

# Topics in the Nursing Care of People Living with HIV/AIDS



## Module III

### HIV and Hepatitis Co-Infection

Lucille Sanzero Eller PhD RN

## Acknowledgements

This publication is supported by the New York/New Jersey AIDS Education and Training Center. The AIDS Education and Training Center (AETC) Program of the Ryan White CARE Act currently supports a network of 11 regional centers (and more than 130 local performance sites) that conduct targeted, multi-disciplinary education and training programs for healthcare providers treating persons with HIV/AIDS. The AETCs serve all 50 States, the District of Columbia, the Virgin Islands, Puerto Rico, and the six U.S.-affiliated Pacific Jurisdictions. The AETC Program is administered by the HIV/AIDS Bureau of the Health Resources and Services Administration (HRSA) of the United States Department of Health and Human Services (DHHS).

The NY/NJ AETC's mission is to assist health care professionals, through education and training, to provide optimal quality services and sensitive care to HIV positive persons, and to provide access to current research and treatment of HIV/AIDS. We serve the New York and New Jersey healthcare communities by providing AIDS and HIV education and training to those who treat, manage, diagnose, or counsel individuals with HIV infection and AIDS, and to help prevent high risk behaviors that lead to HIV transmission.

For more information about the NY/NJ AETC or if you would like to receive training, please contact us at:

New York/New Jersey AIDS Education and Training Center  
Columbia University, Mailman School of Public Health  
722 West 168th Street, Room 1110  
New York, NY 10032  
Phone: (212) 305-8291  
Website: [www.nynjaetc.org](http://www.nynjaetc.org)

The National AETC Program also includes the following clinician services:

Warmline

National HIV Telephone Consultation Service: 1-800-933-3413

PEPLINE

National Clinicians' Post-Exposure Prophylaxis Hotline: 1-888-HIV-4911

Perinatal HIV Hotline

National Perinatal HIV Consultation and Referral Service: 1-888-448-8765

HIV/AIDS National Resource Center: [www.aidsetc.org](http://www.aidsetc.org)

Providing resources (including curricula and lecture slide sets) on HIV disease, treatment, education and data

**RUTGERS THE STATE UNIVERSITY  
COLLEGE OF NURSING  
CENTER FOR PROFESSIONAL DEVELOPMENT**

**MISSION:** These modules will equip nurses with the basic knowledge needed to provide safe, comprehensive care to clients with HIV/AIDS.

**INTENDED AUDIENCE:** These five modules are intended for all nurses who work with clients with HIV/AIDS in doctor's offices, hospitals, ambulatory care and correctional settings.

**LEARNING OBJECTIVES:**

After completing this Module III of V the nurse should be able to:

**Module III**

1. discuss the implications of and therapy for HIV and hepatitis co-infection.

**OUTLINE:**

**Module III**

**HIV And Hepatitis Co-Infection**

- a. Background / Prevalence
- b. Assessment / Testing
- c. Treatment
- d. Patient Education

**AUTHOR:**

Lucille Eller, PhD, RN  
Associate Professor  
Rutgers The State University of New Jersey  
College of Nursing

**REVIEWERS**

Marshall J. Glesby, MD, PhD  
Lucy Bradley-Springer, PhD, RN, ACRN, FAAN

Additional thanks to Debbie M. Winters, APRN-BC AACRN and Maryann Andrews BSN RN for their thoughtful comments.

**NURSING ACCREDITATION:**

Rutgers College of Nursing Center for Professional Development is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation. Continuing education activities meet standards as defined by the American Nurses Credentialing Center. One contact hour is sixty minutes of instruction. Contact hour verification can only be awarded at the completion of the program. In order to receive one contact hour for each module the participant must return the post test, program evaluation and PIF (Participant Information Form) forms that appear at the end of each module.

The post test, program evaluation and PIF form which appear at the end of each module should be sent to:

Dr Gayle A Pearson, Assistant Dean  
Rutgers, The State University  
College of Nursing  
Center for Professional Development  
175 University Avenue, Conklin Hall 244  
Newark, New Jersey 07102  
Or Fax to: 973-353-1700  
Or Scan and email to: [cpdn@rutgers.edu](mailto:cpdn@rutgers.edu)

A certificate of completion will be emailed to you upon receipt of post test answers, program evaluation and PIF form. No certificate of completion will be sent without our receipt of the Participant Information Form (PIF) or a valid email address.

# Module III

## HIV and Hepatitis Co-Infection

Over the past decade, liver disease caused by the hepatitis B virus (HBV) and hepatitis C virus (HCV) has become an increasing cause of morbidity and mortality in patients with HIV infection. Current guidelines recommend that all HIV-infected individuals be tested for HCV, and all HCV-infected people with risk factors for HIV be tested for HIV (Panel on Antiretroviral Guidelines, 2006; Strader, Wright, Thomas, and Seeff, 2004).

### Viral Hepatitis

The viruses that can cause hepatitis include hepatitis A, B, C, D, E, F, and G, but over 90% of hepatitis cases are caused by A, B, or C viruses.

Hepatitis A virus (HAV) is transmitted through contact with fecal matter containing the virus. It causes an acute hepatitis with symptoms that can include fever, malaise, anorexia, nausea, abdominal pain, dark urine, and jaundice. These signs and symptoms usually last fewer than 2 months, although 10% to 15% of infected people have prolonged or relapsing disease lasting from 6 to 9 months (CDC, 2006b, 2006d). Once recovered, those who have had HAV are immune to the disease.

HBV and HCV are both communicable and in those who are monoinfected (HBV or HCV without HIV infection), 5-10% of those with HBV and 50-80% of those with HCV become chronically infected. While HIV/HBV and HIV/HCV co-infection occur with some frequency, tri-infection with HIV/HBV and HCV is rare (Boston & Slish, 2005).

**Background: HBV, HCV and HIV Co-infection**

### Hepatitis B

HBV, the most common hepatitis virus, is a DNA virus from the *Hepadnaviridae* family. HBV is transmitted through perinatal, percutaneous, and sexual exposure to infected blood and body fluids. The replication cycle of HBV starts with its attachment to a hepatocyte, and subsequent synthesis of a covalently closed circular DNA (cccDNA), the template for the eventual production of new viral particles. HBV can evade the innate human immune response. Even many years after recovery from acute HBV infection, HBV-specific T cells and trace amounts of HBV DNA persist in hepatocytes.

Symptoms, which are the same as those of HAV infection, occur in about 70% of patients within 9-21 weeks after exposure to HBV. Chronic HBV infection can cause cirrhosis, hepatocellular carcinoma (HCC), and liver failure. The CDC estimates that 1.25 million people in the U.S. are infected with HBV (CDC, 2006c). HBV vaccine, available since 1982, is recommended for all age groups to prevent HBV infection (Lok and McMahon, 2004).

People with HIV who are co-infected with HBV are 3 to 6 times more likely to develop chronic HBV than those mono-infected with HBV. In addition, since HBV genetic material remains in human cells, the virus may be reactivated as immune function deteriorates. About 25% of people with chronic hepatitis B develop liver damage including cirrhosis or liver cancer, usually after years or decades. The rate of liver damage is higher and hepatitis B disease progression is more rapid in those co-infected with HIV/HBV.

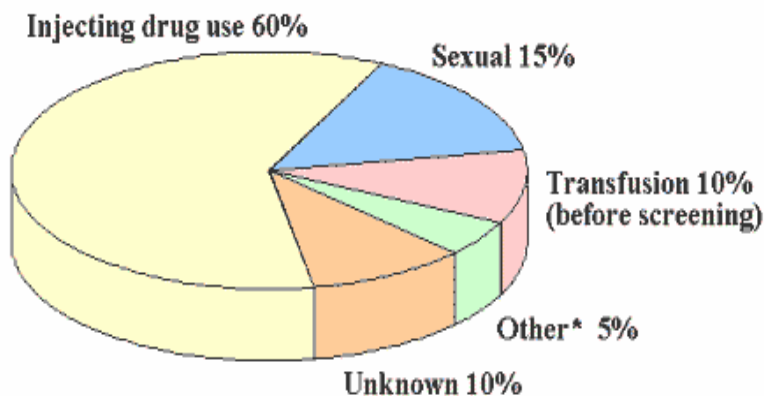
# Hepatitis C

HCV is a single-stranded ribonucleic (RNA) virus of the *Flaviviridae* family. Six major subtypes have been identified, with genotype 1 responsible for more than 70% of infections in the U. S. (Boston and Slish, 2005).

HCV is the most common blood borne infection in the U.S. as estimated from the third National Health and Nutrition Examination Survey (NHANES III) of the civilian, non-institutionalized population. This survey estimated that 1.8% of Americans (3.9 million) have been infected with HCV, and most (2.7 million) are chronically infected (CDC, 2006a). This estimate was thought to be conservative because the survey did not include the incarcerated or the homeless, groups known to have high rates of HCV infection.

Eighty percent of those infected with HCV do not experience symptoms. About 60% to 85% of immunocompetent people who become infected with HCV become chronically infected, and 60% to 70% of these develop chronic hepatitis. Cirrhosis develops in 10% to 20% of people with chronic HCV over a period of 20 to 30 years, and HCC (liver cancer) develops in 1% to 5% (CDC, 2006a). End-stage liver disease (ESLD) and HCC resulting from HCV infection cause between 10,000 and 12,000 deaths every year in the U.S. Unlike HBV, there is no vaccine to prevent HCV. Figure III.1 and the following information describe the sources of infection for HCV (CDC, 2006a).

Figure III.1. Sources of Infection for Persons with Hepatitis C



\*Hemodialysis, health-care work, perinatal

Source: Centers for Disease Control and Prevention (CDC). (2006a). *Viral Hepatitis C*. Retrieved May 30, 2006, from [http://www.cdc.gov/ncidod/diseases/hepatitis/c/plan/HCV\\_infection.htm](http://www.cdc.gov/ncidod/diseases/hepatitis/c/plan/HCV_infection.htm)

- Past or current injection drug users (IDUs) are at highest risk for HCV infection. Among those injecting drugs for at least 5 years, 60% to 80% are infected with HCV compared to about 30% infected with HIV.
- The risk of HCV transmission through sexual exposure is low. However, the frequency of sexual behaviors, coupled with the prevalence of HCV, explains the high proportion (15%) of those who acquired HCV through sexual exposure.
- Prior to the mid-1980s, there was a 7% to 10% risk of acquiring HCV from a blood transfusion. As of 2001, the risk of HCV infection from a unit of transfused blood is less than one per million

transfused units. Clotting factor concentrates, used to treat individuals with hemophilia, posed a high risk for HCV infection prior to 1985. Viral inactivation techniques for clotting factors were introduced in 1985 (Factor VIII) and 1987 (Factor IX). Currently, all immune globulin products undergo a virus inactivation procedure or test negative for HCV prior to release.

- Exposures to HCV from hemodialysis, employment in the health care field, and birth to an HCV-infected mother together account for about 5% of cases.
- About 10% of people with HCV have no recognized source of infection.

It is estimated that one-third of those with HIV are co-infected with HCV. However, the rate of co-infection varies by HIV risk group. In those who acquired HIV through IDU, the co-infection rate is 90%, and more than 50% in people who received clotting factor concentrates prior to 1985.

## HIV Co-Infection

Co-infection with HIV increases the levels of hepatitis viremia and progression of cirrhosis, liver failure, and death in those with HBV or HCV (Bonacini and Puoti, 2000; Thio, 2004). The risk of liver-related mortality in the co-infected patient appears to be related to viral load and CD4+ T cell count. In a study of 5,294 participants in the Multicenter AIDS Cohort Study (MACS), researchers observed a 14.2/1000 mortality rate in those who were co-infected with HIV/HBV. This compared to rates of 1.7/1000 and 0.8/1000 in those mono-infected with HIV or HBV, respectively (Thio, 2004).

In a review of several studies that reported correlations between CD4+ T cell counts and cirrhosis in HIV/HCV co-infected subjects, an inverse correlation between CD4+ T cell counts and cirrhosis was noted (Bonacini and Puoti, 2000). In other words, lower CD4+ T cell levels were correlated with higher rates of cirrhosis. In a study comparing 265 HCV/HIV co-infected, 251 HCV mono-infected, and 227 HIV mono-infected participants, mortality in those co-infected with HCV/HIV was significantly higher. Mortality over a 3-year period was 17% for co-infected subjects compared to 6% in those with HCV alone and 9% in those with HIV alone. In this study, mortality among HCV/HIV co-infected patients was significantly greater in white (31%) compared to black (15%) participants (Merriman, Porter, Brensinger, Reddy, and Chang, 2006).

The influence of HBV or HCV co-infection on the course of HIV disease remains unclear. Some early reports noted accelerated clinical progression of HIV infection in HCV co-infected patients (Mathurin, et al., 1998; Tong, El-Farra, Reikes and Co, 1995). Grueb and colleagues (2000) observed impaired CD4+ T cell recovery and faster HIV disease progression in HCV co-infected patients despite receiving ART. However, other longitudinal studies have described no impact on progression or survival (Hayashi, et al, 1991; Thomas, et al., 1996, Mayor, et al., 2006, and Merriman, et al., 2006). Merriman and colleagues (2006) found that HCV/HIV co-infection was not associated with worsened HIV-related parameters, including CD4+ T cell count and HIV viral load. More data are needed to determine if HCV infection influences the long-term natural history of HIV infection.

## Hepatitis B Testing

Testing for HBV is recommended for specific at-risk groups, including men who have sex with men (MSM), IDUs, patients on dialysis, people with HIV, pregnant women, and the families, household members, and sexual contacts of HBV-infected individuals. Initial evaluation should include an unamplified HBV DNA assay with detection limits of  $10^5$  to  $10^6$  copies/ $\mu$ L, which is the diagnostic criterion for chronic HBV. Liver biopsy or alanine aminotransferase (ALT) are recommended to assess the degree of necroinflammation. Specific recommendations of the American Association for the Study of Liver Diseases (AASLD) for type of test and frequency of follow-up monitoring of patients with chronic HBV infection can be found at [https://www.aasld.org/eweb/docs/chronichep\\_B.pdf](https://www.aasld.org/eweb/docs/chronichep_B.pdf)

## Hepatitis B Treatment

The goal of treatment for chronic HBV is viral suppression and remission of liver disease. First line treatment options, each of which has advantages and disadvantages, are interferons (IFN- $\alpha$ -2a and 2b and Pegylated IFN- $\alpha$ -2a and 2b) and nucleoside/nucleotide analogs (lamivudine, adefovir dipivoxil, and entecavir). None of these drugs cure HBV, and the efficacy of long-term treatment is limited. An adequate response to treatment includes findings of undetectable serum HBV DNA, HBeAg loss or seroconversion, and improved liver histology on biopsy. The ARVs tenofovir (Viread) and emtricitabine (Emtriva) are effective against both HBV and HIV. However, they are not yet FDA approved for use in HBV infection. A New Drug Application was submitted in January 2006 for the use of telbivudine, a nucleoside analog, for treatment of HBV. Updated Practice Guidelines for Treatment of Hepatitis B can be found at [https://www.aasld.org/eweb/docs/update\\_chronichep\\_B.pdf](https://www.aasld.org/eweb/docs/update_chronichep_B.pdf) The National Institutes of Health (NIH) convened a national meeting in April 2006 to address current controversies in the management and treatment of HBV and to make recommendations on directions for future research. Resistance to the five currently approved drugs was a key concern. Summary recommendations have not yet been published. However, they will serve as practice guidelines in addressing the use of liver biopsy, optimally low HBV viral loads, and appropriate treatment endpoints.

## Hepatitis C Testing

According to CDC guidelines, all HIV-infected patients should be routinely tested for HCV (Panel on Antiretroviral Guidelines, 2006). First the patient is tested for anti-HCV antibodies using an enzyme immunoassay (EIA) test. In those who test positive on the EIA, HCV RNA should be tested to document viremia.

## HCV RNA Assays

Qualitative and quantitative assays to detect HCV RNA in blood use target amplification (PCR, TMA) or signal amplification (branched DNA) techniques.

Qualitative HCV RNA assays are often used as the primary test for diagnosis of HCV. They are also used to confirm results of the less sensitive quantitative HCV antibody assays. Quantitative HCV RNA assays can detect HCV RNA in most patients with chronic HCV. The quantification of HCV RNA can be used to predict and monitor responses to treatment. Because results of different assays are not easily compared, the same assay should be used when monitoring responses (Strader, et al., 2004).

Patients who are co-infected with HCV/HIV may have negative HCV antibody tests because of immunosuppression. Quantitative HCV RNA assays can be used in these patients to establish HCV infection within two weeks of infection (Strader, et al., 2004).

## HCV Genotyping

Of the known genotypes of HCV, genotype 1 is most common in the U.S. Genotyping is sometimes used to determine the type and duration of treatment and is helpful in assessing the likelihood of response to therapy. Patients with genotype 1 have much lower rates of response to treatment than do patients with genotypes 2 or 3.

## ALT and AST

Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) are markers of liver cell damage. Acute HCV infection is sometimes discovered on the basis of elevations in AST or ALT in asymptomatic patients who receive regular monitoring of hepatic transaminases. AST and ALT are not sensitive or specific measures of disease activity. In most studies, there is only a weak association between ALT level and severity of findings on liver biopsy, and ALT levels are insensitive in detecting disease progression to cirrhosis. However trends in ALT and AST levels can be useful in monitoring treatment effects, because reversal of the ALT/AST ratio to  $>1$  can indicate progression from chronic viral hepatitis to cirrhosis (Fontana and Lok, 2002).

## Liver biopsy

There is a debate regarding the use of liver biopsy in the management of HCV (Strader, et al., 2004). Liver biopsy may be used to stage the degree of necrosis, inflammation, and fibrosis to determine the need for HCV treatment. False-negative results occur in 10% to 30% of cases, due to the small size of biopsy specimens and the heterogeneous distribution of liver fibrosis.

## Treatment for Chronic HCV

The goal of treatment for HCV is viral eradication (undetectable viral load) to prevent the progression of liver disease. Currently the best indicator of effective treatment is a sustained virologic response (SVR). SVR means that serum HCV RNA is undetectable based on a qualitative HCV RNA assay with a lower limit of detection of 50 IU/ $\mu$ L or less at 24 weeks after treatment ends. The *AASLD Practice Guideline for the Diagnosis, Management and Treatment of Hepatitis C* can be found at <https://www.aasld.org/eweb/docs/hepatitisc.pdf> (Strader, et al., 2004). The most effective treatment for HCV in patients with or without HIV is combination therapy with pegylated interferon alfa (PEG-IFN) plus ribavirin (Carrat, et al., 2004; Chung, et al., 2004; and Torriani, et al., 2004). In HCV mono-infected patients, approximately 50% of genotype 1 patients achieve HCV viral clearance using this combination. HCV genotype 1/HIV-co-infected patients have a 22% rate of SVR to PEG-IFN alfa plus ribavirin if treated for 48 weeks. Those with other genotypes have about a 55% SVR rate. For some patients with lower CD4+ T cell counts ( $<200$  cells/ $\text{mm}^3$ ), HCV therapy may be delayed while ART is initiated. Concurrent treatment is feasible, but may be complicated by pill burden, drug toxicities, and drug interactions (Panel on Antiretroviral Guidelines, 2006).

The NIH recommends that patients who are actively using alcohol, pregnant women, those with untreated depression, renal disease, and advanced cirrhosis are not candidates for treatment. Ribavirin is teratogenic and women and men both must use contraception during and for 6 months after treatment with ribavirin. Although pregnant women and people with active alcohol use should not receive HCV treatment, certain individuals with renal disease, depression, IDU, and lower degrees of hepatic fibrosis can be considered for treatment (AIDS Education and Training Center National Resource Center, 2006).

Management of HIV infection in HCV co-infected patients generally is similar to that for patients with HIV alone, although there is some risk of liver toxicity from ARVs (CDC, 2006a). Hepatitis C accelerates and exhausts the cytochrome P450 system, so that ARV medications have to compete for depleted liver enzymes.

Below are some considerations in the management of HCV/HIV co-infection (Panel on Antiretroviral Guidelines, 2006):

- Ribavirin should not be given with didanosine because drug-drug interactions can cause pancreatitis and lactic acidosis.

- Some NRTIs and all NNRTIs and PIs can be hepatotoxic, so transaminase levels should be monitored.
- Higher rates of anemia are associated with zidovudine when combined with ribavirin.
- Growth factors may be needed to manage IFN-associated neutropenia and ribavirin-associated anemia.

Decisions about whether and when to initiate HCV treatment for HCV/HIV co-infected patients varies by individual case. Starting HIV treatment first can increase CD4+ T cell counts, and may improve response to HCV therapy. Initiating HCV treatment first in those with high CD4+ T cell counts and low HIV viral loads can simplify treatment and improve tolerance for ART.

## Patient Education

Health care providers should consider the following with all HCV-infected patients:

- Educate patients how to avoid infecting others (avoid sharing toothbrushes, dental appliances, razors, sex toys, tattoo equipment, injection equipment, or personal care items that may have blood on them). Educate and encourage use of safer sex practices.
- Alcohol is an important cofactor in the progression of liver disease to cirrhosis and HCC. Alcohol use during therapy adversely affects the response to treatment. Recommend alcohol abstinence before and during antiviral therapy. Assess readiness and refer to treatment if appropriate.
- Assess readiness and counsel patient regarding drug treatment programs for IDU. If drug treatment is not an option, provide risk reduction education regarding cleaning injection equipment. Provide patient with a source of clean, single-use needles if possible.
- Instruct patient to avoid exposure to hepatotoxins, including hepatotoxic medications (e.g., acetaminophen in large doses, fluconazole, and isoniazid), and to consult a health care professional before taking any new medicine(s), including over-the-counter, alternative, or herbal products.
- Instruct patient to avoid exposure to environmental toxins such as solvents, paint thinners, and pesticides. If using toxic chemicals, work in a well-ventilated area and wear gloves and a protective face mask.
- If patient is pregnant or considering pregnancy, discuss ways to decrease the infection risk for the baby. (Patients taking ribavirin must use contraception during treatment and for 6 months after.)
- Patients with HCV infection should be tested for immunity to HAV and HBV. Those who are not immune to hepatitis A should receive the vaccine. Those who are not immune to hepatitis B should receive the vaccine.
- All patients with chronic liver disease should be vaccinated annually against influenza and should receive pneumococcal vaccine (CDC, 2006a).
- Side effects of interferon can include fatigue, depression, or confusion, which can interfere with appointment and medication adherence. Supportive measures should be taken to reduce adverse effects.
  - Instruct patients to increase fluid intake; eat small, frequent, well-balanced meals; exercise as tolerated; get adequate sleep and rest; and avoid highly populated areas to prevent exposure to other infections.
  - Taking interferon injections before going to bed is recommended so that the patient will sleep through some of the adverse effects.
  - Conduct ongoing assessments for depression and refer/consult as needed for treatment.

## References

- AIDS Education and Training Center National Resource Center. (2006). "Hepatitis C infection." In AIDS Education and Training Center National Resource Center (Ed.), *Clinical Manual for the Management of the HIV-Infected Adult* (Section 6). Newark, NJ: Retrieved August 26, 2006 from [http://www.aids-ed.org/aetc/aetc?page=cm-512\\_hepc#S6X](http://www.aids-ed.org/aetc/aetc?page=cm-512_hepc#S6X).
- Bonacini, M. and Puoti, M. (2000). "Hepatitis C in patients with human immunodeficiency virus infection." *Archives of Internal Medicine*, 160, 3365-3373.
- Boston, N.S. and Slish, J.C. (2005). "Management of HIV infection in persons co-infected with hepatitis." *Journal of Pharmacy Practice*, 18(4), 295-309.
- Carrat, F., Bani-Sadr, F., Pol, S., Rosenthal, E., Lunel-Fabiani, F., Benzekri, A., et al. (2004). "Pegylated interferon alfa-2b vs. standard interferon alfa-2b plus ribavirin, for chronic hepatitis C in HIV-infected patients: A randomized controlled trial." *Journal of the American Medical Association*, 292(23), 2839-2848.
- Centers for Disease Control and Prevention (CDC). (2006a). "Viral hepatitis C." Retrieved May 30, 2006, from [http://www.cdc.gov/ncidod/diseases/hepatitis/c/plan/HCV\\_infection.htm](http://www.cdc.gov/ncidod/diseases/hepatitis/c/plan/HCV_infection.htm).
- Centers for Disease Control and Prevention (CDC). (2006b). "Viral hepatitis A." Retrieved May 30, 2006, from <http://www.cdc.gov/ncidod/diseases/hepatitis/a/fact.htm>.
- Centers for Disease Control and Prevention (CDC). (2006c). "Viral hepatitis B fact sheet." Retrieved June 5, 2006, from <http://www.cdc.gov/ncidod/diseases/hepatitis/b/fact.htm>.
- Centers for Disease Control and Prevention (CDC). (2006d). "Prevention of hepatitis A through active or passive immunization." *Morbidity and Mortality Weekly Report*, 55 (RR07), 1-23.
- Chung, R.T., Andersen, J., Volberding, P., Robbins, Liu, T., Sherman, K.T., et al. (2004). "Peginterferon Alfa-2a plus ribavirin versus interferon alfa-2a plus ribavirin for chronic hepatitis C in HIV-coinfected persons." *New England Journal of Medicine*, 351(5), 451-459.
- Fontana, R.J. and Lok, A.S.F. (2002). "Non-invasive monitoring of patients with chronic hepatitis C." NIH Consensus Conference on the Management of Hepatitis C: 2002. Part I. Retrieved August 26, 2006, from [http://209.41.169.29/news/NewsUpdates\\_pdf/2.2\\_Conference\\_Reports/nihconf1.pdf#search=%22HCV%20and%20trends%20in%20ALT%20and%20AST%22](http://209.41.169.29/news/NewsUpdates_pdf/2.2_Conference_Reports/nihconf1.pdf#search=%22HCV%20and%20trends%20in%20ALT%20and%20AST%22).
- Greub, G., Ledergerber, B., Battegay, M., Grob, P., Perrin, L., Furrer, H., et al. (2000). "Clinical progression, survival, and immune recovery during antiretroviral therapy in patients with HIV-1 and hepatitis C virus coinfection: The Swiss HIV Cohort Study." *Lancet*, 356(9244), 1800-1805.
- Hayashi, P.H., Flynn, N., McCurdy, S.A., Kuramoto, I.K., Holland, P.V., and Zeldis JB. (1991). "Prevalence of hepatitis C antibodies among patients infected with human immunodeficiency virus." *Journal of Medical Virology*. 33, 177-180.

- Lok, A.S.F. and McMahon, B.J. (2004). "AASLD Practice Guidelines. Chronic Hepatitis B. Update of recommendations." Retrieved June 2, 2006, from [https://www.aasld.org/eweb/docs/chronichep\\_B.pdf](https://www.aasld.org/eweb/docs/chronichep_B.pdf).
- Mayor, A.M., Gomez, M.A., Fernandez, D.M., Rios-Olivares, E., Thomas, J.C., and Hunter, R.F. (2006). "Morbidity and mortality profile of human immunodeficiency virus-infected patients with and without hepatitis co-infection." *American Journal Tropical Medicine and Hygiene*, 74(2), 239-245.
- Mathurin, P., Moussalli, J., Cadranel, J.F., Thibault, V., Charlotte, F., Dumouchel, P., et al., (1998). "Slow progression rate of fibrosis in hepatitis C virus patients with persistently normal alanine transaminase activity." *Hepatology*, 27 (3), 868-872.
- Merriman, N.A., Porter, S.B., Brensinger, C.M., Reddy, K.R., and Chang, K.M. (2006). "Racial difference in mortality among U.S. veterans with HCV/HIV coinfection." *American Journal of Gastroenterology*, 101(4), 760-767.
- Panel on Clinical Practices for Treatment of HIV Infection. (2006). *Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents*. Bethesda (MD): Department of Health and Human Services.
- Strader, D.B., Wright, T., Thomas, D.L., and Seeff, L.B. (2004). "AASLD Practice Guidelines. Diagnosis, management and treatment of hepatitis C." *Hepatology*, 39(4), 1147-1171.
- Thio, C. (2004). "Management of chronic hepatitis B infection in the HIV-infected patient." *AIDS Reader*, 14, 1122-1137.
- Thomas, D.L., Shih, J.W., Alter, A.J., Vlahov, D., Cohn, S., Hoover, D.R., et al. (1996). "Effect of human immunodeficiency virus on hepatitis C virus infection among injecting drug users." *Journal of Infectious Diseases*, 174(4), 690-695.
- Tong, M.J., El-Farra, N.S., Reikes, A.R., and Co, R.L. (1995). "Clinical outcomes after transfusion-associated hepatitis C." *New England Journal of Medicine*, 332, 1463-1466.
- Torriani, F.J., Rodriguez-Torres, M., Rockstroh, J.K., Lissen, E., Gonzalez-García, J., Lazzarin, A., et al. (2004). "Peginterferon alfa-2a plus ribavirin for chronic hepatitis C virus infection in HIV-infected patients." *New England Journal of Medicine*, 351(5), 438-450.

# SELF ASSESSMENT TEST

## MODULE III: HIV AND HEPATITIS CO-INFECTION

**DIRECTIONS:** Please select the one best answer and circle your response directly on the self assessment test. To obtain Continuing Nursing Education credit, a minimum of 70% of the questions must be answered correctly. To assure your receipt of Continuing Nursing Education credit, please complete the self assessment test, program evaluation (reader information form) and HRSA participant information form (3 pages total).

This activity is eligible for nursing credit thorough **June 30, 2007**. Individuals who mail the required documentation noted above after this date will be ineligible for credit. The estimated time for completion of this activity is 1 hour. There is no fee for the nursing continuing education credit for this module.

*Rutgers University mailing information is on the reverse side of this document.*

1. **A characteristic of the hepatitis A virus (HAV) is that:**
  - A. it is transmitted through contact with blood containing the virus.
  - B. it causes a chronic hepatitis that leads to cirrhosis of the liver.
  - C. signs and symptoms of HAV infection can last for 12 to 24 months.
  - D. those who have had HAV are immune to the disease once they recover.
2. **Which of the following is true of Hepatitis B (HBV)?**
  - A. It is the least common hepatitis virus.
  - B. HBV vaccine is recommended for all persons over the age of 5 years.
  - C. Symptoms of infection occur immediately following exposure and can include fever, malaise, anorexia, nausea, abdominal pain, dark urine and jaundice.
  - D. HBV is transmitted through perinatal, percutaneous and sexual exposure to infected blood and body fluids.
3. **Hepatitis C is:**
  - A. the most prevalent blood borne infection in the United States.
  - B. asymptomatic in 80% of those infected.
  - C. a cause of cirrhosis in 10% to 20% of infected persons in 5 years.
  - D. preventable with a vaccine.
4. **Sources of new infections with Hepatitis C, in order of frequency from highest to lowest are:**
  - A. injection of illegal drug use, sexual transmission, transfusion.
  - B. sexual transmission, illegal injection drug use, transfusion, and unknown sources.
  - C. injection drug use, transfusion, sexual transmission.
  - D. sexual transmission, transfusion, injection drug use.
5. **HIV/HCV co-infection:**
  - A. decreases the levels of hepatitis viremia.
  - B. decreases the risk of liver-related mortality.
  - C. is known to speed HIV disease progression.
  - D. Occurs in up to 90% of those who acquire HIV through injection drug use.
6. **Testing for HBV is recommended for the following at-risk groups:**
  - A. injection drug users, patients on hemodialysis, pregnant women, and infants born to women with HBV.
  - B. men who have sex with men, injection drug users, patients on hemodialysis, people with HIV, pregnant women, and the families, household members and sexual contacts of HBV-infected persons.
  - C. men who have sex with men, injection drug users, infants born to women with HBV, and household members and sexual contacts of HBV-infected persons.
  - D. men who have sex with men, injection drug users, people with HIV and friends, co-workers and family of HBV-infected persons.
7. **In treatment for chronic HBV:**
  - A. tenofovir (Viread) and emtricitabine (Emtriva) can be used to cure HBV.
  - B. the goal of treatment is viral suppression and cure of liver disease.
  - C. first line treatment options are interferons and nucleoside/nucleotide analogs.
  - D. an adequate response to treatment is indicated by serum HBV DNA and HBeAg increase.
8. **In interpreting a test for chronic HCV:**
  - A. an HCV/HIV co-infected client may have negative HCV antibody tests.
  - B. quantitative HCV RNA assays can establish HCV infection within 2 days of exposure.
  - C. false positives occur in 30% of HCV/HIV co-infections.
  - D. ALT and AST are sensitive measures of HCV disease activity.
9. **Which of the following is TRUE regarding treatment for HCV?**
  - A. The goal of treatment is a moderate reduction in viral load.
  - B. The best indicator of treatment effectiveness is a sustained virologic response.
  - C. The most effective treatment for HCV in patients with or without HIV is monotherapy with pegylated interferon (PEG-IFN) alfa.
  - D. The National Institute of Health (NIH) recommends that pregnant women and persons with active alcohol use should be treated with ribavirin.
10. **Education of the patient with HCV should include:**
  - A. alcohol abstinence before and during antiviral therapy and avoidance of hepatotoxins.
  - B. vaccination against HAV but not necessarily HBV.
  - C. mandatory drug treatment for injection drug users.
  - D. moderation of alcohol use during antiviral therapy, safer sex practices, and HAV and HBV vaccinations.

# PROGRAM EVALUATION & READER INFORMATION FORM

## MODULE III: HIV AND HEPATITIS CO-INFECTION

To assure your receipt of Continuing Nursing Education credit, please mail your completed self assessment test, program evaluation/reader information form and HRSA participant information form (3 pages total) to: **Dr Gayle A Pearson, Assistant Dean, Rutgers, The State University, College of Nursing, Center for Professional Development, 175 University Avenue, Conklin Hall 244, Newark, New Jersey 07102** or scan and email to: [cpdn@rutgers.edu](mailto:cpdn@rutgers.edu). Please allow 6 to 8 weeks for education credit processing. An attendance certificate will be emailed to you at that time. If you have any questions, contact 973-353-5895 or [cpdn@rutgers.edu](mailto:cpdn@rutgers.edu).

PLEASE COMPLETE THIS FORM BY COMPLETELY FILLING IN THE CIRCLES WITH BLACK PEN OR PENCIL.	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE	NOT APPLICABLE
1. As a result of completing the program, I am able to meet the following program goal: to equip the correctional nurse to arrange the necessary care and services to optimize the health of the HIV-infected patient.	①	②	③	④	⑤
2. As a result of reading this module, I am able to discuss the implications and therapy when HIV and hepatitis are co-infected.	①	②	③	④	⑤
3. The objective of this program was relevant to the overall goals of the program.	①	②	③	④	⑤
4. The module was an effective learning tool for me.	①	②	③	④	⑤
5. The author of this module was an effective teacher.	①	②	③	④	⑤
6. The slides that accompany the module are helpful.	①	②	③	④	⑤

Time required to complete this learning activity: \_\_\_\_\_ minutes

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### READER INFORMATION FORM

(Please print legibly as all information is needed for education credit processing.)

Name: (first and last): \_\_\_\_\_

Degree: \_\_\_\_\_ (NP, RN, LPN) Other: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Facility Address: \_\_\_\_\_ Street

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Email Address: \_\_\_\_\_

Please proceed to the next page and complete the HRSA participant information form.

Please completely fill in the circles (●) when answering the questions.

1. To create your unique ID number, use the month of your birth, the day of your birth, and the last four digits of your social security number. For example, May 29, 123-45-6789 has the ID number 05296789. Unique ID Number

Today's Date

2. Your Profession/Discipline (Select one)

- Advanced Practice Nurse, Pharmacist, Dentist, Physician, Mental Health Professional, Physician Assistant, Nurse, Social Worker, Nurse Practitioner, Substance Abuse Professional, Other Dental Professional, Other (specify)

3. Your Primary Functional Role (Select one)

- Administrator/Supervisor, Student/Graduate Student, Care Provider/Clinician, Teacher/Faculty, Case Manager, Other (specify), Intern/Resident, Not Working, Researcher

4. Your Principal Employment Setting (Select one)

- Community/Migrant Health Center, Substance Abuse Treatment Prog., Community Mental Health Center, STD/Family Planning Clinic, Correctional Facility, Tribal/Indian Health Service, HMO/Managed Care Organization, Other Community-Based Service Organization (CBO), Hospital or Hospital-Based Clinic, Other Public Health Agency, Rural Health Center, Other Health Care, Solo/Group Private Practice, Non-health, State/Local Health Department, Not Working

Questions 5-7 are about your principal employment setting

5. Is it a faith-based organization? Yes No Don't Know

6. Zip Code/Setting Rural Urban

7. Does the agency receive Ryan White CARE Act funding? Yes No Don't Know

7a. If you don't know, write the full name of your employer:

8. Are you of Hispanic, Latino, or Spanish origin? Yes No

8a. Your Racial Background (Select all that apply)

- White, Native Hawaiian/Other Pacific Islander, Black or African American, American Indian/Alaska Native, Asian

9. Your Gender Female Male Transgender

10. Which of the following statements describes the way in which you most often provide services for HIV/AIDS patients (Select one)

- Not applicable/Do not see patients, Refer/transfer HIV+ patients for all medical care, Provide primary care and refer/transfer HIV+ patients for HIV treatment only, Provide all HIV treatment and refer/transfer for primary care, Provide all medical care and refer/transfer when antiretroviral treatment fails, Provide all medical care throughout the course of the disease

11. Estimate the NUMBER of HIV+ clients/patients you have personally treated/managed in practice in the past month.

Number of clients/patients Don't Know

For questions 12-18, estimate the PERCENTAGE of your HIV+ clients/patients in the past YEAR who were:

12. Racial or Ethnic Minorities

None 1-24% 25-49% 50-74% ≥75% Don't Know

13. On Antiretroviral Therapy

None 1-24% 25-49% 50-74% ≥75% Don't Know

14. Severely/Persistently Mentally Ill

None 1-24% 25-49% 50-74% ≥75% Don't Know

15. Substance Users

None 1-24% 25-49% 50-74% ≥75% Don't Know

16. Uninsured

None 1-24% 25-49% 50-74% ≥75% Don't Know

17. Women

None 1-24% 25-49% 50-74% ≥75% Don't Know

18. Incarcerated/Parolees

None 1-24% 25-49% 50-74% ≥75% Don't Know

PUBLIC BURDEN STATEMENT: An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB number. The OMB control number for this project is 0915-0281. Public reporting burden for this collection of information is estimated to be 10 minutes per form. These estimates include the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

For Office Use Only May 2004 AETC Subsite Program Number Agency RWCA Yes No Don't Know