



# Similarities and Differences between HIV and HCV

A SERIES OF FACT SHEETS WRITTEN BY EXPERTS IN THE FIELD OF LIVER DISEASE

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## Foreword

HIV and the hepatitis C virus (HCV) share many of the same characteristics, but there are also some very distinct differences in the way they are transmitted, how long each virus lives outside of the body, disease progression, and treatment. This fact sheet will explore some of the similarities and differences between HIV and hepatitis C.

### • RNA Viruses

Both HIV and hepatitis C are RNA viruses, but they are different types of RNA viruses—HIV is a retrovirus and HCV is a flavivirus.

### • Replication

HIV mainly infects human immune cells (CD4, macrophages, and dendritic cells). The hepatitis C virus mainly infects liver cells.

The HIV virus goes through a complex process where the HIV virus inserts its genetic material into the host DNA cell and uses the host genetic material to replicate. HCV on the other hand uses the host's cell to replicate, but does not insert itself into the host DNA. These differences have major implications when discussing HIV and HCV treatment and disease progression.

HIV/HCV Coinfection Fact Sheet is a publication of the Hepatitis C Support Project

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The information in this fact sheet is designed to help you understand and manage HCV and is not intended as medical advice. All persons with HCV should consult a medical practitioner for diagnosis and treatment of HCV.

This information is provided by the Hepatitis C Support Project a nonprofit organization for HCV education, support and advocacy

In regards to how much each virus replicates on a daily basis—HIV replicates billions of new viruses vs. the trillions that the hepatitis C virus replicates daily.

### • **Mutation Rate**

HIV has a high mutation rate, but hepatitis C is thought to replicate and mutate at a much higher rate than HIV.

### • **Vaccines**

Studies are underway to find a vaccine for HIV and hepatitis C, but because of the high mutation rate of both viruses it will most likely be a long time before a vaccine that will prevent HIV or hepatitis C infection is discovered and available for use.

### • **Antibodies**

Both HIV and HCV produce antibodies that last lifelong. They will mostly always be present, but they are not protective antibodies. The reason that the antibodies against HIV and HCV are not protective is that HIV and HCV are RNA viruses that mutate at very high rates that make it difficult to develop protective vaccines.

### • **Prevalence**

In the United States it is estimated that more than 3.2 million Americans are infected with chronic hepatitis C compared to about 1.2 million who are estimated to be infected with HIV. Worldwide the estimates are in the range of 40 million people infected with HIV compared to 170 million infected with HCV.

### • **Strains**

There are different strains of HIV (HIV-1 and HIV-2) and hepatitis C (genotypes 1, 2, 3, 4, 5, 6 and 7). In the United States HIV-1 is the most common strain of HIV and genotype 1 is the most common strain of hepatitis C.

### • **Viral Loads**

In people with HIV the viral load affects transmission and disease progression. A high viral load for someone with HIV is in the range of 5,000 to 10,000 copies/mL. In contrast a high HCV viral load for people with hepatitis C is any amount higher than 800,000. Frequently people with HCV have viral load amounts in the millions. Studies have not found that a high hepatitis C viral load increases transmission of hepatitis C or HCV disease progression. However, there is some evidence that a high HCV viral load may increase the chances of transmission of HCV from a mother to child.

### • **How long do HIV and HCV live outside the body?**

Once HIV is exposed to air it lasts only a few moments, but may live longer if blood is present especially in a closed environment such as in a syringe. Hepatitis C on the other hand has been found to live outside the body for at least 16 hours but no longer than 4 days, up to 6 weeks on surfaces at room temperature, and in a syringe for up to 63 days. This is the reason, for instance, that exposure to blood through unsafe tattooing carries a risk of transmission of

hepatitis C, but it does not carry a risk of transmission of HIV.

### • **Chronic Infection**

All people who are initially infected with HIV will have long-term or chronic infection. Hepatitis C is different—some people (about 15 to 25%) who are initially infected (acute) will naturally resolve or clear HCV infection. The other (75 to 85%) of people will have long-term or chronic infection.

### • **Transmission**

HIV and hepatitis C are transmitted in similar ways through blood routes although there are clear differences in the risk of transmission. The hepatitis C virus is about 10 times more concentrated in blood than HIV. This means that the hepatitis C virus can be transmitted easier when any HCV-infected blood is involved.

In the United States, the most common way that HIV is transmitted is through anal and vaginal sex. HIV can also be transmitted by sharing HIV infected needles and an HIV positive mother can pass HIV to her child.

The most common way that hepatitis C is transmitted is from sharing HCV-infected needles and drug preparation and using tools. Transmission routes of hepatitis C that are less common but still possible include sexual, and mother-to-child.

### • **Treatment**

Hepatitis C can be cured—this is because the hepatitis C virus does not integrate into the host’s DNA when it is replicating (see above). It’s a different story with HIV because HIV inserts itself into the host’s DNA. As a result, HIV treatment is aimed at lowering HIV viral load, increasing or stabilizing CD4 cell counts and preventing long-term consequences of infection.

### • **Drug Resistance**

The medications used to treat HIV can lead to drug resistance because they are direct antiviral medications.

Certain HCV medications also have the potential to cause HCV drug resistance but it appears that when treatment resistance emerges (if HCV treatment doesn’t work) after time the mutation reverts back to the original virus.

**LEARN MORE** by visiting the websites below...

[www.hcvadvocate.org](http://www.hcvadvocate.org) • [www.hbvadvocate.org](http://www.hbvadvocate.org) • [www.hepatitistattoos.org](http://www.hepatitistattoos.org)

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