

What is Hepatitis C?

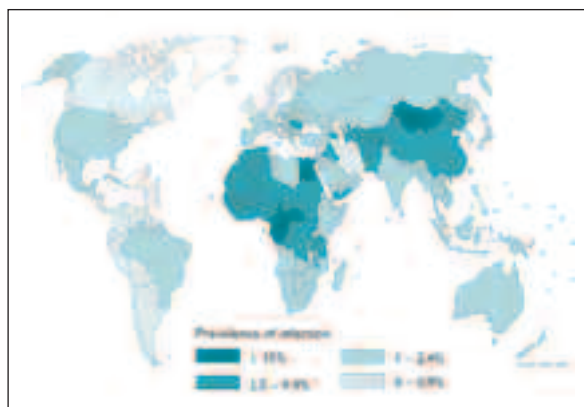
Hepatitis C is caused by the hepatitis C virus. The virus primarily affects the liver. The infection can cause quick, life-threatening liver inflammation, but this reaction is rare. For most people, hepatitis C infection leads to slow, progressive liver damage. The damage can include liver inflammation, liver scarring (fibrosis), severe liver damage (cirrhosis), and even liver cancer (hepatocellular carcinoma). Hepatitis C is the leading cause of liver disease, the leading reason for liver transplantation, and is now the leading cause of death for HIV-infected individuals in the United States.

Hepatitis C is called a "silent infection" because most infected people have no noticeable symptoms. A small percentage of people (20%) are able to fight off the virus in the first few months and get better. This initial, short-term infection is called an 'acute' infection. If the virus remains in the blood for more than six months, then a person is considered to have a 'chronic infection'. According to the National Institutes of Health, approximately 80% of hepatitis C infections become chronic.

How many people are affected by hepatitis C?

The World Health Organization (WHO) estimates that approximately 200 million people around the world are chronically infected by the hepatitis C virus. The prevalence of hepatitis C varies by region. The WHO diagram below indicates that parts of Asia and Africa have high endemic rates of hepatitis C. The CDC estimates that more than 4 million Americans are chronically infected with hepatitis C.

Distribution of Hepatitis C



Symptoms of hepatitis C

Most people with hepatitis C have NO symptoms. Many people have no idea they are infected until a doctor does a blood test or they start seeing signs of severe liver damage.

If symptoms do occur, they can vary in type and severity.

Common symptoms include:

- Fever
- Fatigue (extreme tiredness)
- Muscle and joint pain
- Nausea and vomiting

Less common symptoms:

- Severe nausea and vomiting that could lead to dehydration
- Jaundice (yellowing of the skin and eyes, dark urine)
- Bloating or swollen abdomen or stomach.

How is hepatitis C transmitted?

Hepatitis C is transmitted through contact with infected blood or infected bodily fluids.

This DOES occur through:

- Direct blood-to-blood contact
- Use of unsterile medical equipment
- Use of unsterile injection drug equipment

This MAY occur through

- Unprotected sex
- From an infected woman to her newborn during birth
- Unsterile tattoos, piercing and acupuncture
- Sharing razors and toothbrushes

Hepatitis C is NOT transmitted through casual contact.

The virus is not transmitted by coughing, sneezing, hugging, or eating.

Who should be tested for hepatitis C?

- Individuals who used injection drugs EVER - even if just once.



- Individuals who received a blood transfusion prior to 1992,
- Individuals who received blood products (like clotting factors) prior to 1987,
- Illicit drug users (injecting, inhaling, snorting, popping pills),
- Individuals with evidence of liver disease (symptoms or abnormal lab tests),
- Persons with HIV.

While not recommended by all health officials, HepTREC recommends that the following groups be tested for hepatitis C:

- Residents and staff of correctional facilities,
- Health care workers and emergency personnel,
- Individuals who get unsterile tattoos or body piercing,
- Individuals with hepatitis B infection,
- Individuals with early kidney disease or undergoing kidney dialysis,
- Household members and sexual partners of someone with hepatitis C.

How can hepatitis C infection be prevented?

There is NO vaccine against the hepatitis C virus. Avoiding exposure to infected blood and bodily fluids can reduce the risk of acquiring a hepatitis C infection.

- NEVER share needles or any injection drug equipment.
- Do not touch others blood- wear latex or rubber gloves – use universal precautions!
- Get only sterile, professional tattoos and piercings.
- Make sure acupuncture needles are sterile.
- Cover all wounds.
- Practice safer sex - use condoms if you have multiple sexual partners.
- If you believe you may have been exposed to the virus, call your doctor or health department immediately.
- Report any occupational needle sticks to health officials immediately.

Diagnosis of hepatitis C

A simple blood test can diagnose hepatitis C infection. Unfortunately, since few people have symptoms of hepatitis C, few people are tested. Tests must be ordered by a healthcare provider, so it is important to discuss potential risk factors for infection with a doctor. Sometimes patients need to request the tests. All blood donations are tested and many life insurance companies test for hepatitis B and C.

Laboratory tests for hepatitis C

Blood tests are used to diagnose hepatitis C. Interpreting the blood tests can be a little confusing, even for doctors and nurses. Anyone tested for hepatitis C should request a copy of the laboratory report and discuss it carefully with a healthcare provider. Important terms that appear in hepatitis C lab reports include:

- **Antibody:** a protein made by the body in response to a foreign substance, like the hepatitis C virus. A positive hepatitis C antibody test indicates a current or previous hepatitis C infection.
- **HCV RNA:** the genetic material of the hepatitis C virus. Presence of HCV RNA indicates a current hepatitis C infection.
- **Viral load:** the amount of virus in the blood. In hepatitis C, viral load does not correlate to the amount of liver damage. It does impact hepatitis C treatment. This test is sometimes called a 'quantitative' test.
- **Genotype:** the type of hepatitis C virus. There are 6 main genotypes of hepatitis C (1, 2, 3, 4, 5, and 6). All are hepatitis C viruses, they just have small differences. Genotype is important in making treatment decisions.

Some tests are repeated after 6 months to see if the person fought off the virus or is chronically infected.

Hepatitis C Management and Treatment

Being diagnosed as having hepatitis C can be upsetting, but the good news is that *most people with chronic hepatitis C can expect to live a long and healthy life.*

A person with hepatitis C should find a healthcare provider experienced in the care of hepatitis C patients. There is much to consider in the management of hepatitis C and new advances occur each year. A provider that is up-to-date and easy to communicate with is essential.



People with hepatitis C have, or may develop, liver damage. Many substances can inflame or damage the liver. Substances can be ingested, inhaled, and even absorbed through the skin. In people with healthy livers, they are usually of limited concern. People with hepatitis C infection should consider the following to prevent liver damage:

- **Avoid alcohol!** Alcohol will accelerate liver damage.
- Get tested for hepatitis A and B, if susceptible, get vaccinated!
- Maintain a healthy body weight.
- Eat a healthy, balanced diet. Excess fat can impact the liver.
- Talk to a healthcare provider about all medications (including prescription, over-the-counter, and herbal medications). Some may interact to damage the liver.
- Avoid excess vitamins. Use the daily recommended amount- not more. Talk with your provider.
- Avoid toxic chemicals at home and in the workplace (including herbicides, pesticides, and some cleaning products).

Treatment

Hepatitis C treatment has improved substantially. The treatments are easier to manage and more effective than just a few years ago. Today, the primary goal of hepatitis C treatment is elimination of the virus and as treatments improve, more and more patients are able to eliminate the virus. Even if the virus persists, treatment is not in vain. It can reduce the amount of virus in the body and help improve the health of the liver.

It is important to recognize that not everyone with hepatitis C needs to be on medication. Treatment has costs

and benefits, or pros and cons. It is important to discuss the pros and cons with a doctor knowledgeable about hepatitis C treatment. Treatment decisions should be made on an individual basis. Each person has a unique medical history and personal preferences. These should be considered when making treatment decisions.

Who should receive treatment? The first thing to consider in hepatitis treatment is verification of current infection. Remember that 20% of infected people fight off the virus. Providers may test for the virus over a six month period to make sure it is still there prior to treatment.

Some health conditions like heart disease and psychiatric conditions may be affected by the treatment and treatment may not be recommended for such patients.

In addition to the two issues above, providers will consider:

- Health of the liver (usually determined by biopsy and liver enzyme tests)
- Overall health of the patient
- Patient's interest in the treatment
- Patient's ability to follow the treatment plan (concerns about compliance, insurance coverage, cost, and household stability may influence treatment decisions)

Patients may want to seek a second opinion if their doctor deems treatment unnecessary or if the patient is concerned about starting hepatitis C treatment.

What medications are used? Today, two medications are typically used to treat hepatitis C: interferon and ribavirin. Interferons are a class of proteins produced by the body in response to viral infections. Medications provide high doses of interferon to boost the body's natural immune response.

Interferon

- *Interferon-alpha* (trade names are Intron A, Infergen, and Roferon) is an injected medication that is administered three times per week.
- *Pegylated Interferon* (trade names are Pegasys and PegIntron) is a modified version of interferon. The half-life (or time the medication is active in the body) of interferon-alpha was increased by adding a molecule of polyethylene glycol (PEG). This means that



pegylated interferons need to be injected only one time per week.

- *Consensus Interferon* (trade name Infergen) is a modified version of interferon. It is called consensus because it pulls together the amino acids considered to be the active portions of many types of interferons. Consensus interferon is injected daily.

Ribavirin

Ribavirin is an anti-viral drug. By itself it has little or no impact on hepatitis C, but it improves the effectiveness of interferon therapy. Ribavirin is an oral medication (a pill) that is taken twice a day. Trade names for ribavirin are Rebetol and Copegus. There is also generic ribavirin.

Treatment protocols

In the past, interferon-alpha was used by itself and injected 3 times per week. Interferon used alone is called interferon monotherapy. Interferon monotherapy was improved by the addition of ribavirin. The addition of pegylated interferon improved the success of treatment and made it easier for patients since it needed to be administered just once a week. Pegylated interferon and ribavirin together improved the success of treatment even more. Consensus interferon is generally used to treat patients who were unsuccessful with pegylated interferon treatment.

The recommended length of treatment and doses of medication used varies by genotype of the virus, patient's treatment history, weight, and in some cases the amount of damage to the liver. Dose of medication varies by product used and sometimes by the weight of

the patient and the patient's treatment history. Some people want to reduce the dose of their medication if side effects appear. It is important to discuss this with a provider and try to manage side effects rather than reduce the treatment dose. Getting a second opinion about side effects management or joining a support group can often help.

In general, recommended length of treatment for HCV genotypes 2 and 3 is 24 weeks. The general recommended length of treatment for genotypes 1 and 4 is 48 weeks. Providers may adjust treatment length for each patient. For example, if a patient was treated with interferon and ribavirin in the past and the virus was not eliminated, they may treat the patient for a longer period of time. It is important to stay on treatment for the recommended time period. Compliance with recommended therapy offers the best chance for success.

How well does the treatment work?

It is hard to predict how any one individual will respond to the therapy. Providers follow treatment response by periodically checking viral load. Response to therapy is measured by reduction in the level of hepatitis C virus in the blood.

Most patients will experience a reduction in viral load while on treatment. A couple of factors influence how well the treatment works. These factors include the virus genotype (patients with genotypes 2 and 3 generally respond better than those with genotypes 1 and 4), how well a patient complies with the treatment protocol, and the extent of fibrosis or scarring in the liver.

Treatment response is typically measured at 12 weeks, 24 weeks, at the end of therapy, and at 6 months after treatment.

- *Early Viral Response (EVR)*: This is the response measured at 12 and/or 24 weeks. Most people who will go on to clear the virus see a significant drop in the level of virus in the blood at this point. Healthcare providers and insurance companies typically want to see at least a 2-log drop in viral load (this means for example, from 2,000,000 iu/ml to 20,000iu/ml). Sometimes the virus has dropped enough to be undetectable. It is possible for people who do not see this drop to go on and clear the virus, but it is not common.



- *End of Treatment Response (ETR)*: This is the response measured at the end of treatment. Ideally, the virus will be undetectable at this point. If it is not, providers may recommend continued treatment. Pros and cons of this decision should be discussed. Remember, even if virus is still present, the treatment likely helped the liver.
- *Sustained Viral Response (SVR)*: This is the response measured 6 months after completion of treatment. If the virus is undetectable at this point, it is called sustained viral response. Most, about 95%, of people who achieve SVR stay that way. Some doctors say SVR means 'cured'. Some do not use that term, for they fear the virus may still be in the body at undetectable levels.
- *Relapse*: A relapse is when the virus returns once treatment stops. Some believe that the virus may remain in liver cells during treatment and when treatment is stopped, the virus starts to replicate again. Patients who relapse should discuss other treatment protocols (including increasing dosage or length of treatment) with their provider.
- *Nonresponse*: This term is used when hepatitis C virus is detectable during and after treatment. Some patients who do not respond have had difficulty taking all their medication due to side effects or life events. Others just do not respond to treatment even if they are very compliant. Patient who do not respond to the therapy should talk with their provider about altering treatment protocols. Some providers suggest waiting for new treatments, others may suggest changing the treatment protocol, others still may recommend that the patient continue to take interferon at a low dose for a long period of time. This is called 'maintenance therapy' and is believed to help prevent liver damage.

What is the expected level of response? *Medical treatments have improved greatly in the past few years, and the percentage of patients who are Sustained Viral Responders has also increased.* The data below was compiled from a number of sources. It is not possible to predict how any one patient will respond until treatment has started. There are factors that influence success of treatment (see influences section below).

- When interferon-alpha is used alone, about 15% of patients will achieve SVR.
- When pegylated interferon is used alone about 30% of patients will achieve SVR.
- Combination therapy (interferon-alpha and ribavirin) raises the SVR percentage to about 40%.
- Combination therapy (pegylated interferon and ribavirin) increases the SVR percentage to over 50%.
- More than 95% of patients who achieve SVR have no evidence of the virus 5 years after treatment.

What influences treatment success?

Genotype of virus. Genotypes 2 and 3 may require only 6 months of treatment and the likelihood of achieving SVR is about 80%!

Baseline Viral Load. Starting treatment with a viral load less than 800,000 iu/ml is favorable.

Race. For reasons that are not understood, African Americans do not respond to treatment as well as Caucasians. Though many do respond!

Obesity. Obese patients do not respond as well to treatment as those who are not obese.

Cirrhosis. Patients who have cirrhosis or advanced fibrosis do not respond as well to treatment as those with mild liver disease.

It is impossible to change most of these factors. Overweight patients may want to consider losing weight before treatment. People with progressing fibrosis may consider starting treatment before more liver damage occurs. Remember- the liver can benefit from treatment even if the virus is not eliminated.

Side Effects of Hepatitis C Treatment

Many patients on hepatitis C treatment experience side effects. The number and severity of side effects vary from person to person. Side effects range from very mild with slight discomfort, to moderate effects that are inconvenient, to severe side effects that can lead to temporary disability. At this time, we can not predict which patients will experience side effects or the severity of the side effects. Most side effects can be prevented or managed, so don't let fear of side effects prevent you from considering of interferon therapy.



Interferon side effects: Some side effects of interferon show up soon after treatment is initiated (early side effects) others appear later in the course of treatment and may remain through treatment (persisting side effects)

Early Side Effects typically include flu-like symptoms (fever, chills, body aches, headache, and nausea). Taking anti-inflammatory medications like Ibuprofen and Naproxyn BEFORE interferon can help prevent these symptoms. Taken at anytime, these medications can help reduce the flu-like symptoms. Also, staying hydrated can help reduce side effects. DRINK PLENTY OF WATER. Avoid caffeine and other diuretics.

Persisting Side Effects

The side effects that appear later in interferon use can be more difficult to deal with. They usually begin a couple of weeks or several months into treatment. The side effects are usually not severe enough to stop therapy and many can be relieved with use of other medications. Talk with a provider about the side effects and try not to reduce or stop therapy.

- Thinning hair or change in hair texture – this effect is temporary and stops when therapy is over.
- Weight loss – this effect will also stop when treatment is over. Make sure to eat a healthy diet when on therapy!
- Neutropenia (suppression of neutrophils, a type of white blood cell). Neutrophils are a very important part of the immune system. A medication called Neupogen can help reduce neutropenia.
- Depression – interferon therapy can cause depression as well as depression-related symptoms like insomnia, irritability, fatigue, crying episodes, and loss of appetite. Anti-depressants work very well against interferon-induced depression. Some doctors recommend taking an antidepressant BEFORE starting interferon treatment. This should prevent depression from occurring. The dose of antidepressants can be modified to handle depression symptoms. If serious depression occurs, it helpful to work with a psychologist or psychiatrist.

Ribavirin side effects

Ribavirin can cause side effects. The most common side

effects are nausea, coughing, and rashes. Eating with ribavirin can reduce nausea. Creams and antihistamines can relieve rashes. Anemia can be a very serious side effect. Healthcare providers monitor patients closely and may treat anemia with a medication called *erythropoietin*. Trade names for *erythropoietin* are Epogen and Procrit. Another important consideration is that ribavirin may cause birth defects if a woman or her partner is using ribavirin during conception or pregnancy. People on ribavirin should use condoms and a secondary contraceptive method to prevent pregnancy. Pregnant women should not use ribavirin.

Patient assistance

There are numerous organizations offering assistance and support for people with hepatitis C and those who just want to learn more about hepatitis C. The producers of the medications listed have patient assistance programs to support patients and even help with the cost of the medications.

Pregnancy and hepatitis C

Many women with HCV worry about transmitting the infection to their babies. The rate of transmission is very low, but not negligible. The CDC estimates that about 5% of infants born to infected mothers acquire HCV infection. The most important consideration for pregnancy and HCV is the potential danger to fetus from HCV treatment medications. Since ribavirin, one of the medications used in hepatitis C treatment, may cause birth defects, women and men using ribavirin should use two forms of birth control to prevent pregnancy.

The CDC presents the following information about HCV and pregnancy in MMWR October 16, 1998 / 47(RR19); 1-39.

- HCV-positive women do not need to avoid pregnancy or breastfeeding. Potential, expectant, and new parents should be advised that
 - approximately 5% of infants born to HCV-infected women become infected (This occurs at the time of birth, and no treatment exists that can prevent this from happening);
 - infants infected with HCV at the time of birth seem to do very well in the first years of life (More studies are needed to determine if these



infants will be affected by the infection as they grow older);

- no evidence exists that mode of delivery is related to transmission; therefore, determining the need for cesarean delivery versus vaginal delivery should not be made on the basis of HCV infection status;
- limited data regarding breastfeeding indicate that it does not transmit HCV, although HCV-positive mothers should consider abstaining from breastfeeding if their nipples are cracked or bleeding;
- infants born to HCV-positive women should be tested for HCV infection and if positive, evaluated for the presence or development of chronic liver disease; and
- if an HCV-positive woman has given birth to any children after she became infected with HCV, she should consider having the children tested

While not necessarily supported by other public health and medical organizations, HepTREC recommends screening pregnant women for HCV, especially those who are unlikely to receive medical care after their pregnancy.

Hepatitis C and HIV

Many, about 25%, of people with HIV are also infected with HCV. Now that people with HIV are living for long periods of time, the hepatitis C virus has time to attack the liver. A significant percentage of HIV-positive people are hospitalized with or die from liver disease related to HCV infection.

Generally, people with HIV have weakened immune systems and may not be able to fight the HCV virus as well as people without HIV. The result is that people co-infected with HIV and HCV have more of the hepatitis C virus in their blood, may develop HCV-related liver disease more quickly, and may have more extensive scarring of the liver than people infected with HCV alone.

Since such a large proportion of HIV patients also are HCV positive, more and more healthcare providers are learning how to help their patients stay healthy and alive with HCV. Recently, one combination of medications used for HCV treatment (Pegasys and Copegus) was approved by the FDA for use in HIV patients. A large per-

centage of co-infected patients succeeded in clearing the HCV with treatment.

People with HIV/HCV coinfection should:

- Receive tests for and/or vaccinations against hepatitis A and hepatitis B
- Limit or eliminate alcohol use
- Take steps to prevent the spread of HIV and HCV

Tattoos and hepatitis C

Infection with HCV occurs during percutaneous (below the skin) exposure to the blood of an infected person. Since blood is present during the tattoo process, it is possible to be infected with HCV while getting or giving a tattoo. While this transmission possible, the CDC has not verified transmission of HCV through commercial tattooing.

Given the possibility that hepatitis C can be acquired through tattooing, HepTREC recommends that people use only professional, commercial tattoo artists that follow strict safety procedures. BEFORE getting a tattoo, talk to the staff about safety. Check to make sure that the establishment:

- Is clean and surfaces are disinfected
- Uses a new, sterile needle for each client
- Uses separate ink pots for each client
- Does NOT put ink from used pots back in the bottle
- Uses new, clean latex gloves for each client
- Sterilizes all equipment that is in contact with clients
- Covers new tattoos with a fresh, sterile bandage
- Disposes of all materials properly.

HepTREC believes all people should avoid street and prison tattoos. It is difficult or impossible to sterilize tattoo ink and equipment in prisons, jails, on the street, or at home. HCV, hepatitis B, and HIV can be transmitted in very small, invisible amounts of blood.