



Environmental Stability of HCV: How Long Does HCV Live Outside the Body and What Kills It?

Written by: Alan Franciscus, Editor-in-Chief

The most common transmission route for hepatitis C is from sharing HCV infected needles and drug preparation tools. Before the discovery of an HCV cell culture system there was basically only one solid science study that told us the length of time that HCV can survive outside the body. Now that there have been many cell cultures, however, there have been many important findings for knowledge and prevention of HCV transmission.

This fact sheet will summarize the findings to date.

Surfaces

The first study that looked at the time that HCV could live on surfaces was conducted by the Centers for Disease Control and Prevention (CDC). At the time a cell culture was not available so a chimpanzee—the only other animal that could be infected with HCV—was inoculated with HCV. The chimpanzee's blood was dried (7 days, 4 days and overnight) and reconstituted. It was found that the hepatitis C virus could survive on surfaces for at least 16 hours but no longer than 4 days.¹ In a study released in 2013, Yale researchers found that the hepatitis C virus could **live on surfaces for up to six weeks at room temperature** (39.2 to 71.6 Fahrenheit).²

Syringes

In 2010 a study was released detailing how long the hepatitis C virus lives inside a syringe. The study found that the hepatitis C virus can live for up to **63 days** in a high volume tuberculin syringe with a detachable needle compared to **7 days** in a low volume syringe (insulin syringe with permanent needles).³

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*A publication of the
 Hepatitis C Support Project*

**EXECUTIVE DIRECTOR,
 EDITOR-IN-CHIEF,
 HCSP PUBLICATIONS**
Alan Franciscus

DESIGN
*Leslie Hoex,
 Blue Kangaroo Design*

PRODUCTION
C.D. Mazoff, PhD

CONTACT INFORMATION

Hepatitis C Support Project
 PO Box 15144
 Sacramento, CA 95813
alanfranciscus@hcvadvocate.org

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.

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Syringes & Works

Researchers lead by V. Thibault studied pooled works (50 swabs/cotton pads, 20 cups, 20 vials, 10 filters and 60 syringes) and analyzed them for HCV RNA and found that **43.8% of all pooled materials tested positive for HCV RNA. Swabs accounted for the highest rate of detectability with 80% testing positive for HCV RNA.** In the second part of the study (to validate the findings in the first part) pooled works were collected (60 swabs, 90 cups, 50 vials of water, and 260 syringes). HCV RNA was detected in 28% of the pooled works and **83% of the swabs.**⁴

J. Doerrbecker and colleagues conducted the most recent study: “Sharing drug preparation equipment a potential source of hepatitis C transmission.”⁵ The authors addressed the length of time that HCV RNA could be detected in water, water containers and filters.

Key findings of the study include:

- **Water:** HCV RNA was detectable in the water for greater than 3 weeks.
- **Bottles:** HCV RNA was detectable in water bottles even after the bottles were rinsed out. Water bottles made of aluminum or plastic retained HCV RNA longer than water bottles made of glass.
- **Filters:** about 10% of filters wrapped in foil—a common practice among injectors—remained positive for HCV RNA after 24 and 48 hours.

Disinfectants

A study released in 2011 looked at the effect of commercially available disinfectants and the temperature required to kill the hepatitis C virus. The published results found that **commercially available disinfectants reduced the infectivity of HCV to undetectable levels with 1-propanol as the most effective disinfectant.**

The results on the effect of heat on the hepatitis C virus found that when spoons and cookers were heated for 80-95 seconds to a temperature of 67-70 °C (152.6 – 158 °F) HCV was undetectable. Injectors use spoons and a cooker to heat heroin, but Holly Hagen, in an accompanying editorial, stated that based on research only about 15% of people who inject drugs (PWID) heat drug solutions for more than 45 seconds, with most injectors heating solutions for less than 15 seconds.^{6,7}

These studies provide important information about the survival of the hepatitis C virus. The studies also shed light on why the prevalence of HCV is high among PWIDs. While sterile syringes is a well-recognized and critical component of HCV prevention, educating PWID’s to either only use their own works or not to share any works is as important, but an even more difficult message. In order to reduce the prevalence of HCV in PWID’s we must provide resources in the form of funded needle exchange programs that can provide education, supplies and services.

Endnotes

1. Environmental Stability of Hepatitis C Virus (HCV): Viability of Dried/Stored HCV in Chimpanzee Infectivity Studies. Kris Krawczynski, Miriam J. Alter, Betty H. Robertson, Ling Lu, John E. Spelbring, Karen A. McCaustland, Centers for Disease Control and Prevention, Atlanta, GA.
2. Hepatitis C Virus Maintains Infectivity for Weeks after Drying on Inanimate Surfaces at Room Temperature: Implications for Risks of Transmission. Elijah Paintsil, Mawuena Binka, Amisha Patel, Brett D. Lindenbach and Robert Heimer.
3. Paintsil E, He H, Peters C, Lindenbach BD, Heimer R. Survival of hepatitis C virus in syringes: implication for transmission among injection drug users. J Infect Dis 2010; 202:984–90.

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4. Thibault V et al. Hepatitis C transmission in injecting drug users: could swabs be the main culprit? J Infect Dis, online edition, doi: 10.1093/infdis/jir650.
5. Doerrbecker J et al. Inactivation and survival of hepatitis C virus on inanimate surfaces. J Infect Dis, online edition, doi: 10.1093/infdis/jir535.
6. Transmission of Hepatitis C Virus Among People Who Inject Drugs: Viral Stability and Association With Drug Preparation Equipment. Juliane Doerrbecker et al. J Infect Dis. (2013) 207 (2): 281-287. doi: 10.1093/infdis/jis677.
7. Agent, Host, and Environment: Hepatitis C Virus in People Who Inject Drugs, Holly Hagan. J Infect Dis. (2011) doi: 10.1093/infdis/jir654.

Related publications:

- **Are You at Risk for Getting Hepatitis C?**
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