Research Update

“Hepatitis” means “inflammation of the liver.” The liver is the body’s largest internal organ, and it performs a number of important functions. These include converting some nutrients into substances our bodies can use for energy and filtering out substances that are harmful to our bodies. There are several kinds of hepatitis virus, each named for a letter of the alphabet, including A, B, C, D, and E. Hepatitis A (HAV), hepatitis B (HBV), and hepatitis C (HCV) are the most common types of hepatitis virus and disease, and are described in “The ABCs of Hepatitis” on page 2.

There are several reasons for HIV test counselors to be concerned about hepatitis C infection. First, it is widespread: approximately 3.2 million people in the United States have chronic hepatitis C infection, almost three times as many as are living with HIV.1 In California, approximately 600,000 people are living with hepatitis C.2 Second, it is a serious public health problem. Chronic HCV can result in cirrhosis (liver scarring) and liver cancer. Approximately 12,000 U.S. deaths per year are attributed to chronic hepatitis C.3 While treatments are available, there is currently no vaccine to protect against the virus.

Third, hepatitis C and HIV are transmitted in some of the same ways, and many of the people who are at risk for or living with hepatitis C are also people who are at risk for or living with HIV. The Centers for Disease Control and Prevention (CDC) estimates that 50 percent to 90 percent of HIV-positive injection drug users also have hepatitis C.4 In addition, the risk of sexual transmission of HIV seems to increase when the person also has HIV.5 Fourth, co-infection with HIV and hepatitis C increases health risks: HIV makes hepatitis C progress more quickly and severely, and liver diseases like hepatitis C are the leading cause of hospital admissions and death in HIV-positive patients.6

Acute or Chronic HCV?

When a person is first infected with hepatitis C, he or she enters the “acute” or early stage of the disease, which lasts six months.7,8 During the acute phase, the virus enters the cells of the liver and multiplies. The person’s immune system recognizes the HCV as an invader, and attacks the HCV-infected liver cells. These cells may become inflamed and damaged, and, over time, the liver may be scarred. Many people who are acutely infected with HCV experience no symptoms and do not know that they are infected.7 The immune systems of some people (about 15 percent to 25 percent of those infected) are able to fight off HCV. This is called “clearing” the virus. It means that after a period of early infection, these people recover completely. The great majority (75 percent to 85 percent) of people who are infected, however, remain infected: this is called “chronic” HCV infection, which can lead to complications. Only 1 percent of people are co-infected with HIV and hepatitis C. This increases health risks: HIV makes hepatitis C progress more quickly and severely, and liver diseases like hepatitis C are the leading cause of hospital admissions and death in HIV-positive patients.6
Transmission

Hepatitis C is most commonly transmitted through contact with HCV-infected blood. Hepatitis C is much easier to transmit than HIV—for example, it is 10 times more infectious through a needlestick than HIV. HCV also lives longer outside the body than HIV does—perhaps as long as four days—making it harder and thus easier to transmit. Prior to 1992, when the United States began widespread screening of the blood supply for HCV, the most common route of transmission for new infections was blood transfusions and organ transplants. Today, most people becoming infected with HCV have shared needles or other drug injection equipment, such as syringes, cottons, cookers, tourniquets, and water. There is a strong relationship between the number of times a person has injected drugs and the likelihood that person will test HCV-positive.

Other types of blood exposures also present a risk of HCV transmission. For example, people can become infected through needlestick injuries in health care settings. Tattooing and body piercing can also create a risk of hepatitis C transmission if equipment is re-used without being properly sterilized. Although this has not been found to be a problem in licensed, commercial tattooing establishments, tattooing without access to clean equipment in prisons is a common practice. It is uncommon, but not impossible, to transmit hepatitis C by sharing items such as razors or toothbrushes that have come in contact with another person’s blood.

Approximately 4 percent of children born to mothers who have HCV will become infected with HCV, if the mother is HIV-negative. When the mother is co-infected with HIV and HCV, the likelihood of passing HCV from mother to child is two to three times greater. Transmission occurs during birth, and, unlike HIV, there is no treatment that can be given before or after delivery to prevent HCV transmission from mother to child. Also unlike HIV, there is no evidence that HCV is spread through breast milk, although if a mother’s nipples are cracked or bleeding, this could present a risk of HCV transmission.

It is possible to contract hepatitis C through sexual contact with a person who has the virus, although this seems to be much rarer than other routes. Some sexual activities involve exposure to blood (for example, vaginal or anal sex can result in tearing of tissues). Having certain STDs—especially ones that may involve blood or lesions on the skin—can also increase the chances of HCV transmission. Over the last decade, a number of outbreaks of HCV among HIV-positive men who have sex with men have been reported in the large urban centers of the United States, Europe, and Australia, providing increasing evidence that hepatitis C is more likely to be transmitted sexually when HIV is present than when it is not. It may be that HIV leads to higher levels of HCV in the blood and semen of co-infected people; it may also be that the immune systems of people with HIV are less able to defend against HCV infection.

The ABCs of Hepatitis: Most Common Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Transmission</th>
<th>Symptoms</th>
<th>Vaccine</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A</td>
<td>Through rimming (oral-anal contact) or through other oral contact with feces (for example, eating food that is contaminated with feces due to inadequate hand washing).</td>
<td>Weakness; dark urine; yellow-colored skin and eyes; enlarged liver.</td>
<td>Yes</td>
<td>Resolves without treatment in people with healthy immune systems after a few weeks. Does not lead to chronic infection.</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Through mucosal contact with blood and other body fluids such as semen and saliva during oral, anal, or vaginal sex, or by sharing drug injection syringes, or from a mother to her newborn.</td>
<td>Weakness; dark urine; enlarged liver; yellow-colored skin and eyes. Can result in liver cancer.</td>
<td>Yes</td>
<td>Antivirals; most people recover after six to eight weeks of resting, eating well, and abstaining from drugs and alcohol.</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>Primarily through blood-to-blood contact through shared drug injection equipment. Occasionally during birth, or, rarely, during sex involving blood contact, and possibly through tattooing with needles that have not been properly sterilized.</td>
<td>80 percent of people have no symptoms. Nausea; fever; loss of appetite; dark urine; abdominal pain; enlarged liver; yellow-colored skin and eyes. Can result in liver failure or liver cancer.</td>
<td>No</td>
<td>Interferon and ribavirin; abstaining from alcohol and other toxins, and limiting fatty foods recommended.</td>
</tr>
</tbody>
</table>

Sources: Centers for Disease Control and Prevention. Viral Hepatitis. Atlanta: Centers for Disease Control and Prevention, 2008; Cataldo M. Update on STDs other than HIV. Perspectives. 2008; 17(1): 1-8.
Preventing HCV Transmission

Avoiding contact with blood is at the center of HCV prevention. Since shared injection equipment remains the primary route of HCV transmission, primary HCV prevention interventions include access to substance abuse treatment and access to sterile syringes. “Harm reduction” is any strategy that tries to minimize the negative consequences of a behavior.

Among the harm reduction options for HCV prevention:

**Needle Exchange Services.** Also called “syringe exchange,” these programs provide new syringes in exchange for used ones. Many have credited needle exchange services with the decline or stabilization of HIV rates among injection drug users in areas that have such services. In addition, many syringe exchange programs provide links to HIV and HCV education and services.18

**Over-the-Counter Pharmacy Sale of Syringes.** Since 2005, it has been legal in California for people to purchase up to 10 syringes from participating pharmacies without a prescription. This program is meant to compensate for some of the limitations of needle-exchange services. These include the lack of services in some areas, lack of anonymity, and underutilization by some injection drug users, particularly younger users, infrequent users, and men who have sex with men.19

**Other Injection-Related Harm Reduction.** Other harm reduction methods can also be effective, for example, starting with a clean surface and clean hands; splitting drugs when they are dry; cleaning the injection site with alcohol or soap and water; avoiding contact with blood; and using a designated “splitter” syringe (a sterile syringe that no one else is going to use) to “backload” (from the back of the syringe, not the needle end) the syringes of other users.20 Syringe disinfection, also called “cleaning your works,” is an imperfect, “backup” strategy during which syringes and cookers are rinsed in cold water, filled with bleach for at least two minutes, and then rinsed with water again. This method may not eliminate hepatitis C virus.21

**Sexual Harm Reduction. While the risk of HCV transmission is lower for sexual contact than for blood contact, this risk is elevated when blood is present during sex (including menstrual blood or blood from active STDs such as herpes).** “Rough” sex sometimes creates tears in the skin—either during prolonged sex, sex under the influence of drugs such as methamphetamine, as part of S/M play, or as a result of inadequate lubrication. Using latex barriers and condoms, water-based lubricants, sterile equipment for any cutting or piercing, and gloves during any play that may involve blood, and not sharing sex toys are all ways to reduce sex-related HCV transmission risk.14

**Integrating HCV and HIV Testing**

In 2003, the California Department of Public Health Office of AIDS conducted a demonstration project that offered HCV testing alongside HIV testing. The results revealed that almost twice as many injection drug users tested for HIV when HCV testing was also offered, and that injection drug users were more interested in finding out their HCV status than their HIV status.7 Today, more than half of the California State Office of AIDS-funded local health jurisdictions also provide hepatitis C testing.22 Currently, this service is offered only to clients who have injected drugs. The CDC recommends that people who have ever injected drugs (even once) get tested for HCV. Other people for whom the CDC recommends testing are: people who were treated for a blood clotting problem before 1987 or received a blood transfusion or organ transplant before July 1992; people with abnormal liver test results or liver disease; people who have had an occupational exposure to blood through a needlestick or other sharp object injury; and people who are HIV-positive. The CDC does not recommend that pregnant women be tested for hepatitis C as part of routine prenatal care unless there are other reasons to test for HCV, as noted above.23

Several different blood tests are used to test for hepatitis C. Most HIV test sites that offer HCV testing do a “screening” test that looks for HCV antibodies in the client’s blood. An HCV-negative result could mean one of three things: (1) the client is not infected with hepatitis C; (2) the client is infected but is still in the HCV “window period”; or (3) the client’s immune system is compromised, for example, by HIV, and so the client does not have a consistently detectable level of HCV antibodies.

Similar to HIV, HCV has a “window period” defined as the time after infection but before the body has been able to produce enough antibodies to show up
on a screening test. With HIV, the window period is two weeks to six months, with most people developing antibodies by the third month after exposure. HCV is almost the same: 97 percent of people develop antibodies by the end of six months. 5

HCV antibody test results may come back from the lab as “indeterminate.” The most common reasons for an indeterminate result are: the client has HCV but is still in the window period; the client is HCV-negative, but there was a false positive on the enzyme immunoassay (EIA) screening test, and the result of a more specific anti-HCV test was indeterminate; or the client’s immune system is compromised, for example, by HIV, and so the client’s antibodies are not consistently detectable. 6, 7

Having a “positive” HCV antibody test means that a person was exposed to HCV at some time in his or her life. 8 But since 15 percent to 25 percent of people who have been exposed to HCV “clear” the virus from their bodies without treatment, a positive HCV antibody test alone, unlike a positive HIV test, cannot tell us whether or not the person is chronically infected with HCV. Instead, a second test is needed when the screening test is positive. This test can tell whether the hepatitis C virus is still in the person’s bloodstream. 9 If it has been more than six months since the last exposure to HCV, and the confirmatory test is HCV-positive, we say that the person is “chronically infected.”

### References for This Issue


Implications for Counseling

Because so many people who are at risk for HIV are also at risk for hepatitis C, it makes sense to integrate HCV counseling and testing into HIV counseling and testing sessions. Many people who are infected with hepatitis C don’t know their status, and HIV testing services offer an important opportunity not only for HCV testing, but also for prevention and referral services.

In most ways, the guidelines for HCV counseling are similar to those for HIV counseling. The key priorities of the HIV-HCV integrated risk assessment session are:

• Ensuring the client understands the basics of both HIV and HCV transmission and how these apply to his or her personal situation.
• Assessing the client’s stage of change regarding specific HIV and HCV risk behaviors. For example, the client may be in the maintenance stage regarding condom use for anal sex but barely contemplative regarding the importance of using his own cooker and cotton to prepare drugs for injection.
• Having a conversation that explores the context of the client’s risk and the client’s motivation to reduce risk so that the client can decide upon next steps to prevent HIV and HCV transmission.

An Integrated Risk Assessment

An “integrated” HIV-HCV risk assessment is one that effectively explores the client’s risk for both viruses. This means that the counselor is listening for details about both HIV- and HCV-related risk.

Most state Office of AIDS-funded test sites that offer HCV counseling and testing do so only for clients who have injected drugs. Clients may or may not feel comfortable revealing injection drug use to a counselor they have just met. Strive to create a safe place to talk by using neutral language, such as “Tell me about the role that drugs play in sex with the guys that you meet.” Explore the context of the client’s risk behavior—how do the people the client uses with or the settings in which he or she uses the drugs affect his or her risk? For example, does the client inject in a location where he can take his time, clean the injection site, and inject carefully?

Counselors may want to use the “Ask, Tell, Ask” method to avoid overwhelming clients with information in the integrated session. For example, the counselor might ask a client what she knows about hepatitis C. After the client responds, the counselor affirms any correct information and asks permission to fill in any gaps—adding a small amount of information that is relevant to the client’s risk. The counselor then asks the client how this information applies to her situation. This allows the client to figure out how the information is personally relevant and allows the counselor to determine whether the client has understood the information correctly and can use it. The goal is for clients to leave their sessions with a sense of how they can reduce their HIV and HCV risk.

A Harm Reduction Approach

Since most of the people who are at risk for hepatitis C (and many of the people who are at risk for HIV) are substance users, the ability to comfortably discuss drug use and harm reduction strategies with clients is an essential HIV and HCV counseling skill. A person does not need to stop using substances in order to reduce some of the harms that can come with substance use. The counselor’s open, nonjudgmental, and respectful attitude encourages honesty from clients, who may be used to having to defend or deny their use in order to obtain services.

Clients can use a number of harm reduction strategies to lessen their risk for HCV and HIV. Here are examples of just a few from the Harm Reduction Coalition’s website (www.harmreduction.org):

1. Choose another way to deliver the drug. For example, in terms of HIV or HCV transmission, snorting and smoking are safer than injecting. (Note, however, that sharing straws—for example, when snorting cocaine—might lead to HCV risk if there is blood on the straw).

2. Use new, sterile syringes for each injection. This both prevents transmission of diseases like HIV, hepatitis B, and hepatitis C, and helps veins stay healthy, since needles can become blunt after just one use and blunt needles can damage veins.20 Counselors can explore with clients whether or not they have a reliable source for new, sterile syringes, and can make referrals to such resources as needle exchange sites and pharmacies that sell syringes without prescription. If clients must share works, they should clean them with bleach and water—rinsing syringes and cookers in cold water, filling with bleach, and letting bleach stand for at least two minutes, then rinsing again with water. Although this process is somewhat effective against HIV and hepatitis B, it will not necessarily kill hepatitis C.20 Cottons cannot be cleaned, so to prevent HCV transmission, new cottons must be used.

3. Split drugs when they are dry. When people share drugs, often the solid or powder form of the drug is dissolved in water and heated in the cooker (usually a spoon heated by a flame from below). Users then take turns drawing up their portions into their syringes. Unless each piece of the “works” (cooker, cotton, and all syringes) is sterile, it is easy to transmit HIV, HBV, and HCV. Instead, divide the dry drug into separate cookers, and each person can prepare his or her own drugs with his or her own water and equipment.
Backload using a sterile splitter syringe. After the drug is cooked in a sterile cooker, use a sterile cotton and sterile syringe to draw up equal amounts of the drug and squirt it into the back of each user’s syringe after the plunger has been removed.

Learn how to inject yourself safely. People who inject themselves (rather than being injected by others) are better able to protect their health because they are more likely to know what is in the syringe, and where the syringe has been. Some studies have shown that those who are injected by others are at increased risk of infection. Counselors can help create sessions in which clients feel comfortable talking about the context of their use, their risk factors for HIV and HCV, and what behaviors they are interested in changing to reduce those risks. It is more effective for clients to come up with their own harm reduction ideas than for counselors to immediately make suggestions.

The Hepatitis C Test
One of the key features of the integrated session is explaining differences between HIV and HCV testing. This includes differences in the window period, the meaning of a “positive” result, and the steps that follow a diagnosis.

The window period is the time between exposure to the virus and when antibodies to that virus are detectable by testing. In describing this time to a client, a counselor might say: “Many people develop antibodies to both HIV and hepatitis C within three months. To be sure, retest six months after your last exposure to each disease.”

When a person has a confirmed HIV-positive result, we know that that person has HIV. But with hepatitis C, about 20 percent of people with HCV antibodies clear the disease without treatment. This means that they have been exposed to the virus, developed antibodies, and are no longer infected with the active virus itself. For this reason, people who receive a positive HCV antibody test must undergo more testing to see if they are still infected. If a test for the virus itself (often called a “PCR test”) is positive, we say that the person is “chronically” infected with hepatitis C.

It is important to note that clients with HIV—or some other compromise to their immune systems—may need to have a test for the hepatitis C virus itself—even if they have an HCV-negative antibody test, because a damaged immune system may not consistently produce detectable HCV antibodies even when the person has chronic HCV.

The procedure for HCV antibody testing differs from site to site and is changing over time with advances in testing technology. Your supervisor is the best resource to help you understand the protocol that your site uses and what your site requires regarding confirmatory results. Remember to let clients know that not everyone who tests HCV antibody-positive still has the disease: HCV-positive clients will need to get a test for the virus itself to see if they are chronically infected.

Information and Referrals
How a counselor approaches prevention and care referrals in the counseling session depends on available local resources. For example, clients can purchase new syringes legally at participating pharmacies in some counties. Similarly, needle exchange is available in many, but not all, parts of California.

Specialized medical care is the key referral for people living with HCV, HIV, or both. Unfortunately, many people do not have access to medical care for hepatitis C, either because they lack health insurance, because doctors who specialize in hepatitis C are scarce, or because some physicians are reluctant to care for patients who inject or have injected drugs. Although some publicly funded hepatitis C resources are available, they are inadequate to the need for services. When talking with clients who are co-infected with HIV and hepatitis C, remember that not all HIV treatment specialists are also experienced in treating liver problems.

HCV support groups do exist in many communities in California, and online resources are also available. Support groups and virtual communities can be excellent sources of information and encouragement—including help in managing self-care. Chronic HCV is often a mild, slowly progressive disease and that many people live for decades without symptoms. Help clients understand that there are many things that people with hepatitis C can do to protect their health, including getting medical and psychosocial support, reducing or eliminating alcohol use, making dietary changes such as minimizing intake of fatty, salty, and sugary foods; and possibly being immunized against hepatitis A and hepatitis B.

While it is important for counselors to be knowledgeable about resources in their area, it is also wise not to overwhelm clients with too much information or too many referrals at once. When clients hear that they are HCV antibody-positive, just as when they hear that they are HIV-positive, it may be difficult for them to process or remember much other information. Focus on next steps and referrals that will get the client through the next few days or week, and give clients who can read written materials that they can refer to later.

Conclusion
HIV test counselors are becoming an increasingly important source of hepatitis C information, testing, and referral for treatment services. The client-centered focus and harm reduction orientation of HIV test counseling are equally critical in HCV service delivery. By being knowledgeable about the basics of hepatitis C transmission, prevention, consequences, testing, and referrals, counselors can help many clients to protect their health.
Case Study

Regina, a 50-year-old White heterosexual woman with a history of injection drug use, tested HIV-negative two weeks ago. Regina's rapid HIV test result was negative. At that session, Mary Beth, her counselor, talked with Regina not only about reducing her HIV risk, but also about testing for hepatitis C. Regina agreed to test, and now she has come back for her result.

“I’m glad to see you again,” Mary Beth begins. “How have the last two weeks been for you?”

“OK, I guess,” Regina replies. “I was really glad that the HIV test was all right.”

“I know how relieved you were when I told you the result,” Mary Beth says. “Do you have any questions before I give you the results of your HCV test?” Regina shakes her head.

“Your hepatitis C screening test was positive.” Mary Beth pauses to see how Regina receives the news.

“Damn,” Regina says, looking resigned. “I was really hoping I dodged a bullet on that too. But I guess after all the years I’ve been shooting up, it was going to happen sooner or later.”

Mary Beth nods. “I get that this is really hard to hear when you were hoping the HCV test would be negative too. Like we talked about last time, a positive HCV antibody test means that you were exposed to hepatitis C at some point. We don’t know from this test if the virus is still there or not. So the next step is for you to take another test to see if the virus is still there.”

“Can you test me now?” Regina asks.

“No,” Mary Beth replies. But we can talk about your options for finding a medical provider who can give you the viral HCV test. Sometimes that’s called a ‘PCR test.’ If that test is negative, your body probably cleared the HCV on its own. If it is positive, and you are dealing with HCV, then you can get follow-up care.”

“So you’re saying I might not have it?” Regina asks, looking puzzled.

“Right,” Mary Beth answers. “Some people are able to get rid of the virus on their own, without any treatment. The next test will tell you if you are one of those people, and will help you and your doctor know more about the next steps to take. I’m wondering how much you know about living with hep C—do you know anyone who has it?”

“Yeah, I mean, there are plenty of people around me who have it, but we don’t talk about it a lot—especially the whole testing thing. My one friend Grace got clean after she got the news that she had it. She’s doing OK.”

“Cool. Keeping the alcohol and street drugs out of your system is one of the best ways to protect your liver. What do you think about that? Is that a step you want to take?” Mary Beth asks.

“I can’t really think about that right now,” Regina responds.

“OK,” Mary Beth agrees. “If you want, I can also give you a pamphlet on strategies to protect your liver, including healthy eating.”

“OK, that sounds good. I’m still kind of in shock.” Regina looks at her lap.

“Yeah, we’re covering a lot of ground and you just got some big news.” Mary Beth asks: “What are you planning to do today after we finish?”

Regina looks up: “I was going to go visit my kid, but I’m not ready to tell him this. I might talk to Grace. She’s good to be with and she won’t put my business out on the street.”

Mary Beth smiles. “Great. It’s really good to be with someone you can trust. Do you have any questions for me?”

Regina shakes her head again. “I know I will later, but I can’t think of them right now. Maybe just give me the list of stuff?”

“Sure—here’s the list, with some of the liver doctors in the area and these two will take your Medi-Cal,” says Mary Beth, circling two referrals. “There’s also the number for a clinic downtown that has an HCV support group. I also remember that the step you decided on last time to lower your risk of getting HIV was to share needles less and use the needle exchange more often—the hours are here on the back of this sheet. Using your own new needles will help protect you from HIV and other diseases that are transmitted by blood—and if you are living with HCV, it will keep you from passing that on as well. There’s a lot you can do to take care of yourself, and here’s a number you can call later if you have any questions.”
Test Yourself

Review Questions

1. True or False: A person who tests positive for HCV antibodies will always have chronic HCV.

2. Which of the following is not a reason that HIV test counselors might be concerned about hepatitis C among their clients? a) Hepatitis C is widespread; b) The consequences of hepatitis C infection are almost always fatal; c) Hepatitis C and HIV are transmitted in some of the same ways; d) Co-infection with HIV makes hepatitis C progress more quickly.

3. True or False: Many people in the early stage of infection with HCV experience no symptoms, and do not know that they are infected.

4. There is evidence that hepatitis C may be more likely to be transmitted during sex when a) HIV is also present; b) some STDs other than HIV are present; c) when blood contact occurs; d) all of the above.

5. True or False: Approximately 75 percent of the people who become infected with HCV are able to “clear” the virus on their own, without treatment.

6. An HIV-negative pregnant woman who is chronically infected with HCV: a) has approximately a 4 percent chance of passing HCV on to her child; b) can be treated with anti-HCV drugs before or during delivery to prevent transmission from mother to child; c) has the same chance of passing HCV on to her child as an HIV-positive woman; d) is likely to pass HCV on to her child through her breast milk.

7. True or False: The hepatitis C vaccine is the best protection against HCV.

Discussion Questions

1. What challenges and benefits do you see to integrating hepatitis C services into the HIV test counseling session?

2. What kinds of assumptions might a counselor make about clients who use injection drugs that could get in the way of HIV and HCV prevention counseling?

3. What are some of the harm reduction methods not discussed in this issue that clients can use to reduce their HCV-related injection risk?

4. What do you find to be the most important referrals for clients who receive an HCV-positive antibody test? How do you explain the next steps to these clients?

Answers to Review Questions

1. False. People who test HCV antibody-positive have been exposed to HCV, and may or may not be living with chronic HCV infection. Additional testing for the virus itself is necessary to determine if a person is chronically infected.

2. Relatively few people (about 1 percent to 5 percent, who are initially infected with HCV die of liver cancer or cirrhosis as a consequence of long-term infection with the disease.

3. True.

4. d.

5. False. Approximately 15 percent to 25 percent of people who are infected with HCV are able to rid themselves of the virus using only the strength of their immune systems.

6. a.

7. False. Unlike hepatitis A and hepatitis B, there is currently no vaccine that protects against hepatitis C infection.