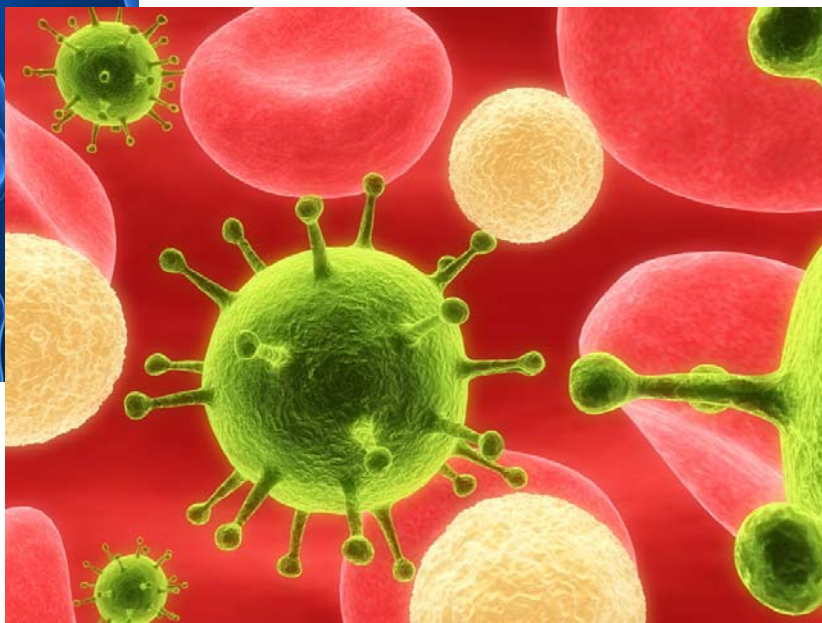
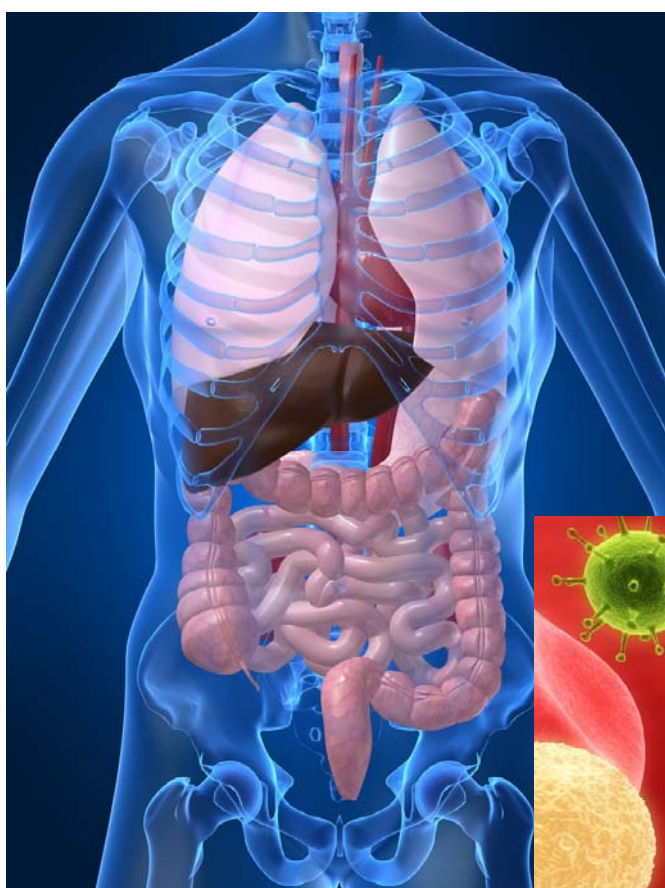


## Hepatitis C

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## Introduction/Purpose Statement

Hepatitis C. It's a virus that many of us know little about. It has been called the "silent killer" with good reason. The virus enters the body silently and stays there in the shadows for decades, slowly doing damage to one of the most important organs in the body. The purpose of this program is to give you information on what hepatitis C is, the risks for acquiring it, its symptoms, diagnosis, and treatment, and how to protect yourself from occupational exposure to Hepatitis C.

## Target Audience

This home study was designed for nurses with no familiarity with Hepatitis C; however, all health care professionals are invited to complete this packet.

## Content Objectives

1. Describe the diagnostic tests for Hepatitis C infection.
2. Describe the signs of Hepatitis C infection.
3. List the medications used to treat Hepatitis C.
4. Describe methods that may be utilized to reduce the risk of exposure to Hepatitis C.

## Disclosures

In accordance with ANCC requirements governing approved providers of education, the following disclosures are being made to you prior to the beginning of this educational activity:

### **Requirements for successful completion of this educational activity:**

In order to successfully complete this activity you must read the home study, complete the post-test and evaluation, and submit them for processing.

### **Conflicts of Interest**

It is the policy of the Twin Cities Health Professionals Education Consortium to provide balance, independence, and objectivity in all educational activities sponsored by TCHP. Anyone participating in the planning, writing, reviewing, or editing of this program are expected to disclose to TCHP any real or apparent relationships of a personal, professional, or financial nature. *There are no conflicts of interest that have been disclosed to the TCHP Education Consortium.*

### **Relevant Financial Relationships and Resolution of Conflicts of Interest:**

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1. Writers, content reviewers, editors and/or program planners will be instructed to carefully review the materials to eliminate any potential bias.
2. TCHP will review written materials to audit for potential bias.
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*This activity has received no commercial support outside of the TCHP consortium of hospitals other than tuition for the home study program by non-TCHP hospital participants.*

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## Contact Hour Information

<p>For completing this <b>Home Study and evaluation</b>, you are eligible to receive:</p>	<p><b>1.0 MN Board of Nursing contact hours / 0.83 ANCC contact hours</b></p> <p><b>Criteria for successful completion:</b> You must read the home study packet, complete the post-test and evaluation, and submit them to TCHP for processing.</p> <p>The Twin Cities Health Professionals Education Consortium is an approved provider of continuing nursing education by the Wisconsin Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.</p>
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Please see the last page of the packet before the post-test for information on submitting your post-test and evaluation for contact hours.

## Introduction

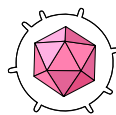
The liver is one of the most vital organs in the body. When it is working properly, the liver:

- Produces bile salts to break down fat in the foods that you eat
- Eliminates bilirubin, produced when a red blood cell is broken down
- Metabolizes estrogen, progesterone, and testosterone
- Metabolizes drugs and 90% of alcohol
- Metabolizes the carbohydrates, fats, and proteins in the foods that you eat
- Makes plasma proteins and clotting factors
- Stores minerals and vitamins
- Filters blood to remove bacteria and particulate matter

The liver, located on the right side of the body under the diaphragm.

Hepatitis is a term that is used to describe the inflammation of the liver. Hepatitis can be caused by a number of things, including alcohol abuse, medications, illegal drug use/abuse, chemical exposure, and viruses.

### *The Viruses That Cause Hepatitis*



There are six viruses that are known to cause hepatitis: A, B, C, D, E, and G. Hepatitis F is under investigation. Each of the viruses has a separate structure, as well as different signs of infection, virulence, and re-infection potential.

**Hepatitis A virus (HAV)** was one of the first hepatitis viruses to be discovered. This virus is transmitted through the oral-fecal route, mainly through contaminated food and water. Exposure and infection with HAV provides lifelong immunity. Vaccination is available against HAV. It may not prevent infection in people who do not achieve protective antibody titers.

**Hepatitis B virus (HBV)** accounts for the majority of acute hepatitis infections. Most people who are infected with Hepatitis B will recover completely and will be immune to further infections by HBV. Approximately 2 – 10% of persons will develop chronic hepatitis B. A vaccination for HBV is currently being given to children because the incidence of chronic infection is higher. Adults who are at higher risk for HBV should also be vaccinated.

**Hepatitis D virus (HDV)**, also known as Delta hepatitis, causes an infection only when Hepatitis B is involved. There is an abnormality within the structure of this virus

that prevents it from “living alone.” So, to acquire HDV, a person needs to be infected with HBV first.

**Hepatitis E** virus (HEV) is transmitted through the oral-fecal route like HAV, often through contaminated water. Rare in the United States, Hepatitis E is endemic in Mexico, parts of Africa, and Asia.

**Hepatitis G** virus (HGV) is a blood borne virus which is not common, but can occur in people who have received transfusions, who are injectable drug users, and who already have Hepatitis C. Infection with HGV leads to chronic infection in 90-100% of all people, but is not felt to be clinically significant. It is rare in the United States.

## Hepatitis C virus (HCV)

According to 1997 National Institute of Health (NIH) data, there are about 4 million persons in the United States who are infected with the hepatitis C virus<sup>1</sup>. The CDC estimates that 40% of chronic liver disease is HCV related. Eight to 10,000 people die each year as a result of HCV related cirrhosis and liver cancer.<sup>2</sup> The number of deaths is expected to triple in the next 1-2 decades.

Hepatitis C is a chameleon. When it enters the body, it stimulates an immune response, causing the body to make an antibody called anti-HCV. Soon after it enters, though, the virus mutates into a different shape – one that the body does not recognize. Through the course of many years, the virus changes multiple times, remaining almost hidden from the immune system. The incidence of new infection with HCV has dramatically declined in the last ten years, but the consequences of past infections are now being seen clinically.



### *Why is Hepatitis C such a concern?*

Because the Hepatitis C virus mutates, the body cannot mount an adequate immune response – which means that Hepatitis C can not be eradicated in most people. About 85% of people infected with HCV will develop a chronic infection. This same mutation makes it extremely difficult for scientists to develop a vaccine to prevent Hepatitis C infection. It's like trying to hit a moving target!

HCV likes to hide in the shadows. Many people who acquire HCV have no symptoms until decades after the infection. Others have mild symptoms, such as fatigue, mild right upper quadrant pain or tenderness, nausea, poor appetite, or muscle and joint pains. Depression is also

quite common in HCV patients. Very few people develop symptoms right away that would cause them to seek health care.

The NIH estimates that about 20% of the people with chronic Hepatitis C will develop cirrhosis of the liver over at least 20-30 years. Cirrhosis is a serious condition of the liver where liver cells have been destroyed. Cirrhosis can lead to liver failure. In fact, Hepatitis C has become the number one reason for liver transplants in the last five years. In a smaller percentage (1-5%), some people with chronic HCV will develop hepatocellular carcinoma (HCC). In some parts of the world (i.e., Japan), the chance of developing HCC is much higher.

### *What else can happen with Hepatitis C?*

Hepatitis C seems to trigger the body's immune system to make auto-antibodies. There are several extrahepatic diseases, all "autoimmune," that can occur with Hepatitis C:

1. Cryoglobulinemia<sup>3</sup> -- Over 50% of patients with HCV develop cryoglobins (not all are symptomatic).
2. Membranoproliferative glomerulonephritis<sup>5</sup>
3. Porphyria cutanea tarda<sup>4</sup>
4. Thyroid dysfunction in 5-12% of patients with HCV.

Other diseases that may have a link to Hepatitis C include seronegative arthritis, Sjogren syndrome, autoimmune thyroiditis, lichen planus, and B-cell lymphomas.<sup>6</sup> Very rarely, Mooren corneal ulcers, idiopathic pulmonary fibrosis, polyarteritis nodosa, and aplastic anemia may develop.

## Recap: Why is it so serious?

- ◆ The body has an inadequate immune system response
- ◆ Scientists are unable to make a vaccine
- ◆ High percentage of infected people develop chronic hepatitis
- ◆ There are few symptoms
- ◆ Cirrhosis, liver failure, and liver cancer can result
- ◆ Extrahepatic disorders may occur

## Risk Factors for Hepatitis C Infection

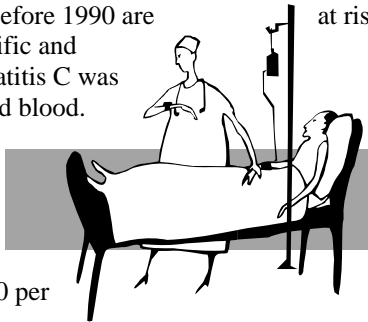
The Hepatitis C virus is a blood-borne pathogen. People who have contact with blood or body secretions of someone who is infected with Hepatitis C are at risk.

People who are most at risk for Hepatitis C are **injectable drug users**. Even people who have only used injectable drugs once or twice may have become infected with HCV.



According to the NIH, more than 50% of all new cases of HCV are related to injection drug use, and 50-80% of all new injectable drug users become infected within 6-12 months<sup>7</sup>. **Intranasal cocaine users** are also at risk for Hepatitis C – probably through shared equipment.

People who received **donated blood**, particularly blood from a paid person, before 1990 are at risk. In 1990, a more specific and rigorous test for Hepatitis C was developed for donated blood. All blood in the United States is now routinely tested. The risk of infection is now 1:10,000 to 1:100,000 per unit administered<sup>8</sup>.



People who have had **solid organ transplants** or who have **cancer requiring chemotherapy** are more at risk for acquiring HCV. **Hemophiliacs** who used clotting factors prior to 1985 have a prevalence of HCV infection as high as 90%<sup>9</sup>. After 1985, most plasma products (clotting factors, albumin, and immune globulin) were required to go through inactivation or be negative for HCV – RNA before release.

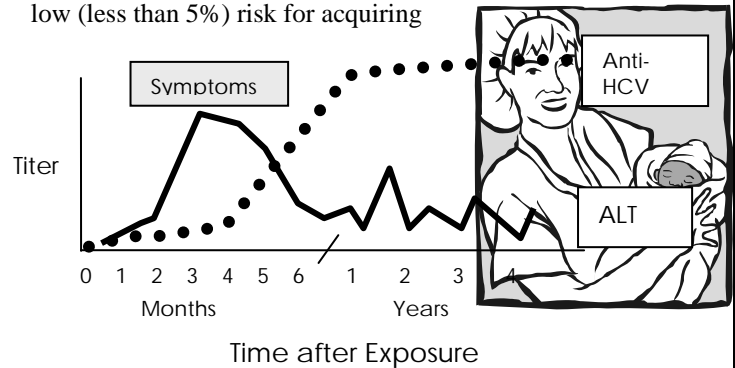


At lower risk for infection are people who have **sex** with HCV-infected people. The risk is higher if the partner is also co-infected with HIV or another sexually transmitted disease, or has sex with multiple partners – about 6% (range 1 – 10%)<sup>10</sup>. The risk of transmission in a long-term monogamous relationship is thought to be minimal – about 1.5% (range 0 – 4.4%)

**Hemodialysis** patients are also at risk – the incidence is currently reported at 2% per year; however, between 10-20% of hemodialysis patients have been infected with HCV. The discrepancy may be related to underreporting and to the lack of clear signs and symptoms.

The risk of acquiring HCV to **health care workers** averages 1-2%.<sup>11</sup> After an accidental needle stick or other sharp exposure, the risk for sero-conversion is 1.8% (range 0 – 7%)<sup>12</sup>. The CDC mentions one case report of transmission with a blood splash to the conjunctiva.

**Infants who are born to HCV infected mothers** have a low (less than 5%) risk for acquiring



HCV. Babies born to mothers with HCV and HIV had a higher transmission rate (5-36%). Infants cannot be reliably tested with reliability until they are 12 months old because of the mother's antibodies in the baby's system. There is no contraindication to breast feeding by HCV positive mothers.

### Who MAY be at risk for HCV?

- People who are exposed during medical, dental, or surgical procedures;
- People who are exposed during tattooing;
- People who have body piercing.

### Who is NOT at risk for HCV?

In the absence of all other risk factors, there has been no association found with:

- Military service
- Acupuncture
- Foreign travel

## Screening & Testing for HCV

All patients are now routinely asked questions regarding their risk for acquisition of blood-borne diseases, such as Hepatitis B and HIV. The risk factors for HCV are similar.

### *Who should be tested?*

Some people are at higher risk for HCV and may be candidates to test for anti-HCV, the antibody that the body makes to protect itself from HCV. The CDC recommends testing if you:

- ever injected illicit drugs, even a few times years ago
- received clotting factor concentrates before 1985
- received a blood or blood product transfusion before 1990
- received a solid organ transplant before 1992
- have ever had hemodialysis
- have persistently elevated liver enzymes

There may be specific situations which also call for anti-HCV screening, including sex partners of HCV-infected people, infants (greater than 12 months old) born to HCV-infected women, and health care workers after a needle, sharp, or mucosal exposure to anti-HCV or PCR positive blood.

### *What blood tests are available for diagnosis?*

#### *Anti-HCV*

The most common test that is done to check for HCV is the anti-HCV. This test is an enzyme immunoassay (EIA), a test that looks for antibodies to the virus. Most people (7 out of 10) have anti-HCV in their blood when they begin to have symptoms. About 90% of people are positive for anti-HCV within three months of when the symptoms start. The problem? Many people don't have symptoms and so don't seek testing immediately.

#### *PCR*

Tests to determine the presence or absence of the Hepatitis C virus are still in the research stage, and are not approved by the FDA. These tests include the *generic polymerase chain reaction (PCR)*. The PCR tests actually look for the RNA of the virus. A person who is infected with HCV would have a PCR test result of "*HCV-RNA positive*." Institutions may do this test and not the anti-HCV test.

#### *Quantitative PCR and branched DNA test*

Where the PCR looked for the **presence** of HCV-RNA, quantitative PCR and branched DNR tests look for the

**amount** of HCV-RNA in the blood. The usual term for the amount of virus found in the blood is the "viral load." These tests are not FDA-approved or standardized, but have been used to determine response to treatment. The amount of virus has not been correlated with the amount of liver damage. These tests are expensive and are generally ordered by the treating physician.

#### *Genotyping*

There are three major genotypes of HCV in the United States. Genotype 1 accounts for about 75% of cases, genotype 2 for about 15%, and genotype 3 for about 7%. Patients with genotypes 2 and 3 respond to treatment much better and more quickly than do those with genotype 1. This test also would generally be ordered by the treating physician.

#### *Alanine Aminotransferase (ALT)*

ALT is an enzyme that is found in the liver and other tissues. If there is damage to the liver because of hepatitis or cirrhosis, the enzyme will leak into the blood stream, causing an increased serum level. Serial ALT tests are performed to determine what type of pattern will emerge. The ALT will rise in many patients within a range of 15-150 days from exposure; however, the ALT may remain normal in chronic HCV infection. Typically, the ALT level will have peaks and troughs. There does not seem, at this time, to be a correlation between ALT levels and extent of liver damage.

### *What other tests can be done in the diagnosis of Hepatitis C?*

A liver biopsy may be done, not necessarily to diagnose Hepatitis C, but to determine the extent of damage caused by Hepatitis C. The biopsy produces cells to be examined for inflammation, scarring, necrosis, or other histologic changes. The liver biopsy is the most reliable way to appreciate the extent of the liver disease.

## Physical Examination

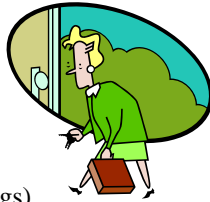
One of the problems with Hepatitis C is that many people don't have symptoms during the **acute** part of the infection. About 60-70% of all people who are infected have no symptoms at all. Twenty to 30% have jaundice, and 10-20% have non-specific complaints of fatigue, loss of appetite, and abdominal pain. Acute HCV is rarely seen and not much is known about it.

In 80% of those people who have symptoms, the serum bilirubin is elevated to over 3.0 mg/dl (average of 4.1)<sup>13</sup>. The serum alanine aminotransferase (ALT) may also be elevated above 600 IU/l with an average of 1410.<sup>14</sup>

The majority of patients who are diagnosed with HCV are found to have the chronic infection during another examination, such as a routine physical or blood donation.

In **chronic** HCV, few people have signs and symptoms. If they do, the symptoms are vague and non-specific:

- Marked fatigue
- Muscle weakness
- Depression
- Right upper quadrant pain
- Itching
- Neuropathy
- Emotional lability (mood swings)



Chronic hepatitis occurs in over 85% of all infections. In 10% of chronic hepatitis cases, patients will have splenomegaly, ascites, coagulopathy, and bleeding esophageal varices, all symptoms of cirrhosis.

People may be in **end-stage liver disease** by the time they come in for treatment. Symptoms that the person may come in with include:

- muscle weakness
- wasting
- fluid retention
- easy bruising
- marked fatigue
- upper GI bleeding
- jaundice
- dark urine
- itching
- depression
- esophageal varices (from cirrhosis)
- ascites (from cirrhosis)
- encephalopathy (from cirrhosis)

### *What are the laboratory markers of HCV infection?*

1. The alanine (ALT) and aspartate aminotransferases (AST) usually are 0 – 20 times greater than the upper limit of normal.
2. Iron and ferritin are slightly increased in some patients.

### *Differential Diagnosis*

Physicians must be careful to look at all of the diagnoses that the symptoms may fit. The NIH has identified certain disease processes that may be confused with HCV:

- hepatitis B
- alcohol related hepatitis
- autoimmune hepatitis
- nonalcoholic steatohepatitis (fatty liver)
- sclerosing cholangiitis

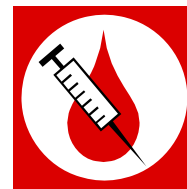
- Wilson's disease
- alpha<sub>1</sub>-antitrypsin-deficiency related disease
- medication-induced liver disease

## Treatment of Hepatitis C

One of the treatments for Hepatitis C is alpha-interferon, an antineoplastic agent. Not everyone with Hepatitis C is a candidate for alpha-interferon. The people who would be treated are those with:

1. detectable HCV-RNA
2. a liver biopsy showing fibrosis or inflammation whether ALT level is elevated or normal

### *Peginterferon plus ribavirin treatment*



Peginterferon alpha-2a or alpha-2b is given weekly by subcutaneous injection. Ribavirin is given daily by mouth. Dosages of both medications depends of genotype. Duration of therapy for genotype 1 is typically 48 weeks, but if there is no response at

week 12, treatment is stopped. Conversely if there is a rapid response (no detectable virus at 4 weeks), treatment can be discontinued at 24 weeks. For genotypes 2 and 3, duration of therapy is typically 24 weeks, but rapid responders 12-16 weeks is adequate. Lack of response is unusual with genotypes 2 and 3.

Interferon causes many side effects. Ten to 40% of patients need to have their dosage decreased to manage the side effects; another 5-15% must have interferon discontinued because of the side effects.

The side effects related to interferon treatment are divided into two categories: early and late. Early effects are somewhat like the flu and may go away with time. Later side effects include fatigue, bone marrow suppression, apathy, cognitive changes, irritability, and severe depression.

There are side effects from ribavirin. Ribavirin can cause hemolytic anemia, which means that people with pre-existing anemia, bone marrow suppression, renal disease, or ischemic heart or brain disease should not receive ribavirin. Ribavirin is also highly teratogenic —women should reliably be on birth control before receiving this drug. Other common side effects are<sup>15</sup>:

- anemia
- fatigue and irritability
- itching
- skin rash
- nasal stuffiness, sinusitis, and cough

These patients need close follow-up because of these side effects. Patients can have severe flu-like symptoms as well as **decreased hemoglobin, platelet count, white blood cells** with treatment, requiring reductions accordingly. **Depression** can become very severe during treatment and needs to be closely monitored.

Treatment may be less effective in people with high iron levels, and/or a high viral load, and/or genotype I.

### *What doesn't work?*

Corticosteroids and ursodiol have been tried with no success.

### *Who shouldn't be treated?*

The following people should not be treated:

1. People who continue to abuse drugs, or who have been abstinent for less than 6 months
2. People who have a history of major depression unresponsive to treatment, severe cytopenias, active, untreated hyperthyroidism, renal transplant, or have evidence of an active autoimmune disease
3. Women who are pregnant or breastfeeding

### *Who falls into the "treatment is unclear" category?*

There are some people for whom treatment is at the discretion of the physician. Risks and benefits should be weighed carefully before deciding on a course of action.

1. People who have decompensated cirrhosis – that is they have jaundice, ascites, variceal bleeding or encephalopathy.
2. People who have persistent ALT elevations, but don't have severe cellular changes in the liver.
3. People who are under 18 years or over 65 years of age
4. People who abuse alcohol, but that is evaluated on a case-by-case basis; social use is not a contraindication to treatment

### *What happens if the drugs fail or the person can't take them?*

Liver transplantation is the only current option available to people who have progressive liver failure and do not respond to any other therapy. Serial ALT's and liver biopsies are monitored, as well as symptoms of liver failure, as necessary per patient condition.

When the person becomes eligible, he will be placed on the transplant list for a new liver. If the person is lucky, he will receive a new liver. The transplanted organ is reinfected with Hepatitis C within weeks; however, it

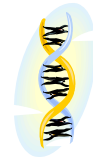
takes a similar amount of time to cause disease as the initial infection.

### *What's on the horizon for treatments?*

Enzyme inhibitors, like those used for HIV-treatment, may be effective in preventing the hepatitis C virus from functioning properly. Drugs that inhibit the protease, helicase, and polymerase enzymes are being investigated. One protease inhibitor, VX-950, is now entering phase 3 trials.

Thymosin alpha-1, an immune modulator, is currently understudy. Drugs that antagonize tumor necrosis factor alpha, such as entanercept, are also being investigated.

Steps of HCV replication may also be blocked by drugs that would inhibit production of antigens from the RNA (IRES inhibitors). Other drugs may be able to inhibit glycosylation, or to prevent HCV from entering a cell.



There are also molecular approaches being investigated. Ribozymes may break down certain viral RNA molecules, and antisense oligonucleotides may bind to HCV RNA to inhibit replication.

## Education

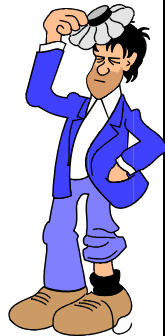
Education is the key to preventing the spread of HCV. People who are infected with HCV should know how to prevent the transmission of HCV from themselves to other people.

1. Don't donate blood, semen, body organs, or any other body fluid.
2. Don't share anything that may have blood contamination, including razors, toothbrushes, nail clippers.
3. Cover any cuts or lesions.
4. Stop using injectable drugs.
5. If you can't stop using drugs, practice the following safer guidelines:
  - Don't reuse or share any needles, syringes, or water for mixing drug.
  - Get needles and syringes from a reliable source.
  - Use sterile water, or water just obtained from the tap, to mix drug.
  - Use disinfected or new cooker and filter.
  - Use new alcohol swab to prepare area for injection.
6. If you have multiple sexual partners, use safer sex techniques. Tell your partner that you are HCV positive.

People who are in monogamous relationships do not need to change their practices. They should discuss the HCV infection with their partner, however. Condoms may be used during the menstrual cycle to minimize risk.

Pregnancy and breastfeeding are not contraindicated for women with HCV. Only a small percentage of babies acquire HCV; the method of delivery does not seem to matter. According to research, there is no additional transmission risk with breastfeeding versus bottle-feeding.

People with HCV should also know how to avoid making the disease worse! Alcohol, even in moderate amounts, should be strongly avoided, as alcohol use increases the progression of the disease. There are many drugs that are metabolized through the liver – all people should check with their physician before taking any prescription, over-the-counter, or herbal medications.



Hepatitis A and B vaccinations should be given to people with chronic liver disease to prevent fulminant hepatitis infections on accidental exposure.

## What about me – the health care worker?

Your risk for being infected with HCV, even with a sharps injury from an HCV infected person, is small. The guidelines from the CDC currently recommend that a baseline anti-HCV level and ALT level be drawn from you after the exposure, and that serial tests should continue for three months after that, including an HCV-PCR at one month, if the source of the exposure is found to have HCV. Some institutions test the PCR or source without checking an anti-HCV level. If either the PCR or the source is positive, they do anti-HCV baseline and liver enzymes tests on the employee.

Administration of immune globulin (IG) is not recommended – it may be that there needs to be an actual infection for the immune globulin to work. Interferon treatment is not recommended for the same reasons.

If you are infected with HCV, you should follow **good aseptic techniques**, as well as good handwashing, use of gloves and other protective devices, and proper disposal of all sharps. The CDC is not recommending that HCV-infected health care providers be restricted from doing their jobs in the normal way. If a blood exposure to a patient occurs from a healthcare worker, infected with HCV or not, the exposure should be immediately reported

to Infection Control in your facility. The Infection Control Practitioner will coordinate appropriate exposure follow-up for the patient.

If you work in an area where there is frequent exposure to blood or body fluids, such as a hemodialysis unit, surgery, or blood bank, you should be very careful to follow stringent infection control guidelines to prevent exposure and transmission of HCV. Review your unit/department policies carefully so that you can reduce the chance of getting hepatitis C!

Follow standard precautions using Personal Protective Equipment with all patients, regardless of their presumed infectious status. Use engineering controls, such as needle-less systems. Dispose of biohazardous wastes appropriately so they don't serve as an exposure hazard. Report any needlestick or sharps injury to Infection Control.

## Summary

Hepatitis C is a sneaky virus hidden in the shadows of the infected person's body. Hepatitis C can devastate the liver, leading to cirrhosis, liver failure, and cancer. Its nature allows it to fester and grow unseen for decades. This program provided an overview of the scope of Hepatitis C infection, risks for infection, methods of prevention, and the diagnosis, symptoms, and treatment of Hepatitis C infection. With this information in your arsenal, you can prevent the spread of the silent killer -- Hepatitis C -- to yourself and to others.

## References

- <sup>1</sup> Morbidity and Mortality Weekly Report (October 16, 1998). Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease.
- <sup>2</sup> Ibid.
- <sup>3</sup> Cryoglobulinemia is a condition in which there is an abnormal protein in the blood that causes it to gel at low temperatures. Usually found in leukemia, multiple myeloma, and certain types of pneumonia.
- <sup>4</sup> Membranoproliferative glomerulonephritis is an inflammation of the glomeruli of the kidney; may be caused by cryoglobulinemia.
- <sup>5</sup> Porphyria cutanea tarda is a disease in which lesions form wherever the skin is exposed to sun.
- <sup>6</sup> Morbidity and Mortality Weekly Report (October 16, 1998). Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease.
- <sup>7</sup> Reference Manual for Hepatitis C, Centers for Disease Control, 1998.
- <sup>8</sup> Reference Manual for Hepatitis C, Centers for Disease Control, 1998.
- <sup>9</sup> Morbidity and Mortality Weekly Report (October 16, 1998). Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease.
- <sup>10</sup> Morbidity and Mortality Weekly Report (October 16, 1998). Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease.
- <sup>11</sup> Ibid.
- <sup>12</sup> Ibid.
- <sup>13</sup> National Institutes of Health Website. Hepatitis C link.
- <sup>14</sup> Ibid.
- <sup>15</sup> National Digestive Diseases Information Clearinghouse (1998) (updated 5/99). Chronic Hepatitis C: Current Disease Management.

## Directions for Submitting Your Post Test for Contact Hours

To obtain a certificate of completion for this home study program, please complete the post-test and evaluation on the next few pages. The date on your certificate of completion will be the date that your home study is received. **Any materials received with a postmark after the expiration will be discarded.**

### HealthEast, HCMC, & MVAMC Employees

If you are an employee of HealthEast, HCMC, or MVAMC, you may send the post-test and evaluation to TCHP for processing. Your post-test will be returned to you through your hospital. It cannot be mailed to your home.

### Paid Participants

If you are not an employee of one of the TCHP hospitals, please send the post-test and evaluation to TCHP with a check for \$6.00. Please make check payable to **TCHP Education Consortium** and mail to:

**TCHP Education Consortium  
Capitol Office Building  
525 Park Street, Suite 120  
St. Paul, MN 55103**

Your post-test will be returned to you with the certificate of completion.

# Hepatitis C Post- Test

Please print all information clearly and sign the verification statement:

Name \_\_\_\_\_  
(please print legal name above)

Birth date (required)

Format: 01/03/1999

M	M	D	D	Y	Y	Y	Y

For HealthEast, HCMC, or MVAMC, employees only:  
Hospital \_\_\_\_\_ Unit \_\_\_\_\_

**Personal verification of successful completion of this educational activity (required):**

*I verify that I have read this home study and have completed the post-test and evaluation.*

\_\_\_\_\_  
Signature

- 1) How many people in the US are infected with HCV?
  - a) One million
  - b) Two million
  - c) Three million
  - d) Four million
- 2) What percentage of people with an HCV infection will develop chronic hepatitis?
  - a) 10-20%
  - b) 30-40%
  - c) 50-70%
  - d) 80-90%
- 3) Which group of people are now at the highest risk for **contracting** HCV?
  - a) Hemophiliacs
  - b) Injectable drug users
  - c) Donated blood recipients
  - d) Health care workers

- 4) What is the most common test to check for HCV?
  - a) Anti-HCV or EIA
  - b) Quantitative PCR
  - c) PCR
  - d) None of the above
- 5) Side effects of Ribavirin and Interferon treatment include all of the following except:
  - a) Severe flu-like symptoms
  - b) Decreased hemoglobin, platelet, and WBC counts
  - c) Hyper-excitability
  - d) Skin rash and anemia
- 6) Which of the following substances should be strongly avoided?
  - a) Alcohol
  - b) Aspirin
  - c) Caffeine
  - d) Over-the-counter medications
- 7) What do you need to do if you are exposed to an HCV-positive person?
  - a) Cleanse the exposed area
  - b) Report the exposure to your supervisor or the Infection Control department
  - c) Obtain a baseline anti-HCV, ALT, or PCR level (per hospital protocol)
  - d) All of the above

**Expiration date:** The last day that post tests will be accepted for this edition is **December 31, 2015**—your envelope must be postmarked on or before that day.

# Evaluation: Hepatitis C

Please complete the evaluation form below by placing an “X” in the box that best fits your evaluation of this educational activity. Completion of this form is required to successfully complete the activity and be awarded contact hours.

At the end of this home study program, I am able to:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Describe the diagnostic tests for Hepatitis C infection.					
2. Describe the signs of Hepatitis C infection.					
3. List the medications used to treat Hepatitis C.					
4. Describe methods that may be utilized to reduce the risk of exposure to Hepatitis C.					
5. The teaching / learning resources were effective. <i>If not, please comment:</i>					

The following were disclosed in writing prior to, or at the start of, this educational activity (please refer to the first 2 pages of the booklet).		
	Yes	No
6. Notice of requirements for successful completion, including purpose and objectives		
7. Conflict of interest		
8. Disclosure of relevant financial relationships and mechanism to identify and resolve conflicts of interest		
9. Sponsorship or commercial support		
10. Non-endorsement of products		
11. Off-label use		
12. Expiration Date for Awarding Contact Hours		
13. Did you, as a participant, notice any bias in this educational activity that was not previously disclosed? <i>If yes, please describe the nature of the bias:</i>		

14. How long did it take you to read this home study and complete the post test and evaluation:  
 \_\_\_\_\_ hours and \_\_\_\_\_ minutes.

15. Did you feel that the number of contact hours offered for this educational activity was appropriate for the amount of time you spent on it?  
 \_\_\_ Yes  
 \_\_\_ No, more contact hours should have been offered  
 \_\_\_ No, fewer contact hours should have been offered.

Expiration date: December 31, 2015