

ASPECTS OF PRIMARY CARE FOR THE HIV-INFECTED SUBSTANCE USER

I. INTRODUCTION

Substance users are often affected by multiple comorbid medical and psychiatric conditions, including HIV infection, viral hepatitis, tuberculosis infection, sexually transmitted infections, other common chronic medical conditions, and depression. Yet despite their need for more intensive medical services, drug users' access to general and HIV-specific medical care is often diminished compared with that of the general population.

Routine medical care for HIV-infected substance users includes the same elements of routine medical care that are appropriate for HIV-infected persons in general (see [Primary Care Approach to the HIV-Infected Patient](#)). This chapter discusses selected conditions that may have greater prevalence among substance users or that may have particular diagnostic, preventive, or therapeutic implications in this diverse patient population. Illnesses associated with injection drug use are emphasized in this chapter. A full review of the medical complications of drug abuse is beyond the scope of this chapter, but can be found in several references (see the reference list for *Further Reading*). Risk reduction and related behavioral interventions are addressed in [Working With the Active User](#).

II. VIRAL HEPATITIS

RECOMMENDATIONS:

As part of the baseline assessment, clinicians should ask HIV-infected patients about their HAV and HBV vaccination history and should obtain the following:

- **HBV serologies: HBsAg, HBsAb, and HBcAb (IgG or total)**
- **Hepatitis A IgG and hepatitis C IgG**

Clinicians should counsel patients about behavior modifications that decrease their risk of acquiring hepatitis infection through unprotected sexual activity and injection drug use.

Hepatitis A virus (HAV) is transmitted primarily by way of fecal-oral contamination, hepatitis B virus (HBV) by sexual contact and injection drug use, and hepatitis C virus (HCV) by injection drug use. Hepatitis contributes substantially to morbidity and mortality among IDUs. IDUs may transmit hepatitis to both substance-using contacts and to non-substance-using sexual, household, and other close contacts.

Key Points:

- Substance users are at high risk for infection with HAV, HBV, and HCV.
- Infection among substance users may initiate and increase the magnitude of hepatitis outbreaks.

It is particularly important to prevent viral hepatitis among HIV-infected substance users because HAV, HBV, and HCV co-infection(s) may have additional implications for HIV-infected patients. Interactions between HIV and hepatitis viruses may complicate the disease progression and treatment of both viruses. Co-infection with HAV or HBV may exacerbate liver disease among those with chronic HCV infection.

ARV therapy has contributed to improvements in life expectancy for HIV-infected persons. Consequently, persons co-infected with HIV and HBV and/or HCV who are receiving ARV therapy are more likely to survive to be at risk for the late sequelae of chronic HBV and HCV infection, including cirrhosis, end-stage liver disease (ESLD), and hepatocellular carcinoma.

A. Hepatitis A

RECOMMENDATIONS:

Clinicians should administer the HAV vaccine to HIV-infected patients who are negative for HAV IgG. The full series, consisting of an initial dose and a second dose 6 to 12 months later, should be given to ensure maximal antibody response.

Clinicians should administer HAV vaccination early in the course of HIV infection. If a patient's CD4 count is <200 cells/mm³, or the patient has symptomatic HIV disease, it is preferable to defer vaccination until several months after initiation of ARV therapy in an attempt to maximize the antibody response to the vaccine. However, vaccination should not be deferred in pregnant patients or patients who are unlikely to achieve an increased CD4 count.

Clinicians should obtain a post-vaccination antibody measurement in patients who are at increased risk for hepatitis A infection, including illicit drug users (see Table 1).

Clinicians should periodically readdress vaccination with individuals who initially decline either hepatitis A or hepatitis B vaccination.

Outbreaks of HAV have been reported among IDUs and non-injection illicit substance users in numerous US cities and numerous countries. HAV seropositivity among IDUs correlates with poverty but not with any specific drug use practice, previous sexually transmitted infections, or serologic evidence of HBV, HCV, syphilis, or HIV infection. Although HAV is primarily transmitted enterally, HAV may also be transmitted parenterally. Use of contaminated water for drug preparation may also contribute to hepatitis A transmission.

HAV does not seem to cause more severe clinical illness in HIV-infected individuals; however, acute HAV may increase HIV viremia,¹ which has the potential for long-term consequences. In patients whose ARV therapy is interrupted because of acute HAV infection, HIV viral load may not be adequately suppressed when ARV therapy is resumed.² HIV-infected patients were found to have a significantly higher HAV viral load and a significantly prolonged duration of HAV viremia with possible viral shedding, compared with non-HIV-infected individuals.² This would likely result in a prolonged duration of HAV transmission in a community.

Almost immediate protection may be obtained from the hepatitis A vaccine. However, vaccination rates among IDUs are low,^{3,4} most likely due to lack of previous engagement in longitudinal medical care that would have included vaccination. HAV vaccination is indicated for all HIV-infected patients, and this may be particularly important for those co-infected with HCV.

Although optimal benefit is obtained after complete courses of vaccine, there is significant clinical value to receipt of single doses, which rapidly stop community outbreaks. Follow-up HAV antibody testing should be obtained in patients who are at increased risk for hepatitis A infection, including illicit drug users, to verify vaccine efficacy and to identify patients who might benefit from vaccine boosting (see Table 1).

A combined hepatitis A and B vaccine is available and can be used in persons susceptible to both hepatitis A and B. It is given in three total doses at 0, 1, and 6 months.

TABLE 1
PERSONS WHO ARE AT INCREASED RISK FOR HEPATITIS A INFECTION

- Men who have sex with men (MSM)
- Travelers to countries with high endemicity of infection
- Persons who live in a community experiencing an outbreak of HAV infection
- Illicit drug users, particularly injection drug users
- Persons who have clotting-factor disorders
- Persons at occupational risk for infection
- Persons with chronic liver disease (e.g., hepatitis B or C)*

* Persons with chronic liver disease are at increased risk for severe infection if they become co-infected with hepatitis A.

B. Hepatitis B

RECOMMENDATIONS:

Clinicians should administer the HBV vaccination series to HIV-infected patients who are negative for HBsAb, unless they are chronically infected.

Clinicians should test for HBsAb between 4 and 12 weeks after vaccination. Nonresponders (HBsAb <10 IU/L) should be revaccinated with another three-dose hepatitis B vaccine series. If a patient's CD4 count is <200 cells/mm³ or the patient has symptomatic HIV disease, revaccination may be deferred until several months after initiation of ARV therapy in an attempt to maximize the antibody response to the vaccine. However, revaccination should not be deferred in pregnant patients or patients who are unlikely to achieve an increased CD4 count.

For HIV-infected substance users who continue to inject drugs, clinicians should:

- **Discuss avoidance of needle/syringe-sharing activity with all injection drug users, regardless of viral load, to prevent HIV and hepatitis B and C virus transmission (see Table 2)**
- **Issue prescriptions for new needles and syringes to patients who inject drugs**
- **Discuss with patients other options for accessing new needles and syringes, including use of the Expanded Syringe Access Demonstration Program and Syringe Exchange Programs, New York State's two syringe access initiatives**

Clinicians should advise HIV-infected substance users with chronic hepatitis B infection that drug-sharing, sexual, and household contacts may be at risk for hepatitis B. Such contacts should be advised to undergo medical evaluations and, if susceptible, should be offered HBV vaccination.

Clinicians should evaluate HIV-infected substance users chronically infected with hepatitis B (or co-infected with hepatitis B and C) for liver disease. These patients should be evaluated and offered treatment when medically indicated according to current guidelines (see [Hepatitis B Virus](#)).

HBV is similar to HIV in that it is spread primarily by sexual activity and injection drug use; however, transmission of HBV is more efficient via the sexual and percutaneous routes than HIV. HBV is generally found in very high concentrations in serum (10^8 - 10^{10} virions/mL), and HBV levels have been shown to be even higher in HIV-infected patients compared with those who are not HIV-infected.

Key Point:

HBV vaccination is indicated for all HIV-infected substance users who are susceptible and may be particularly important for those co-infected with HCV.

HBV is preventable by vaccination but, like HAV, HBV vaccination rates among IDUs are low. Vaccination for hepatitis B is most effective after completion of a three-dose series at 0, 1 to 2 months, and 6 months. Lesser but still clinically significant protection may be conferred by incomplete vaccine courses, even by single doses. Some IDUs may not achieve the same geometric mean HBsAb serum antibodies as non-IDU healthy controls; however, overall seroconversion rates may be comparable in adherent IDUs. Ideally, hepatitis B vaccine should be administered early in the course of HIV disease, before severe immune suppression has occurred. In HIV-infected individuals, the value of routine monitoring may be assessed on a case-by-case basis. Patients who are at increased risk for, and not immune to, hepatitis A and hepatitis B infection may be given the combined hepatitis A and B vaccine in a total of three doses at 0, 1, and 6 months.

Generally, when HIV-infected patients do not respond to the vaccine series, a rapid loss of induced antibody occurs. These patients are, therefore, at risk for HBV infection following exposure. The clinician should test for HBsAb 1 to 2 months after completion of the third vaccine dose. If no antibody is detected, a repeat vaccination series may be initiated, although its

success is not likely. If a second vaccination series is being considered, HBV seroconversion may be enhanced by immune reconstitution (>200 cells/mm³) prior to revaccination. For additional information regarding HBV vaccination and antibody testing, see [Hepatitis B Virus](#).

Key Point:

Advanced immune suppression is not a contraindication to HBV vaccination, and vaccination of susceptible persons should not be deferred or delayed because of advanced immune suppression or in anticipation of expected immune recovery due to the effect of ARV therapy.

C. Hepatitis C

RECOMMENDATIONS:

Clinicians should screen all HIV-infected substance users for HCV at baseline. Patients who are seronegative for HCV infection at baseline should be screened at least annually for recent HCV infection.

HIV-infected substance users who continue to inject substances and who are found to be susceptible to hepatitis C should receive counseling regarding the risk of HCV infection from non-sterile injection practices. These patients should be referred to sources of sterile injection equipment, such as Expanded Syringe Access Demonstration Program and Syringe Exchange Programs, New York State's two syringe access initiatives.

Clinicians should evaluate HIV-infected substance users with chronic hepatitis C infection (or with hepatitis B and C co-infection) for liver disease. These patients should be evaluated and offered treatment when medically indicated according to current guidelines.

HIV-infected substance users chronically infected with hepatitis C (or co-infected with hepatitis B and C) should be counseled to avoid sharing injection equipment or engaging in unprotected sex because their partners will then be at risk for transmission of both HIV and viral hepatitis.

Substance-sharing contacts should be advised to undergo medical evaluations. As part of this medical evaluation, all contacts should be offered testing for HIV and hepatitis C.

Clinicians should advise HIV/HCV co-infected patients and patients infected with HCV alone to discontinue consumption of alcohol.

HCV is primarily transmitted by the parenteral route. Injection drug use is now the major route of HCV transmission, accounting for at least 60% of all new infections in the United States. In some populations of IDUs, over 80% have been infected with HCV. However, lower prevalence has been found in other populations, particularly among younger users. It is estimated that approximately 33% of HIV-infected patients are co-infected with hepatitis C, primarily through injection drug use.⁵ In New York City, the co-infection rate is estimated at approximately 40%, and the rate is presumably much higher among patients infected with HIV through injection drug use (~70%-90%). After 1 year of injecting drugs, 21% of IDUs were identified as being infected with HCV.⁶ The ease with which HCV is transmitted may have important implications for how best to construct prevention strategies.

Key Point:

HCV seems to be more easily transmitted parenterally than HIV.

Prevention

HCV is currently only preventable by behavioral risk reduction because no vaccine is available. However, if an individual becomes acutely infected with hepatitis C and is diagnosed at that time, immediate referral to a gastroenterologist or other specialist experienced in the treatment of hepatitis C is strongly recommended.

Clinicians should discuss risk-reduction methods (see Table 2) with patients. Outreach and educational interventions have been effective in reaching in- and out-of-treatment IDUs and their risk contacts and can also promote desired HIV risk-reduction behaviors. HCV seems to be acquired more rapidly among IDUs than HIV, driven in part by the higher prevalence of HCV than HIV among injection partners.^{7,8} The overlap in modes of transmission and risk behaviors means that many risk-reduction interventions geared toward HIV may also help prevent viral hepatitis. However, the additional modes of transmission, greater infectivity of some hepatitis viruses, and higher background prevalence of HCV among IDUs contribute to the need for additional efforts to prevent HCV among IDUs. These and other data suggest that hepatitis prevention efforts should target both syringe-mediated transmission and sharing of other injection equipment (cookers and filtration cotton), as well as high-risk sexual behaviors among IDUs and their contacts.

Syringe exchange programs and methadone maintenance treatment may not have as marked an effect on the transmission of HCV as on HIV transmission.⁹⁻¹³ However, significant reductions in HCV have been reported.¹²

TABLE 2
VIRAL HEPATITIS RISK-REDUCTION GUIDANCE FOR SUBSTANCE USERS

- Stop using illicit drugs - substance users who wish to stop using drugs should be referred to substance abuse treatment when indicated.
- If unable to stop using illicit drugs, substance users should stop injection of illicit drugs.
- If unable to stop injection of illicit drugs, substance users should use a new, sterile needle for every injection.
- Substance users should use their own needle, syringe, filtration cotton, and cooker, without sharing with others.
- If assisting others with injections, the substance user should wash hands thoroughly between injections and use all new equipment.
- Substance users should know their own HIV, hepatitis B, and hepatitis C status, should not engage in unprotected sex, and should be advised to avoid sharing injection equipment.

IDUs frequently do not access these services when they first begin injection drug use, which is a time when they are at high risk for acquiring initial HCV infection. Furthermore, although the number of shared syringes among substance users has been significantly reduced, sharing of “cookers” (used to dissolve drugs for injection) and filtration “cottons” (used to filter particulate matter from dissolved drugs) has been implicated as a vehicle of transmission of HCV.¹³ Both IDUs and healthcare professionals need to be aware of this potential mode of transmission to promote behavioral risk reduction. IDUs assisting one another in injection may also facilitate contact with infected blood.¹⁴

Effect of Substance Use and Substance Use Treatment on HCV Disease Progression and Treatment

Heavy use of alcohol, which is common among users of other substances, is associated with more rapid progression of cirrhosis. *Alcohol* consumption during HCV treatment reduces the likelihood of response in a dose-related manner.¹⁵ However, the optimal duration of abstinence prior to treatment remains unclear. Patients actively using alcohol or injecting drugs may experience increased toxicity from HCV therapies. The treating physician should consider the inherent risks as well as potential benefits of treatment for HCV in these patients.

Illicit drug use, in general, is not by itself hepatotoxic, and there is no evidence that use of these drugs presents any pharmacological contraindication to anti-HCV treatment.^{16,17}

In contrast to heavy alcohol consumption, persons infected through injection drug use may be less likely to progress to cirrhosis.¹⁸⁻²⁰

Methadone, the most widely used pharmacologic treatment for opioid dependence, does not have an effect on HCV progression, and a decrease in methadone dose is probably not necessary in HCV-infected patients.¹⁶ There has been some clinical controversy as to whether the presence of HCV infection is associated with an increase or a decrease in methadone dose requirements, but definitive data about this issue have not been published. The effects of HCV infection on dose requirements for *buprenorphine* are also undefined.

Key Point:

Clinicians should be guided by patients' symptoms (e.g., opioid craving or oversedation) when considering whether a change in methadone or buprenorphine dose is indicated.

Concern that the similarities between the side effects of interferon treatment for HCV infection and the symptoms of opioid withdrawal might induce relapse in patients with opioid abuse histories has been expressed, but there is no evidence supporting such a connection. Nonetheless, clinicians, drug treatment staff, and patients should be aware of the potential for confusion of these symptoms, and individuals with symptoms should undergo a careful evaluation to determine the etiology of their symptoms.

Treatment and Adherence

The National Institutes of Health (NIH) Consensus Panel statement on management of hepatitis C suggests that substance users be targeted for HCV testing and be considered for treatment. Those interested in and ready for substance use treatment should be referred to substance use treatment programs, and those not ready for substance use treatment should be counseled on behavioral strategies to reduce their risks of re-infection. Studies have shown that in appropriate program models, substance users can complete and benefit from treatment for HCV.²¹⁻²⁴

Key Point:

Adherence to the HCV treatment regimen is difficult for all patients, not just substance users or those with HIV. Identification to potential barriers and consideration of measures to promote adherence are essential.

For further guidance on management of HIV/HCV co-infected patients, including anti-HCV therapy and ARV therapy interactions, refer to the HIV clinical guidelines at: www.hivguidelines.org

III. TUBERCULOSIS

RECOMMENDATIONS:

Clinicians should obtain a TST (tuberculin skin test, commonly known as PPD) or other FDA-approved test for diagnosis of tuberculosis infection, unless the patient has previously tested positive or has had previously documented TB.

For patients with a new positive TB test, clinicians should obtain a detailed history, perform a physical examination, and obtain a chest x-ray to determine whether active TB is present.

After active TB has been excluded, clinicians should prescribe TB treatment when a TST results in induration of ≥ 5 mm or when another FDA-approved test indicates the presence of latent TB infection (LTBI).

HIV-infected substance users with active TB should receive expedited treatment and should be enrolled into directly observed therapy (DOT). TB and HIV therapy should be closely coordinated with the local health department.

Clinicians should evaluate HIV-infected substance users who have LTBI, and, in the absence of medical contraindications or previous completion of preventive therapy, these patients should be offered treatment for LTBI.

A. Risk Factors Associated With Tuberculosis

Substance users, with or without HIV infection, are at increased risk for tuberculosis (TB) infection and disease. Unlike bloodborne infections, skin and soft-tissue infections, or endocarditis, for which the risks are directly related to the act of non-sterile drug use, the increased risks of tuberculosis are related instead to a convergence of clinical, social, and demographic risk factors (see Table 3).²⁵

TABLE 3 RISK FACTORS ASSOCIATED WITH EXPOSURE TO AND DISEASE PROGRESSION OF TUBERCULOSIS
<ul style="list-style-type: none">• Poverty• Malnutrition• Unemployment• Homelessness• Incarceration• Foreign birth• HIV co-infection

Rates of TB infection among substance users increase significantly with both age and years of drug use. The latter is likely related to increased time spent in settings in which TB is transmitted.²⁶ Among IDUs at a New York City syringe exchange program, positive tuberculin skin test rates were 5% among IDUs aged <35 with <5 years of drug use; 13% among those aged >35 with <5 years of drug use; 17% among those aged <35 with >5 years of drug use; and 21% among IDUs >35 with >5 years of drug use.²⁶ This cumulative increased risk supports recommendations for serial TB screening in substance users.

B. Substance Users With LTBI

HIV-infected substance users with LTBI should be evaluated to exclude active TB and, if excluded, should be offered treatment of LTBI. The preferred regimen for LTBI is 9 months of isoniazid 300 mg daily (or 900 mg twice weekly if directly observed) plus pyridoxine, 25 mg per day or 50 mg twice weekly, to prevent peripheral neuropathy. The currently recommended duration of isoniazid for the treatment of LTBI among HIV-infected persons is 9 months, although significant preventive therapy benefit is obtained from 6-month regimens. Because clinically relevant and significant hepatitis has been observed in persons receiving rifampin/pyrazinamide regimens, rifampin/pyrazinamide is not recommended for the treatment of LTBI. Rifampin or rifabutin daily for 4 months is an alternative regimen for persons who are contacts to an isoniazid-resistant, rifamycin-susceptible TB case or who are intolerant to isoniazid.

C. Drug-Drug Interactions

For patients who are receiving treatment for active TB disease and using opioids or receiving methadone maintenance regimens, the interaction of rifampin and opioids may contribute to non-adherence. This may be managed by discussing the potential for this interaction with the patient and monitoring for withdrawal symptoms. At the first sign of withdrawal following rifampin therapy in patients receiving methadone, methadone doses should be increased by 5 to 10 mg

every 1 to 2 days beginning on the day the withdrawal symptoms were observed. Because of methadone's long half-life (24-36 hours), care should be taken not to continue daily dose increases for more than 3 days at a time, at which time at least 2 days of stable dosing should follow before further dose increases are considered. Final methadone doses may be 50% greater than the initial dose prior to the introduction of rifampin. When rifampin is discontinued, the methadone dosage should be lowered to avoid over-sedation. Similarly, rifampin may increase the catabolism of certain PIs and NNRTIs.

Key Point:

Rifampin may increase the catabolism of opioids and can precipitate opioid withdrawal in opioid users or those on methadone maintenance regimens unless methadone doses are increased.

With isoniazid, there is no routine requirement for dose adjustments of any ARV therapy regimen, and less frequent monitoring of serum liver enzymes (e.g., monthly) is required. For further guidance on management of HIV-infected patients with TB infection, refer to [Mycobacterial Infections](#).

D. Role of Directly Observed Therapy (DOT)

For substance users in methadone maintenance treatment programs, on-site DOT may be a valuable adherence-promoting strategy and can be both cost-effective and cost-saving from a societal perspective.²⁷⁻²⁹ When feasible, incentives which offer positive reinforcement to substance users, including monetary incentives, seem to be both effective at increasing rates of adherence to TB services and justifiable on a cost basis. Similarly, DOT for latent tuberculosis infection may be used to increase completion rates in congregate settings (e.g., correctional and residential facilities, shelters) or in ambulatory clinical settings that are attended on a frequent basis (e.g., methadone maintenance programs, dialysis units).

Key Point:

Co-locating TB services may improve adherence and rates of treatment completion.

IV. SEXUALLY TRANSMITTED INFECTIONS IN HIV-INFECTED SUBSTANCE USERS

RECOMMENDATION:

Clinicians should reinforce behavioral risk-reduction measures for STI prevention, including consistent condom use.

High rates of sexually transmitted infections (STIs) are seen among both IDUs and non-injection substance users. STIs have been shown to be independent risk factors for the sexual transmission of HIV.

Young IDUs and IDUs who have recently begun to inject may be more likely to engage in unprotected intercourse than IDUs who have been injecting for longer periods of time.³⁰ This finding, along with the observations that the risk of HBV and HCV may be greatest among new injectors, emphasizes the importance of targeting new injectors for both sexual and injection risk-reduction efforts.³¹ Consistent condom use is highly effective for STI prevention.

Key Point:

Primary care clinicians play an important role in reinforcing behavioral risk-reduction measures.

Among substance users, incidence rates for early syphilis range from 2.9 per 1000 person years to 1 per 100 person years,³²⁻³⁴ which is substantially higher than that in the general population. In recent US outbreaks of primary and secondary syphilis, use of crack cocaine and the exchange of sex for money or drugs have been identified as major risk factors for syphilis as well as for HIV transmission.³⁵⁻³⁷ Among IDUs, young age, multiple sex partners, and engaging in paid sex are associated with higher rates of syphilis.³⁵

Genital ulcers from HSV,^{38,39} as well as from syphilis and chancroid,³⁹ increase the likelihood that genital secretions will contain an infectious amount of HIV. This increases the potential for contact between HIV in genital secretions and genital mucosal cells receptive to HIV infection.³⁹ Smoking crack cocaine may cause blisters and sores on the lips and oral mucosa that may also facilitate the transmission of infectious pathogens.

A. Screening for STIs in HIV-Infected Substance Users

RECOMMENDATIONS:

Clinicians should screen HIV-infected substance-using patients for syphilis by obtaining a nontreponemal test (RPR or VDRL) with verification of reactive tests by confirmatory FTA-Abs or TP-PA at baseline and at least annually. Patients with continued high-risk behavior should be screened for syphilis every 3 months.

Clinicians should screen all sexually active HIV-infected substance-using women for gonorrhea and chlamydia at baseline and at least annually at all sites of exposure, including the cervix, rectum, and pharynx. Culture or nucleic acid amplification tests (NAT) should be used to screen for gonorrhea. Immunofluorescence or DNA amplification should be used for chlamydia.

Clinicians should screen HIV-infected substance-using men who have sex with men for gonorrhea and chlamydia at baseline and at least annually. Clinicians should screen all sites of exposure, including the urethra, rectum, and pharynx.

Urine-based testing for gonorrhea and chlamydia may be of value for both male and female substance users. The logistical ease of urine-based tests may increase patient acceptance and allow testing in community-based field sites.

B. Diagnosis of STDs in HIV-Infected Substance Users

The diagnosis of STIs among substance users differs little from that among non-substance users. However, clinicians need to be aware that false-positive syphilis nontreponemal tests can occur in IDUs and persons with HIV, HBV, and HCV, which emphasizes the importance of also performing treponemal tests. Among HIV-infected persons, FTA antibody tests may fluctuate between negative and positive more frequently than among non-HIV-infected persons,³⁴ highlighting the importance of both follow-up testing and making treatment decisions within the entire clinical context.

For further guidance in managing STIs in HIV-infected patients, see [Management of STIs in HIV-Infected Patients](#).

V. SOFT-TISSUE DISORDERS

RECOMMENDATION:

Clinicians should counsel IDUs on risk reduction for soft-tissue infections (see Tables 4 and 5).

Abscesses are common among IDUs, with an estimated prevalence of 21% to 32%.^{40,41} Table 4 presents risk factors associated with abscesses.

TABLE 4 RISK FACTORS ASSOCIATED WITH ABSCESES*
<ul style="list-style-type: none">• Not cleansing the skin prior to injection• Use of dirty needles• Licking needle tips prior to injection• Subcutaneous injection• Cocaine or speedball (cocaine + heroin) injection• New injectors (risk decreases significantly as years of injection drug use increases)• Caucasian race

*HIV as a risk factor has been an inconsistent finding.
Data are from Ref. 42-44.

The most common organisms are skin and oral flora, including *Staphylococcus aureus*, facultative gram-negative bacteria, and mixed anaerobic bacteria. This suggests that the contamination is usually related to the injection practices and not the drugs used. However, drugs or injection equipment may be contaminated with environmental organisms, such as *Clostridium tetani* or *C. botulinum*, and may cause cases or clusters of tetanus or wound botulism. Homeless IDUs and IDUs who have been hospitalized two or more times in the past year are more likely to require in-patient treatment of soft-tissue infections.⁴⁵

Table 5 provides topics that clinicians should discuss with IDUs to reduce the risk of soft-tissue infections.

TABLE 5 TOPICS FOR CLINICIANS TO DISCUSS WITH IDUs TO REDUCE SOFT-TISSUE INFECTIONS
<ul style="list-style-type: none">• Clean skin thoroughly before each injection• Use a sterile syringe for every injection• Rotate injection sites• Keep tetanus vaccinations up-to-date

Pus-filled abscesses usually need to be drained and packed. Culture and sensitivity testing should be performed when pus can be obtained safely, because antimicrobial-resistant organisms, including methicillin-resistant *Staphylococcus aureus*, are increasingly common among injectors. The clinician should be aware that subcutaneous injection may cause inflammation and swelling that is not infected and will resolve on its own. IDUs may also develop necrotizing skin and soft-tissue infections. See [Working With the Active User](#) for more information concerning safer injection techniques.

REFERENCES

1. Ida S, Tachikawa N, Nakajima A, et al. Influence of human immunodeficiency virus type I infection on acute hepatitis A infection. *Clin Infect Dis* 2002;34:379-385. [[PubMed Abstract](#)]
2. Laurence JC. Hepatitis A and B immunizations of individuals infected with human immunodeficiency virus. *Am J Med* 2005;118(Suppl 10A):75S-83S. [[PubMed Abstract](#)]
3. Kuo I, Sherman SG, Thomas DL, et al. Hepatitis B virus infection and vaccination among young injection and non-injection drug users: Missed opportunities to prevent infection. *Drug Alcohol Depend* 2004;73:69-78. [[PubMed Abstract](#)]
4. Carey J, Perlman DC, Friedmann P, et al. Knowledge of hepatitis among active drug injectors at a syringe exchange program. *J Subst Abuse Treat* 2005;29:47-53. [[PubMed Abstract](#)]
5. Sulkowski MS. Viral hepatitis and HIV coinfection. *J Hepatol* 2008;48:353-367. [[PubMed Abstract](#)]
6. Thorpe LE, Ouellet LJ, Levy JR, et al. Hepatitis C virus infection: Prevalence, risk factors, and prevention opportunities among young injection drug users in Chicago, 1997-1999. *J Infect Dis* 2000;182:1588-1594. [[PubMed Abstract](#)]
7. Thorpe LE, Ouellet LJ, Hershov R, et al. Risk of hepatitis C virus infection among young adult injection drug users who share injection equipment. *Am J Epidemiol* 2002;155:645-653. [[PubMed Abstract](#)]
8. Hagan H, Des Jarlais DC, Stern R, et al. HCV synthesis project: preliminary analyses of HCV prevalence in relation to age and duration of injection. *Int J Drug Policy* 2007;18:341-351. [[PubMed Abstract](#)]
9. Dore GJ, MacDonald M, Law M, et al. Epidemiology of hepatitis C virus infection in Australia. *Aust Fam Physician* 2003;32:796-798.
10. De P, Cox J, Boivin JF, et al. Social network-related risk factors for bloodborne virus infections among injection drug users receiving syringes through secondary exchange. *J Urban Health* 2008;85:77-89. [[PubMed Abstract](#)]
11. Huo D, Ouellet LJ. Needle exchange and sexual risk behaviors among a cohort of injection drug users in Chicago, Illinois. *Sex Transm Dis* 2009;36:35-40. [[PubMed Abstract](#)]
12. Des Jarlais DC, Perlis T, Arasteh K, et al. Reductions in hepatitis C virus and HIV infections among injecting drug users in New York City, 1990-2001. *AIDS* 2005;19(Suppl 3):S20-S25. [[PubMed Abstract](#)]
13. Hagan H, Des Jarlais D. HIV and HCV infection among injecting drug users. *Mt Sinai J Med* 2000;67:423-428. [[PubMed Abstract](#)]
14. Kral AH, Bluthenthal RN, Erringer EA, et al. Risk factors among IDUs who give injections to or receive injections from other drug users. *Addiction* 1999;94:675-683. [[PubMed Abstract](#)]
15. Ohnishi K, Matsuo S, Matsutani K, et al. Interferon therapy for chronic hepatitis C in habitual drinkers: Comparison with chronic hepatitis C in infrequent drinkers. *Am J Gastroenterol* 1996;91:1374-1379. [[PubMed Abstract](#)]
16. Loguercio C, Di Pierro M, Marino MP, et al. Drinking habits of subjects with hepatitis C virus-related chronic liver disease: Prevalence and effect on clinical, virological, and pathological aspects. *Alcohol* 2000;35:296-301. [[PubMed Abstract](#)]
17. Selim K, Kaplowitz N. Hepatotoxicity of psychotropic drugs. *Hepatology* 1999;29:1347-1351.

18. Gordon SC, Bayati N, Silverman AL. Clinical outcome of hepatitis C as a function of mode of transmission. *Hepatology* 1998;28:562-567. [[PubMed Abstract](#)]
19. Thomas DL, Astemborski J, Rai RM, et al. The natural history of hepatitis C virus infection: Host, viral, and environmental factors. *JAMA* 2000;284:450-456. [[PubMed Abstract](#)]
20. Rai R, Wilson LE, Astemborski J, et al. Severity and correlates of liver disease in hepatitis C virus-infected injection drug users. *Hepatology* 2002;35:1247-1255. [[PubMed Abstract](#)]
21. Backmund M, Meyer K, Von Zielonka M, et al. Treatment of hepatitis C infection in injection drug users. *Hepatology* 2001;34:188-193. [[PubMed Abstract](#)]
22. Sylvestre DL. Treating hepatitis C in methadone maintenance patients: An interim analysis. *Drug Alcohol Depend* 2002;67:117-123. [[PubMed Abstract](#)]
23. Schaefer M, Heinz A, Backmund M. Treatment of chronic hepatitis C in patients with drug dependence: Time to change the rules? *Addiction* 2004;99:1167-1175. [[PubMed Abstract](#)]
24. Guadagnino V, Trotta MP, Montesano F, et al. Effectiveness of a multi-disciplinary standardized management model in the treatment of chronic hepatitis C in drug addicts engaged in detoxification programmes. *Addiction* 2007;102:423-431. [[PubMed Abstract](#)]
25. Perlman DC, Salomon N, Perkins MP, et al. Tuberculosis in drug users. *Clin Infect Dis* 1995;21:1253-1264. [[PubMed Abstract](#)]
26. Salomon N, Perlman DC, Friedmann P, et al. Prevalence and risk factors for positive tuberculin skin tests among active drug users at a syringe exchange program. *Int J Tuberc Lung Dis* 2000;4:47-54. [[PubMed Abstract](#)]
27. Gourevitch MN, Wasserman W, Panero MS, et al. Successful adherence to observed prophylaxis and treatment of tuberculosis among drug users in a methadone program. *J Addict Dis* 1996;15:93-104. [[PubMed Abstract](#)]
28. Gourevitch MN, Alcabes P, Wasserman WC. Cost-effectiveness of directly observed chemoprophylaxis among drug users at risk for tuberculosis. *Int J Tuberc Lung Dis* 1998;2:531-540. [[PubMed Abstract](#)]
29. Batki SL, Gruber VA, Bradley JM, et al. A controlled trial of methadone treatment combined with directly observed isoniazid for tuberculosis prevention in injection drug users. *Drug Alcohol Depend* 2002;66:283-293. [[PubMed Abstract](#)]
30. Des Jarlais DC, Friedman SR, Perlis T, et al. Risk behavior and HIV infection among new drug injectors in the era of AIDS in New York City. *J Acquir Immune Defic Syndr Hum Retrovirol* 1999;20:67-72. [[PubMed Abstract](#)]
31. Garfein RS, Vlahov D, Galai N, et al. Viral infections in short-term injection drug users: The prevalence of the hepatitis C, hepatitis B, human immunodeficiency, and human T-lymphotropic viruses. *Am J Public Health* 1996;86:655-661. [[PubMed Abstract](#)]
32. Nelson KE, Vlahov D, Cohn S, et al. Sexually transmitted diseases in a population of intravenous drug users: Association with seropositivity to the human immunodeficiency virus (HIV). *J Infect Dis* 1991;164:457-463. [[PubMed Abstract](#)]
33. Gourevitch MN, Hartel D, Schoenbaum EE, et al. A prospective study of syphilis and HIV infection among injection drug users receiving methadone in the Bronx, NY. *Am J Public Health* 1996;86:1112-1115. [[PubMed Abstract](#)]
34. Erbeding EJ, Vlahov D, Nelson KE, et al. Syphilis serology in human immunodeficiency virus infection: Evidence of false-negative fluorescent treponemal testing. *J Infect Dis* 1997;176:1397-1400. [[PubMed Abstract](#)]

35. Rolfs RT, Goldberg M, Sharrar RG. Risk factors for syphilis: Cocaine and prostitution. *Am J Public Health* 1990;80:853-857. [[PubMed Abstract](#)]
36. Centers for Disease Control and Prevention. Outbreaks of primary and secondary syphilis - Baltimore City, Maryland, 1995. *MMWR Morb Mortal Wkly Rep* 1996;45:166-169. [[PubMed Abstract](#)]
37. Edlin BR, Irwin KL, Faruque S, et al. Intersecting epidemics: Crack cocaine use and HIV infection among inner-city young adults. *N Engl J Med* 1994;331:1422-1427. [[PubMed Abstract](#)]
38. LeGoff J, Weiss HA, Gresenguet G, et al. Cervicovaginal HIV-1 and herpes simplex virus type 2 shedding during genital ulcer disease episodes. *AIDS* 2007;21:1569-1578. [[PubMed Abstract](#)]
39. Centers for Disease Control and Prevention. Sexually Transmitted Diseases Treatment Guidelines 2006. Available at: www.cdc.gov/std/treatment
40. Binswanger IA, Kral AH, Bluthenthal RN, et al. High prevalence of abscesses and cellulitis among community-recruited injection drug users in San Francisco. *Clin Infect Dis* 2000;30:579-581. [[PubMed Abstract](#)]
41. Morrison A, Elliott L, Gruer L. Injecting-related harm and treatment-seeking behaviour among injecting drug users. *Addiction* 1997;92:1349-1352. [[PubMed Abstract](#)]
42. Murphy EL, DeVita D, Liu H, et al. Risk factors for skin and soft-tissue abscesses among injection drug users: A case-control study. *Clin Infect Dis* 2001;33:35-40. [[PubMed Abstract](#)]
43. Phillips KT, Anderson BJ, Stein MD. Predictors of bacterial infections among HCV-negative injection drug users in Rhode Island. *Am J Drug Alcohol Abuse* 2008;34:203-210. [[PubMed Abstract](#)]
44. Gordon RJ, Lowy FD. Bacterial infections in drug users. *N Engl J Med* 2005;353:1945-1954.
45. Takahashi TA, Baernstein A, Binswanger I, et al. Predictors of hospitalization for injection drug users seeking care for soft tissue infections. *J Gen Intern Med* 2007;22:382-388. [[PubMed Abstract](#)]

FURTHER READING

Gourevitch MN, Arnsten JH. Medical complications of drug use. In: *Substance Abuse: A Comprehensive Textbook*, 4th edition. (Lowinson JH, Ruiz P, Millman RB, et al., eds.) Baltimore, MD: Lippincott Williams & Wilkins: 2004.

Infectious Disease Clinics of North America. Volume 16, Number 3, September 2002.