

# Medical Writers' Circle

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a series of articles  
written by medical  
professionals about  
the management  
and treatment of  
hepatitis C

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## Sex and the C Virus

**H**epatitis C is a bloodborne pathogen and a frequent cause of chronic viral hepatitis in the world. The World Health Organization estimates that around 170 million people worldwide are infected with hepatitis C.<sup>1</sup> A large amount of information has been delineated from the National Health and Nutrition Examination Survey (NHANESIII) conducted between 1988 and 1994 regarding how many people in the United States are estimated to be HCV antibody positive (~3.9 million) and how many have HCV-RNA in their blood (~2.7 million).<sup>2</sup> The Centers for Disease Control have been collecting data about the number of acute cases of hepatitis C virus infection each year (~25,000 new cases in 2001)<sup>3</sup>. According to the CDC epidemiological data they estimate the source of infection in around 15-20% of acute cases is derived "sexually"—making this the second most common reason for infection behind intravenous drug use.

This number seems to be in stark contrast to the data regarding your risk of contracting hepatitis C if your sexual partner is HCV positive.

So why is there this seeming discrepancy between

these two pieces of information? Hopefully, in this paper, I will be able to shed some light on this. I want also to give information to patients about the risk for their sexual contacts possibly becoming infected, and how to best assess and deal with this risk.

### Sexual Activity as a Risk Factor for Having Hepatitis C

Many epidemiological studies throughout the United States and Europe have shown that a large percentage of people infected with the hepatitis C virus deny the use of IV drugs. Some studies asked, "have you ever used IV drugs," and some asked, "have you used drugs in the past six months prior to the onset of your being noted to be HCV positive." Obviously there is a big difference in these two situations. It is known that at least 70% of people who have used IV drugs are hepatitis C positive, and that after 5 years of IV drug use over 90% are HCV positive.

Obviously, some of these people may have been HCV positive previously for reasons other than sex, but this doesn't explain why those people who have never used intravenous drugs are positive.

Also when one looks at

patients of sexually transmitted disease clinics, a higher proportion than that seen in the general population are HCV positive, including those who report never having used IV drugs. The greater number of sexual partners a patient reported correlated with the likelihood of being HCV positive. Data collected from the NHANES III study showed that people who had more than 49 sexual partners during their lifetime had a prevalence of 9.4% for the HCV antibody. The prevalence decreased with lower numbers of sexual partners (**see table 1**). One of the problems with the NHANES data is that the use of IV drugs was not asked about in the questionnaire. So is a large number of sexual partners a surrogate marker for IV drug use? Maybe, in part; but we won't be able to answer that question here.

The NHANES study did ask about intranasal cocaine use and marijuana. A positive response to these questions also was reported in a higher frequency in those who were HCV positive than in those who were hepatitis C negative.

This is not to say that hepatitis C virus is not spread to sexual partners, but is it spread through intimate sexual activity? Previous studies have

**TABLE 1:*****Prevalence and Relative Risk of Being HCV Positive Based upon the Number of Sexual Partners in Your Lifetime***

<b>No. of Partners</b>	<b># Tested</b>	<b>Prevalence %</b>	<b>95% CI</b>	<b>Relative Risk</b>
0-1	2808	0.6	0.3-1.0	1.0 (95% CI)
2-9	5545	1.6	1.1-2.2	2.54 (1.14-5.66)
10-49	2299	3.3	2.6-4.3	2.54 (1.14-5.66)
≥ 50	454	9.4	5.6-15.8	5.16 (1.8-14.73)

*Modified from Alter, M. NEJM 341:556-62,1999.<sup>8</sup>*

not been able to demonstrate the presence of HCV-RNA in body fluids except for blood.<sup>4</sup> However, more recently, there have been reports of the presence of the hepatitis C virus RNA in the semen of up to 1/3 of HCV viremic men.<sup>5</sup> The levels are low, but, nonetheless, were positive. This may explain the lower rates of infection in sexual partners of patients with HCV than what is seen with other sexually transmitted viruses, such as Hepatitis B and HIV. Whether it is the act of sexual intercourse that is the cause of the transfer of the HCV virus to a person who was previously uninfected is not known, and may never be, since there are no good animal models for HCV infection except for humans and chimpanzees. We do know that in Chayama's study the hepatitis C virus RNA sequence pattern is the same in both partners in two pairs of long-term monogamous couples without a history of previous IV drug use.<sup>6</sup> Thus, as best we can tell, it is possible that the hepatitis C virus could be spread through sexual intercourse, but, perhaps, because of the lower amounts of virus in semen, the rate of transmission

is lower than if there were a blood to blood transfer of virus. Also, there has been a study that showed evidence of the hepatitis C virus in cervical smears.<sup>7</sup>

Other epidemiological data have shown a higher prevalence of hepatitis C in women and men who are engaged in sexual behavior for money, and in men who have sex with men. This higher prevalence over the rest of the US population persists even when one controls for other variables, such as IV drug use and HIV infection.

***'So What is My Risk?'***

Epidemiological studies are nice for the CDC and physicians, but, as a patient, I want to know—if I have hepatitis C what is the risk that my partner/spouse is going to become infected?

Several studies in several patient populations have been performed to look at the question of how frequently a sexual partner of a hepatitis C patient becomes hepatitis C positive. The studies are limited to a certain degree by two major factors. One is that phenomenon I call "birds of a feather." What I mean by this

is that people are going to be with people who have similar interests and activities. So some couples may both be HCV positive because of past risky behavior. Whether that be sharing needles in IV drug use, intranasal cocaine use, or other activities. The basal prevalence of HCV may be slightly higher than or at least equal to that of the general population. The other factor is, have the couples had sex before the blood sample collection and observation periods began? In most studies yes; therefore, how many of those HCV positive partners became infected sexually may not be determinable. In spite of these problems when one tries to sort out the relative risk for a partner of a hepatitis C infected patient becoming infected there are some data to suggest the risk is low but not zero.

A study was conducted of 398 couples, each couple consisting of a hemophiliac male and his partner. Of the 398 males 343 were positive for HCV and HIV, 42 for HCV alone and 6 for HIV alone and 2 with neither virus. In this study, blood samples from the patients and their partners were collected at baseline in 1982 and then every 6-12 months for the next 6 years. At the beginning of the data collection 5 couples were eliminated from the study because of a history of past IV drug use by the female partner. Of the remaining 393 couples, 52 (13%) of the 393 were HIV positive at the beginning of the data collection. All 52 women's husbands were HIV positive. Nine women seroconverted to HIV positive during the 6 years of data collection. At the start of the data collection 22 (5%) of the 393 women were HCV positive. Only 1 partner of the 42 men with HCV alone became HCV positive during the 6 year follow up. However of the 343 men who were dually infected with HIV and HCV, 20 women became HCV positive (6%).<sup>9</sup>

From information obtained from sexually transmitted disease (STD) clinics, we know that HIV and HBV infection transmission is enhanced in the presence of genital ulcerations or other sexually



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transmitted diseases. This has not been clearly proven in the case of HCV. However, the numbers of patients with a previous IV drug use and who were excluded from analysis in these studies from STD clinics studied were very high and may have limited the ability of these studies to find such an association.

When one looks at the males who were the sexual partners of women who had HCV in a Baltimore STD clinic, the risk of the men becoming HCV positive over time was no different in the men who had an HCV positive partner or who had a partner that was negative for the hepatitis C virus. This suggests, as do other studies, that if transmission from sexual activity does occur it occurs less frequently from a positive female to her sexual partner than from male to female, or male-to-male. A female partner of a male patient in that clinic had a 3% risk of having hepatitis C if the man were HCV negative and a 10% chance of having HCV if he were HCV antibody positive.<sup>10</sup>

In a STD clinic in Rome, 709 patients and their partners were followed for 1 to 3.7 years prospectively. In this study 16% were HIV positive, 2.1% admitted to IVDU, 34% were men having sex with men. Their partners had an incidence of becoming HCV positive of 1.25 per 100.<sup>11</sup>

This low frequency of transmission of the hepatitis C virus from a woman who is infected to her male partner is supported by the data from Ireland of the 2533 women who received contaminated anti-D globulin after childbirth. 94 male partners of 86

women with chronic hepatitis C were followed for 10-15 years. None of them developed antibodies to the hepatitis C virus.<sup>12</sup> Reports from other authors suggested that the male sexual partners had a 0.2% risk of becoming infected with hepatitis C in 17 years. This equates to a rate of 1 in 10,000 infections in the sex partner per year.

To try to make sense of the risk of transmitting hepatitis C infection from a male to his sexual partner, or from a female to her sexual partner, please **see table 2**.

Taking this information into account, it appears that sexual transmission may occur, or at least that the sexual partners of patients with hepatitis C may be at risk to

become infected with the hepatitis C virus. There are studies that have shown HCV RNA in semen and in vaginal secretions in a low amount, in patients with hepatitis C. But as seen in table 2, if the virus is spread through sexual contact, it does not happen very frequently. Factors that may increase the risk of sexual transmission of hepatitis C are having HIV co-infection, a low CD-4 count, having sex with a male who is HCV positive, and having multiple sex partners.

So, to answer the question posed at the beginning of this section, what is the risk that I will spread this virus to my spouse or sexual partner, the answer should be that if you are in a monogamous relationship then the risk of your

spouse or lover becoming HCV positive is about 1 in 1000 to 1 in 10,000, that is provided that you are not HIV positive. The risk is about three times higher for a woman to become infected if her male partner is HCV positive than for a man who has a female HCV positive partner. So it is not zero but it is a fairly low chance.

### What can you do to protect your spouse or lover?

The recommendations of the CDC are that if you are in a monogamous relationship with a person then you don't have to do anything different than what your normal practice is. You do not need to wear condoms if you choose not to. However, if 1 chance in 10,000

**TABLE 2**

#### *Incidence of Partner Seroconversion by Risk Group.*

<b>Study Population (Author)</b>	<b>Number of patients and partners</b>	<b>Length of study</b>	<b>Incidence of seroconversion</b>
Prospective-Rome STD clinic (Guilliani) <sup>11</sup>	709	1 to 3.7 years	1.25 per 100 person-years
<i>Prospective cohort monogamous heterosexual couples</i>			
Italian (Piazza) <sup>13</sup>	499	Mean 12 months	6 per 1000 person-years
Taiwan (Kao) <sup>14</sup>	112	Mean 46 months	2.3 per 1000 person-years
Ireland (Meisel) <sup>12</sup>	94	17 years	1 per 10,000 person-years
<i>Retrospective Cohort monogamous heterosexual couples</i>			
German Hemophilia (Bresters) <sup>15</sup>	50	13 years	0 per 1000 person years
Italian dialysis or liver clinics (Scotto) <sup>16</sup>	83	15.6 years	3.86 per 1000 person-years
Austria ( Neumayr) <sup>17</sup>	80	21.4 years	1 per 1000 person-years

**Modified from Terrault, N. Hepatology 2002.Vol 36,No 5, S99-S105 <sup>18</sup>**

is too high then maybe you should consider the use of condoms. I leave that decision up to you as a couple. If you are not in a monogamous relationship then you should be using condoms, not necessarily to protect your partner, as much as to protect yourself.

### How often should your spouse or sexual partner be tested for hepatitis C?

Most of us recommend that the partner of a person with hepatitis C be screened for the antibody to the virus. Some authors have suggested that they then be tested repeatedly approximately every two years but most physicians have not made that recommendation because of the low incidence of conversion from HCV antibody negative to HCV antibody positive (seroconversion) in this population unless they have other risk factors.

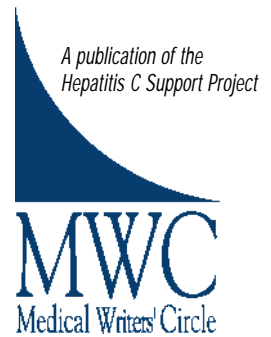
While sexual transmission of the hepatitis C virus may occur it does so infrequently. Just how often it is difficult to say, but hopefully I have provided some useful information that will help us counsel our patients about the risks of HCV as a sexually transmitted disease.



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The Mission of the Hepatitis C Support Project is to offer support to those who are affected by the hepatitis C Virus (HCV) and HIV/HCV coinfection.

Support is provided broadly, through information and education, as well as access to support groups. The (Project) seeks to serve the HCV community as well as the general public.

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