio Confidential Reportable Disease form](#) (HEA 3334, rev. 1/09), [Positive Laboratory Findings for Reportable Disease form](#) (HEA 3333, rev. 8/05), the local health department via the Ohio Disease Reporting System (ODRS), or telephone.
- Information collected from the [Viral Hepatitis Case Report form, Ohio Confidential Reportable Disease form](#) (HEA 3334, rev. 1/09), [Positive Laboratory Findings for Reportable Disease form](#) (HEA 3333, rev. 8/05) should be entered into ODRS and not mailed to the Ohio Department of Health (ODH), unless otherwise requested.
- Additional reporting information, with specifics regarding the key fields for ODRS Reporting can be located in [Section 7](#).

AGENT

Hepatitis C virus is classified in the *Flaviviridae* family, and is the only member of the *Hepacivirus* genus. Hepatitis C virus is a single-stranded RNA virus, 40-50nm in diameter.

TEST NAME ABBREVIATIONS

IgM anti-HAV	Immunoglobulin M antibody to hepatitis A virus
HBsAg	Hepatitis B surface antigen
IgM anti-HBc	Immunoglobulin M antibody to hepatitis B core antigen
Anti-HCV	Antibody to hepatitis C virus
HCV RNA	Hepatitis C virus RNA
NAT	Nucleic acid test
RIBA	Recombinant immunoblot assay
s/co	Signal to cut-off ratio
ALT (SGPT)	Serum alanine aminotransferase
AST (SGOT)	Serum aspartate aminotransferase
EIA	Enzyme immunoassay

CASE DEFINITION

Hepatitis C, Acute

Clinical Case Definition

An acute illness with discrete onset of symptoms (such as nausea, vomiting, abdominal pain and diarrhea) and either jaundice or abnormal serum aminotransferase levels (ALT or AST).

Laboratory Criteria for Diagnosis

- ALT levels greater than 400 IU/L, **AND**
- IgM anti-HAV negative, **AND**
- IgM anti-HBc negative, **AND** one of the following:
 - anti-HCV screening-test-positive verified by an additional more specific assay (e.g., RIBA or HCV RNA) or
 - anti-HCV screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay (e.g., ≥ 3.8 for EIA).

Case Classification

Suspect: A case that is reported by a health-care professional as acute hepatitis C without laboratory results.

Probable: A case that does not meet the clinical case definition, but has supportive serologic findings of hepatitis C infection, and is a clinically compatible case, as reported by a health-care professional.

Confirmed: A case that meets the clinical case definition and is laboratory confirmed, and is not known to have chronic hepatitis C.

Hepatitis C, Past or Present

Clinical Description

Persons with chronic HCV infection may be asymptomatic. They may have no evidence of liver disease or may have a spectrum of disease ranging from chronic hepatitis to cirrhosis or liver cancer.

Laboratory Criteria for Diagnosis

- Anti-HCV positive by EIA, verified by an additional more specific assay *or*
- HCV RIBA positive *or*
- HCV RNA positive *or*
- Anti-HCV positive by EIA with a signal to cut-off ratio predictive of a true positive as determined for the particular assay (e.g. ≥ 3.8 for EIA).

Case Classification

Suspect: A case that is reported by a health-care professional as chronic hepatitis C without laboratory results; or anti-HCV positive test by EIA that has not been verified by an additional and more specific assay, and the signal to cut-off ratios are unknown.

Probable: A case that is reported by a health-care professional as chronic hepatitis C with supportive serologic findings of hepatitis C infection (ODH); or a case that is anti-HCV positive by EIA and has ALT values above the upper limit of normal, but the anti-HCV result has not been verified by an additional more specific assay or the signal to cut-off ratio is unknown.

Confirmed: A case that is laboratory confirmed and does not meet the case definition for acute hepatitis C.

Comments

- 1) Up to 20% of acute hepatitis C cases will be anti-HCV negative when reported and will be classified as acute viral hepatitis C with undetermined etiology because some (5% - 10%) have not yet seroconverted and others (5% - 10%) remain negative even with prolonged follow-up.
- 2) Available serologic tests for anti-HCV do not distinguish between acute and chronic or past infection. Thus, other causes of acute hepatitis should be excluded for anti-HCV positive patients who have an acute illness compatible with viral hepatitis.

SIGNS AND SYMPTOMS

Acute infection is usually asymptomatic. Symptomatic infection is generally mild, with malaise being the most common manifestation. Fulminant disease is rare. After acute infection, 15% - 25% of persons appear to resolve their infection without sequelae as defined by sustained absence of HCV RNA in serum and normalization of ALT levels. Chronic hepatitis C virus infection develops in 55% - 85% of those infected. Active liver

disease develops in 60% - 70% of chronically infected persons and is accompanied by persistent or fluctuating ALT levels; the progression of disease is usually slow and without symptoms or physical signs during the first two or more decades after infection. Cirrhosis develops in 5% - 20% of the chronically infected over a period of 20-30 years, and hepatocellular carcinoma in 1% - 5%.

DIAGNOSIS

Hepatitis C is diagnosed by an anti-HCV screening test; two examples are enzyme immunoassay (EIA) and chemiluminescence immunoassay (CIA). Positive anti-HCV results are then confirmed with a more specific assay (e.g. recombinant immunoblot assay [RIBA] or NAT for HCV RNA) or confirmed by signal to cut-off ratio (s/co) predictive of a true positive (e.g. ≥ 3.8 for EIA or ≥ 8.0 for CIA). An anti-HCV-positive person is defined as one whose serologic results are screening-test-positive and supplemental-test-positive. Persons with a negative anti-HCV or a positive anti-HCV and a negative supplemental test result are considered uninfected, unless other evidence exists to indicate hepatitis C infection. Indeterminate supplemental test results have been observed in: recently infected persons who are in the process of seroconversion; persons chronically infected with hepatitis C; and persons with a false positive result, especially those at low risk for hepatitis C infection. The presence of hepatitis C infection can also be ascertained, either qualitatively or quantitatively, by detecting HCV RNA using gene amplification techniques (e.g. reverse transcriptase polymerase chain reaction [RT-PCR]). A negative HCV RNA indicates that viremia is absent, but it does not confirm a false positive EIA or that a patient has resolved their infection.

The table below summarizes interpretation of laboratory findings:

Laboratory Findings		Interpretation
Anti-HCV screening	Anti-HCV supplemental test	
Negative	Not applicable	Does not indicate hepatitis C infection
Positive with high s/co ratio	Not done	Probably indicates past or present hepatitis C infection*
Positive	RIBA positive	Indicates past or present hepatitis C infection
Positive	RIBA negative	Does not indicate hepatitis C infection
Positive	RIBA indeterminate	Hepatitis C antibody and infection status cannot be determined; another sample should be collected for repeat anti-HCV testing (>1 month) or for HCV RNA testing
Positive	HCV RNA positive	Indicates active hepatitis C infection
Positive	HCV RNA negative RIBA positive	The presence of anti-HCV indicates past or present hepatitis C infection; a single negative HCV RNA result does not rule out active infection
Positive	HCV RNA negative RIBA negative	Does not indicate hepatitis C infection
Positive	HCV RNA negative RIBA indeterminate	Anti-HCV screening probably a false-positive; does not indicate hepatitis C infection

*Samples with high s/co ratios usually (95%) confirm positive, but <5 of every 100 might represent false positives; more specific testing can be requested, if indicated.

EPIDEMIOLOGY

Source

Hepatitis C virus is found in human blood and blood products, semen and vaginal secretions.

Occurrence

Hepatitis C infection is prevalent throughout the world. Hepatitis C is the most common chronic bloodborne infection in the United States. Hepatitis C infection occurs among persons of all ages, but the highest incidence of new hepatitis C cases is found among persons 25-39 years of age. In 2005, the rates of new infection were similar across racial and ethnic groups, and rates of hepatitis C were similar for Hispanics and non-Hispanics. The higher prevalence of chronic infection among non-Hispanic blacks compared to other racial and ethnic groups indicates previous racial and ethnic disparities in incidence. Although the annual number of new infections has declined since 1989 by more than 90% to an estimated 20,000 in 2005, there are an estimated 4.1 million persons (1.6%) who have been infected with hepatitis C and about 3.2 million (1.3%) who are chronically infected. The peak prevalence is in persons 40-49 years of age, the majority of whom were likely infected during the 1970s and 1980s when rates for hepatitis C were the highest. Those who are chronically infected serve as a source of transmission to others and are at risk for chronic liver disease or other hepatitis C -related chronic diseases.

Mode of Transmission

Currently, hepatitis C is rarely transmitted by blood transfusion or organ transplantation; however, prior to donor screening, both blood transfusion and organ transplantation carried a high risk for transmission of hepatitis C. Injecting drug use, through transfer of infected blood by sharing needles or other drug paraphernalia, is currently the predominant mode of hepatitis C transmission in the United States. Nosocomial transmission of hepatitis C is possible if infection-control techniques or disinfection procedures are inadequate and contaminated equipment is shared among patients. Health-care, emergency medical and public safety workers who are exposed to blood in the workplace are at risk of being infected with bloodborne pathogens, including hepatitis C. Sexual transmission of hepatitis C appears to occur, but the virus is inefficiently spread in this manner. Hepatitis C transmission to nonsexual household contacts, presumably through direct or inapparent percutaneous or permucosal exposure to infectious blood or body fluids containing blood, is uncommon. There is a 5%-6% risk that hepatitis C may also be transmitted perinatally from HCV RNA-positive pregnant women to their infants. If a woman is co-infected with HIV, this risk increases to approximately 14%.

Period of Communicability

Communicability lasts from one or more weeks before onset of first symptoms through the acute clinical course of the disease and indefinitely in the chronic carrier stages.

"At-Risk" Groups

Groups at high risk of acquiring this infection are injection drug users who share needles or other drug paraphernalia; prison inmates; heterosexuals with multiple partners; hemodialysis patients; medical, dental and laboratory workers with exposure to blood; and household or other close contacts of known cases.

Incubation Period

The incubation period ranges from 2 weeks to 6 months with an average of 6-7 weeks.

PUBLIC HEALTH MANAGEMENT

Case

Investigation

Determine through the patient's physician if the patient is/was acutely ill and meets the case definition (see above).

Treatment

No therapeutic measures have been proven effective for acute hepatitis C following the onset of disease. It has been suggested that treatment should be considered in most instances after 2-4 months of waiting for spontaneous clearance, but more data is needed. Diet and rest should be dictated by the individual's sense of well-being. Persons with acute or chronic liver disease due to viral hepatitis or other causes are advised to avoid drinking alcohol and eating raw shellfish, such as oysters.

Antiviral therapy is recommended for patients with chronic hepatitis C, who are at greatest risk for progression to cirrhosis. These persons include anti-HCV-positive patients with persistently elevated serum alanine aminotransferase (ALT) levels, detectable HCV RNA and a liver biopsy that indicates either portal or bridging fibrosis or at least moderate degrees of inflammation and necrosis. Currently, treatment consists of a combination of pegylated interferon injected once a week along with ribavirin in pill form taken twice daily. Interferon monotherapy is generally reserved for patients in whom ribavirin is contraindicated. Because of advances in the field of antiviral therapy for chronic hepatitis C, with resultant changes in the standards of practice, the most up-to-date information may be obtained through consultation with specialists knowledgeable in this area.

Isolation

None, beyond the universal application of blood and body fluid precautions. Persons diagnosed with hepatitis C should not donate blood.

Prevention and Control

General control measures against hepatitis B virus infection apply for hepatitis C virus infection as well (see hepatitis B elsewhere in this manual). The value of prophylactic immunoglobulin (IG), however, is not clear. Current data suggest that postexposure prophylaxis with IG is not effective in preventing hepatitis C infection. No assessments have been made of postexposure use of antiviral agents (e.g., interferon) to prevent hepatitis C infection. Mechanisms of the effect of interferon in treating patients with hepatitis C are poorly understood, and an established infection might need to be present for interferon to be an effective treatment. Interferon is currently FDA-approved only for treatment of chronic hepatitis C. There is no vaccine available.

Special Information

Personnel from the Bureau of Infectious Disease Control at the ODH are available to answer questions regarding hepatitis C. Please call 614-644-1838.

The Division of Viral Hepatitis, Centers for Disease Control and Prevention (CDC), has developed an automated telephone system to provide information on viral hepatitis. This "Hepatitis Hotline" (888-4HEPCDC or 888-443-7232) contains general information on all types of hepatitis, including risks, modes of transmission, prevention, serologic diagnosis, and infection control. Up-to-date statistics on incidence for the different

types of hepatitis are also included. Information disseminated on the Hepatitis Hotline is comprehensive and is a valuable public health tool in assisting anyone with questions regarding viral hepatitis.

Many excellent fact sheets are also available at the CDC Website:
<http://www.cdc.gov/hepatitis>.

Hepatitis C Case Classifications

Revised May 2007

Disease Stage	Case Status	Onset Date	Hlth Care Prof.	Elevated ALT Levels	IgM anti-HAV	IgM anti-HBc	Anti-HCV	s/co ratio	RIBA	HCV RNA	Lab data is weakly positive or missing
Symptomatic											
Acute	Confirmed	X		>400	(-)	(-)	(+)	PT+			
	Confirmed	X		>400	(-)	(-)			(+)		
	Confirmed	X		>400	(-)	(-)				(+)	
	Probable		X		(-)	(-)	(+)	PT+			
	Probable		X		(-)	(-)			(+)		
	Probable		X		(-)	(-)				(+)	
	Suspect		X								X
Case is not known to be symptomatic											
Chronic	Confirmed						(+)	PT+			
	Confirmed								(+)		
	Confirmed									(+)	
	Probable			>N			(+)				
	Probable		X				(+)				
	Suspect		X								X
	Suspect						(+)				

***Terms and symbols used in this table:**

Hlth Care Prof. = Case is reported by a healthcare professional as acute or chronic hepatitis

(-)* = A negative test result (if done) (+) = A positive test result

>N= greater than the reference range for the test

PT+ = the signal to cut-off ratio is predictive of a true positive for the particular assay (e.g. ≥ 3.8 for EIA and ≥ 8.0 for CIA)

Lab data is weakly positive or missing = Hepatitis C infection is reported without lab results or labs may be weakly or borderline positive, indeterminate RIBA or NAT for HCV RNA is below reference range

Source: ODH Hepatitis Surveillance Program May 2007.

What is hepatitis C?

Hepatitis C is a liver disease caused by the hepatitis C virus, which is found in the blood of persons who have this disease. Hepatitis C is spread by contact with the blood of an infected person.

How is hepatitis C diagnosed?

There are several blood tests that can be done to determine if you have been infected with hepatitis C. Your doctor may order just one or a combination of these tests. The following are the types of tests your doctor may order and the purpose for each:

Anti-HCV (antibody to hepatitis C)

- EIA (enzyme immunoassay).
This test is usually done first. If positive, it should be confirmed.
- RIBA (recombinant immunoblot assay).
A supplemental test used to confirm a positive EIA test.

Anti-HCV does not tell whether the infection is new (acute), chronic (long-term) or is no longer present (resolved).

Who should get tested for hepatitis C?

- persons who ever injected illegal drugs, including those who injected once or a few times many years ago
- persons who were treated for clotting problems with a blood product made before 1987 when more advanced methods for manufacturing the products were developed
- persons who were notified that they received blood from a donor who later tested positive for hepatitis C
- persons who received a blood transfusion or solid organ transplant before July 1992 when better testing of blood donors became available
- long-term hemodialysis patients
- persons who have signs or symptoms of liver disease (e.g., abnormal liver enzyme tests)
- healthcare workers after exposures (e.g., needle sticks or splashes to the eye) to hepatitis C-positive blood on the job
- children born to hepatitis C-positive women

How is hepatitis C virus spread from one person to another?

Hepatitis C virus is spread primarily by direct contact with human blood. For example, you may have gotten infected with hepatitis C virus if:

- you ever injected street drugs, because the needles and/or other drug “works” used to prepare or inject the drug(s) may have had someone else's blood that contained hepatitis C virus on them
- you received blood, blood products, or solid organs from a donor whose blood contained hepatitis C virus
- you were ever on long-term kidney dialysis as you may have unknowingly shared supplies/equipment that had someone else's blood on them
- you were ever a healthcare worker and had frequent contact with blood on the job, especially accidental needle sticks
- your mother had hepatitis C at the time she gave birth to you; during birth her blood may have gotten into your body
- you ever had sex with a person infected with hepatitis C virus

- you lived with someone who was infected with hepatitis C virus and shared items such as razors or toothbrushes that might have had his/her blood on them

Is there any evidence that hepatitis C virus has been spread during medical or dental procedures done in the United States?

Medical and dental procedures done in most settings in the United States do not pose a risk for the spread of HCV. There have, however, been some reports that hepatitis C virus has been spread between patients in hemodialysis units where supplies or equipment may have been shared between patients.

Can hepatitis C virus be spread by sexual activity?

Yes, but this does not occur very often. If you are having sex, but not with one steady partner:

- you and your partners can get other diseases spread by having sex (e.g. HIV, hepatitis B, gonorrhea or chlamydia)
- you should use latex condoms correctly and every time you have sex
- you should get vaccinated against hepatitis B

Can hepatitis C virus be spread within a household?

Yes, but this does not occur very often. If hepatitis C virus is spread within a household, it is most likely due to direct exposure to the blood of an infected household member.

Should pregnant women be routinely tested for anti-HCV?

No. Pregnant women have no greater risk of being infected with hepatitis C virus than non-pregnant women. If pregnant women have risk factors for hepatitis C, they should be tested for anti-HCV.

What is the risk that hepatitis C virus-infected women will spread hepatitis C virus to their newborn infants?

About 5 out of every 100 infants born to hepatitis C virus-infected women become infected. This occurs at the time of birth, and there is no treatment that can prevent this from happening. Most infants infected with hepatitis C virus at the time of birth have no symptoms and do well during childhood. More studies are needed to find out if these children will have problems from the infection as they grow older. There are no licensed treatments or guidelines for the treatment of infants or children under the age of three years infected with hepatitis C virus. Children with elevated ALT (liver enzyme) levels should be referred for evaluation to a specialist familiar with the management of children with hepatitis C virus-related disease.

Should a woman with hepatitis C be advised against breast-feeding?

No. There is no evidence that breast-feeding spreads hepatitis C virus. Hepatitis C virus -positive mothers should consider abstaining from breast-feeding if their nipples are cracked or bleeding.

How can you protect yourself from getting hepatitis C and other diseases spread by contact with human blood?

- Do not ever shoot drugs. If you shoot drugs, stop and get into a treatment program. If you cannot stop, never reuse or share syringes, water or drug works, and get vaccinated against hepatitis A and hepatitis B.
- Do not share toothbrushes, razors or other personal care articles. They might have blood on them.

- If you are a healthcare worker, always follow routine barrier precautions and safely handle needles and other sharps. Get vaccinated against hepatitis B.
- Consider the health risks if you are thinking about getting a tattoo or body piercing. You can get infected if:
 - the tools that are used have someone else's blood on them.
 - the artist or piercer doesn't follow good health practices, such as washing hands and using disposable gloves.

What can persons with hepatitis C virus infection do to protect their livers?

- Stop using alcohol.
- See your doctor regularly.
- Do not start any new medicines or use over-the-counter, herbal and other medicines without a physician's knowledge.
- Get vaccinated against hepatitis A and hepatitis B.

What other information should patients with hepatitis C be aware of?

- Hepatitis C virus is not spread by sneezing, hugging, coughing, food or water, sharing eating utensils or drinking glasses, or casual contact.
- Persons should not be excluded from work, school, play, child-care or other settings on the basis of their hepatitis C virus infection status.
- Involvement with a support group may help patients cope with hepatitis C.

Should persons with chronic hepatitis C be vaccinated against hepatitis B?

If persons are in risk groups for whom hepatitis B vaccine is recommended, they should be vaccinated. ([A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices \(ACIP\) Part II: Immunization of Adults](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5516a1.htm?s_cid=rr5516a1_e) found at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5516a1.htm?s_cid=rr5516a1_e).

What are the chances of persons with hepatitis C virus infection developing long term infection, chronic liver disease, cirrhosis, liver cancer, or dying as a result of hepatitis C?

Of every 100 persons infected with HCV about:

- 85 persons may develop long-term infection,
- 70 persons may develop chronic liver disease,
- 20 persons may develop cirrhosis over a period of 20 to 30 years, and
- 5 persons may die from the consequences of long term infection (liver cancer or cirrhosis).

What is the treatment for chronic hepatitis C?

Antiviral drugs such as interferon used alone or in combination with ribavirin, are approved for the treatment of persons with chronic hepatitis C. Interferon works in 10-20 persons out of 100 treated. Interferon combined with ribavirin works in up to 50 persons out of 100 treated for patients infected with the most common genotype found in the U.S. (genotype 1) and up to 80 out of 100 persons treated for patients infected with genotypes 2 or 3. Ribavirin, when used alone, does not work.

What is the risk for hepatitis C virus infection from a needle stick exposure to hepatitis C virus contaminated blood?

After needle stick or sharps exposure to hepatitis C virus-positive blood, about 2 (1.8%) healthcare workers out of 100 will get infected with hepatitis C virus (range 0% - 10%).

What are the recommendations for follow-up of healthcare workers after exposure to hepatitis C virus-positive blood?

Anti-viral agents (e.g., interferon) or immune globulin should not be used for postexposure prophylaxis.

1. For the source, baseline testing for anti-HCV.
2. For the person exposed to a hepatitis C virus-positive source, baseline and follow-up testing including:
 - o baseline testing for anti-HCV and ALT activity; and
 - o follow-up testing for anti-HCV (e.g., at 4-6 months) and ALT activity. (If earlier diagnosis of hepatitis C virus infection is desired, testing for HCV RNA may be performed at 4-6 weeks.)
3. Confirmation by supplemental anti-HCV testing of all anti-HCV results reported as positive by enzyme immunoassay.

Should hepatitis C virus-infected healthcare workers be restricted in their work?

No. There are no recommendations to restrict a healthcare worker who is infected with hepatitis C virus. The risk of transmission from an infected healthcare worker to a patient appears to be very low. As recommended for all healthcare workers, those who are hepatitis C virus-positive should follow strict aseptic technique and standard precautions, including appropriate use of hand washing, protective barriers and care in the use and disposal of needles and other sharp instruments. Hepatitis C virus-infected healthcare workers who perform exposure-prone procedures should refer to the [Ohio Department of Health Updated Recommendations for HIV, HCV, and HBV Infected Healthcare Workers, 2006](#) which can be found at www.odh.ohio.gov/alerts/alerts.aspx.