

a series of fact sheets written
by experts in the field of liver
disease

How Long Does HCV Live on Surfaces ?

Alan Franciscus, Editor-in-Chief

How long is HCV stable on exposed (environmental) surfaces?

In real world situations it would be almost impossible to effectively study this problem because of the many variables involved in testing blood on exposed surfaces, such as room temperature, amount of blood exposed, viral load (low/high) and various contaminants in the environment. However, a study conducted by the Centers for Disease Control may shed some light on this issue and help provide a better understanding of the infectivity of HCV on surfaces, which will help fine tune HCV prevention measures.

A study conducted by Kris Krawczynski et. al from the Centers for Disease Control and Prevention tested the stability of dried and stored serum (blood) of HCV infected blood in chimpanzees to determine how long HCV infected blood lives on an outside surface as well as the level of infectivity of the blood exposed.

Chimpanzee plasma (CID) divided into 105 infectious doses (genotype 1a) was dried in tubes under vacuum. After overnight drying (~16 hours) samples were either rehydrated with sterile water and stored at -70C or transferred to a controlled environmental chamber (42% humidity, over saturated salt solution) for a 4 or 7 day storage at 25C and subsequently rehydrated with sterile water and kept at -70C.

Samples dried/stored 7 days and dried overnight were used for testing. To determine infectivity, samples of dried/stored plasma for 7 days, 4 days and overnight, were reconstituted in sterile water and injected into a chimpanzee. The size of the infectious dose of each inoculum was calculated at 3.3 x 10⁴ CID. Plasma samples were tested for HCV RNA (viral load), HCV anti-body and alanine aminotransferase (ALT) levels twice weekly. In addition, liver specimens were obtained weekly or biweekly and tested for hepatitis C virus antigen (HCVAg) and histopathology (liver health).

The chimpanzee was first inoculated with the HCV inoculum that was dried and stored for 7 days and followed during 129 days. Subsequently, the chimpanzee was inoculated with the HCV inoculum that was dried and stored for 4 days and followed for

134 days, and finally inoculated with the dried sample overnight and followed for 201 days. Data from three chimpanzees with untreated HCV inoculum were included in the study as a control group.

The authors found that HCV RNA (viral load) was detectable in plasma dried overnight and 7 days, but a ten fold decrease of detectable HCV RNA (viral load) was found in both of the samples compared with the HCV RNA level of the original, untreated HCV positive plasma sample. No evidence of HCV infections was detected in the chimpanzee given either the 7-day or 4-day dried and stored samples. All blood samples tested were negative for HCV RNA and HCV antibodies. In addition, ALT levels remained in the normal range. However after inoculation with the overnight dried sample, HCV RNA was detected in the blood of the chimpanzee from day 7 post inoculation and viral load reached 6.0 to 7.3 logs IU/mL. HCV Ag positive hepatocytes (liver cells) were observed from day 11 post inoculation, seroconversion to anti-HCV was observed on day 127, and the chimpanzee was still positive for HCV RNA (4.8 logs IU/mL) at day 201 post infection. ALT activity level was elevated over the normal range from day 11 post inoculation and remained elevated until the end of the observation period. Virologic, serologic, and clinical evidence of HCV infection and acute hepatitis was found in all three control animals.

The Bottom Line

The authors of this study concluded that infectivity studies in a chimpanzee suggest that HCV may survive on environmental surfaces at room temperature for at least **16 hours but not longer than 4 days**. The potential for HCV to survive in the environment re-emphasizes the importance of cleaning and disinfection procedures, safe therapeutic injection practices, and harm reduction counseling and services for injection drug users.

For more information about hepatitis C, hepatitis B and HCV coinfections, please visit www.hcvadvocate.org.

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