

The Color Atlas of Family Medicine, 2e >

Chapter 240. Injection-Drug Use

Patient Story

A 23-year-old woman is seen for her intake physical in a residential treatment program for women recovering from substance abuse. She has not injected heroin for two days now, but her tracks are still visible (**Figure 240-1**). Her parents were both addicted to heroin, and she admits to having been born addicted to heroin herself. She began using heroin on her own in her early teens and has been on and off heroin since that time. She acknowledges a history of physical and sexual abuse as a child. She has had many suicide attempts and has cut herself with a knife across her arm many times. She has traded sex for money to buy heroin. Her 2 children are in foster care after having been removed by Child Protective Services. She is an attractive young woman looking for help and is thankful to have been admitted to this program. She does not know whether she has acquired hepatitis B, hepatitis C, or HIV, but wants to be tested.

Figure 240-1



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A 23-year-old woman with visible tracks on her arms from intravenous heroin use. She also has visible scars from self-mutilation with a knife. (Courtesy of Richard P. Usatine, MD.)

Introduction

Injection-drug use affects millions of people across the world. Combinations of genetic, environmental, and behavioral factors influence risk of drug use and addiction. People who inject drugs often have other medical and psychiatric diagnoses, as well as social, legal, and vocational problems. Comprehensive management includes acute treatment and continuing care. Relapse is common, but involvement in a treatment program improves outcomes.

Epidemiology

- An estimated 16 million people inject drugs worldwide, based on data from 148 countries. The largest numbers of injectors are in China, the United States, and Russia.¹
- In the United States, injection-drug use among persons ages 15 to 29 years increased from 96 (1996) to 116 (2002) per 10,000 persons.²
- From 2000 to 2002, 1.5% of the U.S. population older than the age of 12 years reported injection-drug use at any time; 0.19% reported injection-drug use within the last year—440,000 persons.³
- Prevalence was highest in persons ages 35 to 49 years (3.5%); higher in men than women (2.0% vs. 1.0%); and higher in whites (1.7%) than African Americans (0.8%) or Hispanics (0.8%).³
- In 2002, the mean age of injection-drug users (IDUs) was 36 years compared to 21 years in 1979.³
- Needle sharing is common. In the previous 3 months, 46% of IDUs lent a person a used syringe⁴ and 54% injected with a used syringe.⁵
- There were 27,837–278,371 substance-abuse treatment admissions for injection-drug use (14.2% of all admissions reported to Substance Abuse and Mental Health Services Administration's [SAMHSA] *Treatment Episode Data Set for 2009*).⁶
- The most commonly injected drug is heroin. Amphetamines, buprenorphine, benzodiazepines, cocaine, and barbiturates also are injected.⁷
- HIV prevalence among IDUs is estimated to be 20% to 40%.¹
- The 2009 Monitoring the Future Survey showed that 2.5% of 12th-grade boys in the United States were using anabolic steroids (Figure 240-2).⁸
- Anabolic steroid abuse among athletes may range between 1% and 6%.⁸
- Some adolescents abuse steroids as part of a pattern of high-risk behaviors. These adolescents also take risks such as drinking and driving, carrying a gun, driving a motorcycle without a helmet, and abusing other illicit drugs.⁸

Figure 240-2



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A high school athlete used injectable anabolic steroids for muscle building and developed a large abscess in his buttocks. This photograph was taken 2 months after the original abscess was drained and the wound is healing by secondary intention. (Courtesy of William Rodney, MD.)

Etiology and Pathophysiology

- Drug use disorders are thought to be a result of combinations of multiple factors, including genetic, environmental, and individual risk-conferring behaviors.⁹
- Drug use alters the brain's structure and function. These changes persist after drug use stops.¹⁰

- Most injecting drug users inject drugs intravenously, but subcutaneous injection (skin-popping) also is common.⁷
- Injected, snorted, or smoked heroin causes an almost immediate “rush” or brief period of euphoria that wears off very quickly, terminating in a “crash.” The user then experiences an intense craving to use more heroin to stop the crash and bring back the euphoria. The cycle of euphoria, crash, and craving—repeated several times a day—leads to a cycle of addiction.
- A heroin overdose can lead to death from respiratory depression, coma, and pulmonary edema. Death from the direct effects of cocaine is usually associated with cardiac dysrhythmias and conduction disturbances, leading to myocardial infarction and stroke.⁷
- Anabolic steroids can lead to early heart attacks, strokes, liver tumors, kidney failure, and serious psychiatric problems. In addition, because steroids are often injected, users who share needles or use nonsterile techniques when they inject steroids are at risk of contracting dangerous infections, such as HIV/AIDS and hepatitis B and hepatitis C (Figure 240-2).⁸

Risk Factors

- Family history.

Diagnosis

Clinical Features

Heroin use produces the following clinical appearances:

- Pinpoint pupils and no response of pupils to light.
- A rush of pleasurable feelings.
- Cessation of physical pain.
- Lethargy and drowsiness.
- Slurred speech.
- Shallow breathing.
- Sweating.
- Vomiting.
- A drop in body temperature.
- Sleepiness.
- Loss of appetite.

Cocaine (by injection) can produce the following signs, symptoms, and adverse effects:

- Dilated pupils.
- Hyperactivity.
- Euphoria.
- Irritability and anxiety.
- Excessive talking.
- Depression or excessive sleeping.
- Long periods without eating or sleeping.
- Weight loss.
- Dry mouth and nose.
- Paranoia.
- Cardiac—arrhythmias, chest pain, myocardial infarction (MI), and congestive heart failure (CHF).
- Strokes and seizures.
- Respiratory failure.

Complications of Injecting Drug Use

- Local problems—Abscess (**Figures 240-2** and **240-3**; see **Chapter 121**, Abscess), cellulitis, septic thrombophlebitis, local induration, necrotizing fasciitis, gas gangrene, pyomyositis, mycotic aneurysm, compartmental syndromes, and foreign bodies (e.g., broken needle parts) in local areas.²
 - IDUs are at higher risk of getting methicillin-resistant *Staphylococcus aureus* (MRSA) skin infections that the patient may think are spider bites (**Figure 240-4**).
 - Some IDUs give up trying to inject into their veins and put the cocaine directly into the skin. This causes local skin necrosis that produces round atrophic scars (**Figure 240-5**).
- IDUs are at risk for contracting systemic infections, including HIV and hepatitis B or hepatitis C.
 - Injecting drug users are at risk of endocarditis, osteomyelitis (**Figures 240-6** and **240-7**), and an abscess of the epidural region. These infections can lead to long hospitalizations for intravenous antibiotics. The endocarditis that occurs in IDUs involves the right-sided heart valves (see **Chapter 50**, Bacterial Endocarditis).² They are also at risk of septic emboli to the lungs, group A β -hemolytic streptococcal septicemia, septic arthritis, and candidal and other fungal infections.

Figure 240-3

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A 32-year-old woman with type 1 diabetes developed large abscesses all over her body secondary to injection of cocaine and heroin. Her back shows the large scars remaining after the healing of these abscesses. (Courtesy of Richard P. Usatine, MD.)

Figure 240-4



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A young woman with methicillin-resistant *Staphylococcus aureus* infection from injection-drug use. Track visible on hand with pustule from methicillin-resistant *Staphylococcus aureus*. (Courtesy of Richard P. Usatine, MD.)

Figure 240-5



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A young woman in residential treatment program with multiple scars from skin popping cocaine. She gave up trying to inject into her veins and put the cocaine directly into the skin. Note how the local skin necrosis caused round atrophic scars. (Courtesy of Richard P. Usatine, MD.)

Figure 240-6



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A 24-year-old woman with an 8-year history of injection-drug use. She has a large deep linear scar from osteomyelitis of the ulnar bone and smaller round scars from skin popping. A track is also visible above the deep scar. (Courtesy of Richard P. Usatine, MD.)

Figure 240-7



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The other arm of the woman in [Figure 240-6](#) with deep scar from osteomyelitis secondary to injecting drugs that destroyed the bones in her left forearm. Her arm is deformed and poorly functional. (Courtesy of Richard P. Usatine, MD.)

Laboratory Testing

- All IDUs should be screened for HIV (with consent), hepatitis B, and hepatitis C.
- If there is a history of high-risk sexual behavior, screen for syphilis (rapid plasma reagin [RPR]), chlamydia and gonorrhea.
- Purified protein derivative (PPD) test to screen for tuberculosis (especially if the patient is homeless or HIV-positive).
- Urine screen for common drugs of abuse may reveal other drugs not admitted to in the history.

- ECG is warranted if there are any cardiac symptoms or if the physical examination reveals signs of cardiac disease.

Differential Diagnosis

- Injection-drug use and dependence may be hidden problems. The differential diagnosis will differ based on the presenting complaints.

Management

- Drug-abuse therapy is cost-effective. For example, 1 year of [methadone](#) maintenance therapy is approximately \$4700 compared to 1 year of imprisonment, which costs \$18,400.^{10,11}
- Every \$1 invested in addiction treatment saves \$12 in health, legal, and theft costs.¹⁰

Nonpharmacologic

- Recognize addiction as a chronic illness that requires a comprehensive approach during the treatment phase (e.g., residential/outpatient treatment) and continuing care (e.g., drug-abuse monitoring, booster sessions, and reevaluation of treatment needs).¹⁰
- Identify and address associated medical and psychiatric diagnoses, as well as social, legal, and work-related problems. Coexisting psychiatric illnesses are common.¹⁰
- For criminal justice-involved drug abusers and addicts, use this opportunity to engage individuals in treatment. Research supports the efficacy of combining criminal justice sanctions and drug-abuse treatment.¹⁰
- Test IDUs for HIV/AIDS, and hepatitis B and hepatitis C. Consider testing for tuberculosis and other infectious diseases as indicated.¹⁰
- Consider medically assisted detoxification to minimize withdrawal symptoms.
- Recommend an appropriate length of time for treatment. Most patients need at least 3 months to stop using drugs.¹⁰
- Encourage patients to engage in individual or group behavioral therapies and assist patients in finding programs that meet their individual needs.¹⁰
- Advise patients to join a self-help group, such as Narcotics Anonymous (NA) or [Cocaine](#) Anonymous (CA), which are based on the 12-step model. Most drug-addiction treatment programs encourage patients to participate in a self-help group during and after formal treatment.⁶

Medications

- For opioid addiction, consider a [methadone](#) maintenance program.
 - Opioid replacement therapy reduces injecting drug use and thus reduces the mortality and morbidity associated with injecting drug use, including the transmission of HIV and hepatitis C virus (HCV).⁷
 - Opioid replacement combined with counseling, medical and psychiatric care, employment assistance, and family services is superior to opioid replacement alone.¹⁰
- [Buprenorphine](#), a partial opioid agonist, is also used for opioid detoxification and for opioid replacement therapy.^{7,10} In the United States, physicians who wish to prescribe [buprenorphine](#) must take a certification course.
- [Naltrexone](#), a long-acting synthetic opioid antagonist, blocks opioid receptors, thereby preventing the effects of opioids. Treatment is initiated after patients have been opioid-free for several days to prevent a severe withdrawal.¹⁰
- Treating criminal justice-involved drug abusers and addicts—Drug abusers may come into contact with the criminal justice system earlier than with other health or social systems. Thus, the period of involvement with the criminal justice system may offer an opportunity to engage individuals in a treatment that can shorten a pattern of drug abuse and related crime. Research supports the efficacy of combining criminal justice sanctions and drug-abuse treatment.¹¹
- Drug-abuse treatment is less expensive than alternatives, such as not treating addicts or incarcerating them. The average cost for 1 full year of [methadone](#) maintenance treatment is approximately \$4700 per patient, whereas 1 full year of imprisonment costs approximately \$18,400 per person. According to several conservative estimates, every \$1 invested in addiction treatment programs yields up to \$7 in savings, much of which

results from reduced drug-related crime and criminal justice costs.¹¹ Although **methadone** maintenance is not as desirable as full abstinence, the comparative costs are in favor of drug treatment over incarceration.

- Recovery from drug addiction has two key components: treatment and continuing care. The clinical practices that make up the treatment phase (e.g., residential/outpatient treatment) must be followed up by management of the disorder over time (e.g., drug-abuse monitoring, booster sessions, and reevaluation of treatment needs).¹¹
- Research shows that treatment must last, on average, at least 3 months to produce stable behavior change.¹¹ This accounts for the existence of 90-day residential treatment programs.
- A comprehensive assessment is the first step in the treatment process, and includes identifying individual strengths to facilitate treatment and recovery. In addition, drug abuse cannot be treated in isolation from related issues and potential threats, such as criminal behavior, mental health status, physical health, family functioning, employment status, homelessness, and HIV/AIDS.¹¹
- Treatments that utilize cognitive behavioral therapies, residential treatment, contingency management, and medications have demonstrated effectiveness in reducing drug abuse and criminal behavior.¹¹
- Medications are a key treatment component for drug abusers and can stabilize the brain and help return it to normal functioning. **Methadone** and **buprenorphine** are effective in helping individuals addicted to heroin or other opiates reduce their drug abuse. **Naltrexone** is also an effective medication for some opiate-addicted patients and those with concurrent **alcohol** dependence.¹¹
- Family and friends can play critical roles in motivating individuals with drug problems to enter and stay in treatment. Family therapy is important, especially for adolescents. Involvement of a family member in an individual's treatment program can strengthen and extend the benefits of the program.¹¹
- **Buprenorphine** (Subutex or, in combination with **naloxone**, Suboxone) is demonstrated to be a safe and acceptable addiction treatment. Congress passed the Drug Addiction Treatment Act (DATA 2000), permitting qualified physicians to prescribe narcotic medications (Schedules III to V) for the treatment of opioid addiction. This legislation created a major paradigm shift by allowing access to opiate treatment in a medical setting rather than limiting it to specialized drug treatment clinics. Approximately 10,000 physicians have taken the training needed to prescribe these 2 medications, and nearly 7000 have registered as potential providers.
- **Methadone** and levo- α -acetyl methadol (LAAM) have more gradual onsets of action and longer half-lives than heroin. Patients stabilized on these medications do not experience the heroin rush. Both medications wear off much more slowly than heroin, so there is no sudden crash, and the brain and body are not exposed to the marked fluctuations seen with heroin use. Maintenance treatment with **methadone** or LAAM markedly reduces the desire for heroin.
- If an individual maintained on adequate, regular doses of **methadone** (once a day) or LAAM (several times per week) tries to take heroin, the euphoric effects of heroin will be significantly blocked. According to research, patients undergoing maintenance treatment do not suffer the medical abnormalities and behavioral destabilization that rapid fluctuations in drug levels cause in heroin addicts.

Prevention and Screening

- The United States Preventive Services Task Force concluded that there is insufficient evidence to screen for illicit drug use in adolescents, adults, or pregnant women, but advises clinicians to be alert for sign and symptoms of drug use.¹²
- Accurate and reliable office screening instruments include CRAFFT (adolescent drug use/misuse), and the ASSIST, CAGE-AID, and DAST (adults with drug misuse).¹²

Prognosis

- Most patients who enter and remain in treatment stop injecting drugs and see improvements in their work, relationships, and psychological functioning.¹⁰
- Forty percent to 60% of patients relapse.¹⁰
- Drug injectors who do not enter treatment are up to 6 times more likely to become infected with HIV than are injectors who enter and remain in treatment. Drug users who enter and continue in treatment reduce activities that can spread disease, such as sharing injection equipment and engaging in unprotected sexual activity. Participation in treatment also presents opportunities for screening, counseling, and referral for

additional services. The best drug-abuse treatment programs provide HIV counseling and offer HIV testing to their patients.¹⁰

Follow-Up

- Follow-up is important for the treatment of IDUs. Addiction is a chronic (and relapsing) condition and requires long-term follow-up. Your intervention and caring attitude can help the patient to overcome addiction and to live a sober and drug-free life. Do not give up on patients who relapse because it often takes more than one attempt before long-term cessation can be achieved. The frequency and intensity of follow-up depend upon the substance, the addiction, and the patients and their complications.

Patient Education

- For patients who are not ready to stop their injecting drug use there are harm-reduction and counseling programs that can be helpful. Encourage patients to use clean and sterile needles and not to share their needles with anyone. Bleach can be used to clean and sterilize needles and prevent the spread of HIV and hepatitis.
- Refer continuing drug users to needle exchange programs that exist to help IDUs use clean needles and avoid infectious diseases. These programs can also be helpful if they give out condoms to encourage safe sex.
- Encourage patients to get help to become drug-free and abstinent. There is no safe level of injecting drug use.
- Explain to patients that addiction is a disease and not a failing of their moral character.
- Inform patients about the existing treatment programs in their community and offer them names and phone numbers so that they may get help.
- If your patient is not ready for help today, give the numbers and names for tomorrow.
- Speak about the value of 12-step programs including NA and CA because everyone can afford a 12-step program. There are 12-step programs in the community for everyone including nonsmokers and agnostics.

Patient Resources

- Narcotics Anonymous. Provides information about meetings and literature in more than 40 different languages. <http://www.na.org/>.
- Cocaine Anonymous. Provides information about meetings and other resources. <http://www.ca.org/>.

Provider Resources

- OpioidRisk. *Substance Abuse Assessment Tools* (screening instruments for adults including the ASSIST, CAGE-AID, and DAST are available) —<http://www.opioidrisk.com/node/773>.
- The Center for Adolescent Substance Abuse Research. *The CRAFFT Screening Tool*—<http://www.ceasar-boston.org/clinicians/crafft.php>.
- The National Institute on Drug Abuse. *Medical Consequences of Drug Abuse*—<http://www.nida.nih.gov.proxy.library.upenn.edu/consequences/>.
- Substance Abuse and Mental Health Services Administration. *Substance Abuse Treatment Facility Locator* (information on treatment programs in the United States)—<http://www.findtreatment.samhsa.gov>.

References

1. Mathers BM, Degenhardt L, Phillips B, et al. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *Lancet*. 2008;372(9651):1733-1745. [PubMed: 18817968] □
2. Chatterjee A, Tempalski B, Pouget ER, et al. Changes in the prevalence of injection drug use among adolescents and young adults in large U.S. metropolitan areas. *AIDS Behav*. 2011;15(7):1570-1578. [PubMed: 21739288] □
3. Armstrong GL. Injection drug users in the United States, 1979-2002: an aging population. *Arch Intern Med*. 2007;167(2):166-173. [PubMed: 17242318] □
4. Golub ET, Strathdee SA, Bailey SL, et al; DUIT Study Team. Distributive syringe sharing among young adult injection drug users in five U.S. cities. *Drug Alcohol Depend*. 2007;91 Suppl 1:S30-S38.

5. Bailey SL, Ouellet LJ, Mackesy-Amity ME, et al. DUIT Study Team. Perceived risk, peer influences, and injection partner type predict receptive syringe sharing among young adult injection drug users in five U.S. cities. *Drug Alcohol Depend.* 2007;91 Suppl 1:S18-S29.
6. Substance Abuse and Mental Health Services Administration. *Treatment Episode Data Set (TEDS). 1999-2009.* (National Admission to Substance Abuse Treatment Services, DASIS Series: S-56, HHS Publication No. 9SMA 11-4646.) Rockville, MD: Substance Abuse and Mental Health Services Administration; 2011.
7. Baciawicz GJ. *Injecting Drug Use.* Updated December 15, 2011. <http://www.emedicine.com/med/topic586.htm>. Accessed April 16, 2012.
8. Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. *Monitoring the Future: National Results on Adolescent Drug Use: Overview of Key Findings, 2009.* (NIH Publication No. 10-7583). Bethesda, MD: National Institute on Drug Abuse.
9. Schulden JD, Thomas YF, Compton W. Substance abuse in the United States: findings from recent epidemiologic studies. *Curr Psychiatry Rep.* 2009;11(5):353-359. [PubMed: 19785975]
10. National Institute on Drug Abuse. *Principles of Drug Addiction Treatment: A Research Based Guide*, 2nd ed. (NIH Publication No. 09-4180, revised April 2009.) Bethesda, MD: National Institutes of Health and U.S. Department of Health and Human Services; 2009.
11. *Principles of Drug Abuse Treatment for Criminal Justice Populations—A Research-Based Guide.* <http://www.drugabuse.gov/drugpages/cj.html>. Accessed May 6, 2012.
12. U.S. Preventive Services Task Force. *Screening for Illicit Drug Use.* <http://www.uspreventiveservicestaskforce.org>. Accessed April 16, 2012.