



National Institute  
on Drug Abuse

Research Report Series

# Prescription Opioids and Heroin

## Introduction

Drug overdose deaths involving prescription opioid pain relievers have increased dramatically since 1999. Concerted federal and state efforts have been made to curb this epidemic. In 2011, the White House released an interagency strategy for Responding to America's Prescription Drug Crisis ([www.whitehouse.gov/sites/default/files/ondcp/issues-content/prescription-drugs/rx\\_abuse\\_plan.pdf](http://www.whitehouse.gov/sites/default/files/ondcp/issues-content/prescription-drugs/rx_abuse_plan.pdf)). Enacting this strategy, federal agencies have worked with states to educate providers, pharmacists, patients, parents, and youth about the dangers of prescription drug abuse and the need for proper prescribing, dispensing, use, and disposal; to implement effective prescription drug monitoring programs; to facilitate proper medication disposal through prescription take-back initiatives; and to support aggressive enforcement to address doctor shopping and pill mills and support development of abuse-resistance formulations for opioid pain relievers.

Improvements have been seen in some regions of the country in the form of decreasing availability of prescription opioid drugs and a decline in overdose deaths in states with the most aggressive policies (Johnson et al., 2014). However, since 2007, overdose deaths related to heroin have started to increase. The Centers for Disease Control and Prevention counted 10,574 heroin overdose deaths in 2014, which represents more than a fivefold increase of the heroin death rate from 2002 to 2014 (CDC, 2015).

In an effort to combat the intertwined problems of prescription opioid misuse and heroin use, in March of 2015 the Secretary of Health and Human Services announced the Secretary's Opioid Initiative ([www.hhs.gov/news/press/2015pres/03/20150326a.html](http://www.hhs.gov/news/press/2015pres/03/20150326a.html)), which aims to reduce addiction and mortality related to opioid drug abuse by (HHS takes strong steps, 2015):

- reforming opioid prescribing practices
- expanding access to the overdose-reversal drug naloxone
- expanding access to medication-assisted treatment for opioid use disorder



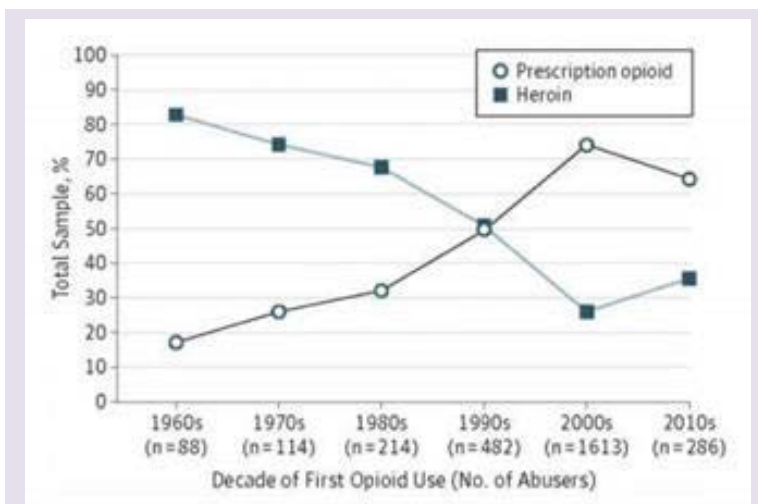
Photo by ©iStock/Pictac/  
[www.istockphoto.com/photo/prescription-drug-gm152110776-14343609](http://www.istockphoto.com/photo/prescription-drug-gm152110776-14343609)

The relationship between prescription opioid abuse and increases in heroin use in the United States is under scrutiny. These substances are all part of the same opioid drug category and overlap in important ways. Currently available research demonstrates:

- Prescription opioid use is a risk factor for heroin use.
- Heroin use is rare in prescription drug users.
- Prescription opioids and heroin have similar effects, different risk factors.
- A subset of people who abuse prescription opioids may progress to heroin use.
- Increased drug availability is associated with increased use and overdose.
- Heroin use is driven by its low cost and high availability.
- Emphasis is needed on both prevention and treatment.

## Prescription opioid use is a risk factor for heroin use

Pooling data from 2002 to 2012, the incidence of heroin initiation was 19 times higher among those who reported prior nonmedical pain reliever use than among those who did not (0.39 vs. 0.02 percent) (Muhuri et al., 2013). A study of young, urban injection drug users interviewed in 2008 and 2009 found that 86 percent had used opioid pain relievers nonmedically prior to using heroin, and their initiation into nonmedical use was characterized by three main sources of opioids: family, friends, or personal prescriptions (Lankenau et al., 2012). This rate represents a shift from historical trends. Of people entering treatment for heroin addiction who began abusing opioids in the 1960s, more than 80 percent started with heroin. Of those who began abusing opioids in the 2000s, 75 percent reported that their first opioid was a prescription drug (Cicero et al., 2014). Examining national-level general population heroin data (including those in and not in treatment), nearly 80 percent of heroin users reported using prescription opioids prior to heroin (Jones, 2013; Muhuri et al., 2013).



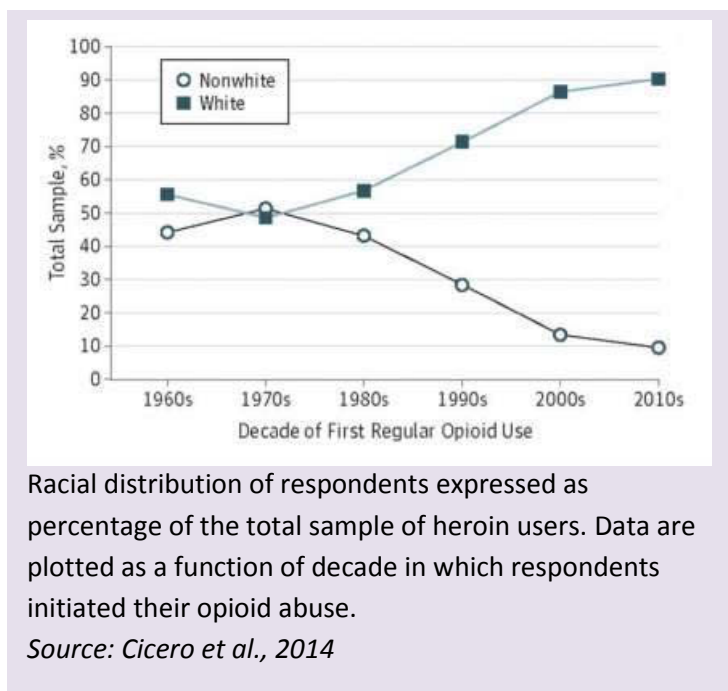
Percentage of the total heroin-dependent sample that used heroin or a prescription opioid as their first opioid of abuse. Data are plotted as a function of the decade in which respondents initiated their opioid abuse. Source: Cicero et al., 2014

## Heroin use is rare in prescription drug users

While prescription opioid abuse is a growing risk factor for starting heroin use, only a small fraction of people who abuse pain relievers switch to heroin use. According to general population data from the National Survey on Drug Use and Health, less than 4 percent of people who had abused prescription opioids started using heroin within 5 years (Muhuri et al., 2013). This suggests that prescription opioid abuse is just one factor in the pathway to heroin. Furthermore, analyses suggest that those who transition to heroin use tend to be frequent users of multiple substances (polydrug users) (Jones et al., 2015). Additional analyses are needed to better characterize the population that abuses prescription opioids who transition to heroin use, including demographic criteria, what other drugs they use, and whether or not they are injection drug users.

## Prescription opioids and heroin have similar effects, different risk factors

Heroin and prescription opioid pain relievers both belong to the opioid class of drugs, and their euphoric effects are produced by their binding with mu opioid receptors in the brain. Different opioid drugs have different effects that are determined by the way they are taken and by the timing and duration of their activity at mu opioid receptors.



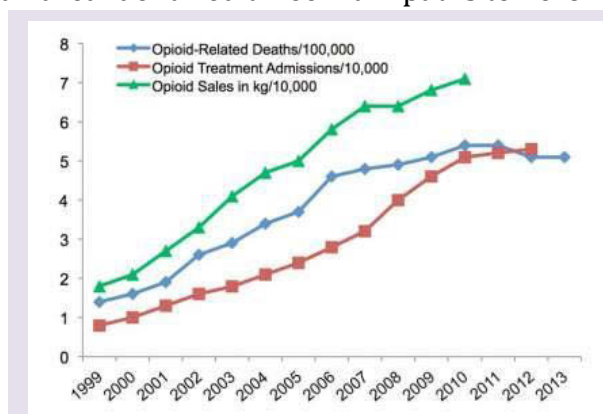
People who began using heroin in the 1960s were predominantly young men from minority groups living in urban areas (82.8 percent; mean age at first opioid use, 16.5 years) whose first opioid of abuse was heroin (80 percent). The epidemic of prescription opioid abuse has been associated with a shifting of the demographic of opioid users toward a population that is somewhat older (mean age at first opioid use, 22.9 years), less minority, more rural/suburban, with few gender differences among those who were introduced to opioids through prescription drugs. Whites and nonwhites were equally represented in those initiating use prior to the 1980s, but nearly 90 percent of respondents who began use in the last decade were white (Cicero et al., 2014).

Because heroin is often injected, the upsurge in use also has implications for HIV, hepatitis C (HCV), and other injection-related illnesses. Recent studies suggest that having used opioid pain relievers before transitioning to heroin injection is a common trajectory for young injection drug users with HCV infection (Klevens et al., 2012). A study of new HCV infections in Massachusetts found that 95 percent of interview respondents used prescription opioids before initiating heroin (Church et al., 2010).

## A subset of people who abuse prescription opioids may progress to heroin use

A recent study of heroin users in the Chicago metropolitan area identified three main paths to heroin addiction: prescription opioid abuse to heroin use, cocaine use to heroin use (to "come down"), and polydrug use (i.e., use of multiple substances) to heroin use. Polydrug use to heroin was the most common path in this study (Kane-Willis et al., n.d.).

The estimated 4 percent subset of people who transition from prescription opioid abuse to heroin use (Muhuri et al., 2013) may be predisposed to polydrug use, and the transition may represent a natural progression for them. Examination of new HCV cases in young adults living in rural areas identified a population who reported transition from non-injection drug use to injecting opioid pain relievers before switching to injecting heroin or methamphetamine (Stanley et al., 2012). A study looking at a larger sample found that prescription opioid abuse preceded heroin use by an average of 2 years (Suryaprasad et al., 2014). Frequent prescription opioid users and those diagnosed with dependence or abuse of prescription opioids are more likely to switch to heroin; dependence on or abuse of prescription opioids has been associated with a 40-fold increased risk of dependence on or abuse of heroin (Jones et al., 2015).



Opioid sales, opioid treatment admissions, and opioid-related deaths.

Sources: CDC Wonder, 2015; DEA ARCOS, 2015; TEDS, 2015

## Increased drug availability is associated with increased use and overdose

From 1991 to 2011, there was a near tripling of opioid prescriptions dispensed by U.S. pharmacies: from 76 million to 219 million prescriptions (IMS Health, 2014a; IMS Health, 2014b). In parallel with this increase, there was also a near tripling of opioid-related deaths over the same time period.

Mexican heroin production increased from an estimated 8 metric tons in 2005 to 50 metric tons in 2009—more than a sixfold increase in just 4 years. Domination of the U.S. market by Mexican and Colombian heroin sources, along with technology transfer between these suppliers, has increased the availability of easily injectable, white powder heroin (National Drug Intelligence Center, 2011). In a recent survey of patients receiving treatment for opioid abuse, accessibility was one of the main factors identified in the decision to start using heroin (Cicero et al., 2014).

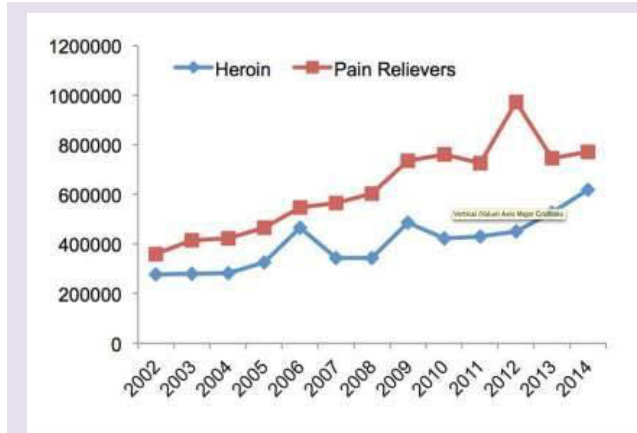
## Heroin use is driven by its low cost and high availability

One main factor that contributes to the popularity of a drug is availability. One key to prevention is reducing exposure. While efforts to reduce the availability of prescription opioid analgesics have begun to show success, the supply of heroin has been increasing (see "Increased drug availability is associated with increased use and overdose" on page 4). Prescription opioids and heroin have similar chemical properties and physiological impacts; when administered by the same method (i.e., ingested or injected), there is no real difference for the user.

It is not clear whether the increased availability of heroin is causing the upsurge in use or if the increased accessibility of heroin has been caused by increased demand. A number of studies have suggested that people transitioning from abuse of prescription opioids to heroin cite that heroin is cheaper, more available, and provides a better high. Notably, the street price of heroin has been much lower in recent years than in past decades (Unick et al., 2014). In addition to these market forces, some have reported that the transition from opioid pills to heroin was eased by sniffing or smoking heroin before transitioning to injection (Mars et al., 2014). In a recent survey of people in treatment for opioid addiction, almost all—94 percent—said they chose to use heroin because prescription opioids were "far more expensive and harder to obtain" (Cicero et al., 2014).

## Emphasis is needed on both prevention and treatment

With the increasing use of opioids, there has been a concomitant increase in the number of treatment admissions attributable to prescription opioids and heroin. The number of persons receiving substance use treatment for prescription opioids rose from 360,000 in 2002, representing 10.3 percent of the total treatment population, to 772,000 (18.6 percent) in 2014 (CBHSQ, 2015b). The number of persons receiving treatment for heroin increased from 277,000 in 2002 to 618,000 in 2014 (CBHSQ, 2015b). In



Number of persons 12 years or older who received last or current substance use treatment for heroin or pain relievers.

Source: CBHSQ, 2015b

addition, the number of heroin users in the United States jumped from about 404,000 in 2002 to 914,000 in 2014, and the number of those with heroin "dependence or abuse" more than doubled from 2002 to 2014, increasing from about 214,000 to 586,000 (CBHSQ, 2015a).

In addition to efforts to prevent initiation of abuse of prescription opioids and use of heroin, there is a significant need to identify and treat people who have already developed an addiction to these substances. The prescription drug monitoring programs are one means by which states are identifying individuals who are doctor shopping.



In addition, there are ongoing efforts to encourage health care practitioners to screen patients for potential drug abuse problems. However, identification is only the first step; it is critical to provide evidence-based treatments for these individuals. Treatment should include access to the medication-assisted treatment (MAT) options of methadone, buprenorphine, or extended-release naltrexone, which are effective for both prescription opioid and heroin addiction. Currently, far fewer people receive MAT than could potentially benefit from it. Nearly all U.S. states have higher rates of opioid abuse and dependence than their buprenorphine treatment capacity (Jones et al., 2015), and fewer than 1 million of the 2.5 million Americans who abused or were dependent on opioids in 2012 received MAT (Volkow et al., 2014). Removing barriers to MAT access and utilization is a top priority for the U.S. Department of Health and Human Services and is a key objective of the Secretary's Opioid Initiative ([www.hhs.gov/news/press/2015pres/03/20150326a.html](http://www.hhs.gov/news/press/2015pres/03/20150326a.html)) to combat opioid drug-related dependence and overdose.

## References

- CDC WONDER. Atlanta, GA: Centers for Disease Control and Prevention; 2015. <http://wonder.cdc.gov/>. Updated September 17, 2015. Accessed September 25, 2015.
- Center for Behavioral Health Statistics and Quality (CBHSQ). Table 7.50A. *2014 National Survey on Drug Use and Health: Detailed Tables*. Substance Abuse and Mental Health Services Administration, Rockville, MD; 2015.
- Center for Behavioral Health Statistics and Quality (CBHSQ). Table 7.62A. *2014 National Survey on Drug Use and Health: Detailed Tables*. Substance Abuse and Mental Health Services Administration, Rockville, MD; 2015.
- Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, Treatment Episode Data Set (TEDS). <http://www.samhsa.gov/data/client-level-data-teds>. Updated November 19, 2014. Accessed September 25, 2015.
- Centers for Disease Control and Prevention (CDC). Number and age-adjusted rates of drug-poisoning deaths involving opioid analgesics and heroin: United States, 2000-2014. National Vital Statistics System, Mortality File. <http://wonder.cdc.gov/>. Reviewed December 9, 2015. Accessed December 10, 2015.
- Church D, Barton K, Elson F, DeMaria A, et al. Notes from the field: risk factors for hepatitis C virus infections among young adults – Massachusetts, 2010. *Morbidity and Mortality Weekly Report (MMWR)*. Atlanta, GA: Centers for Disease Control and Prevention; 2011.
- Cicero TJ, Ellis MS, Surratt HL, Kurtz SP. The changing face of heroin use in the United States: a retrospective analysis of the past 50 years. *JAMA Psychiatry*. 2014;71(7):821-826.
- HHS takes strong steps to address opioid-drug related overdose, death and dependence [news release]. Washington, DC: U.S. Dept. of Health and Human Services; March 26, 2015. <http://www.hhs.gov/news/press/2015pres/03/20150326a.html>. Accessed October 8, 2015.
- IMS Health, National Prescription Audit, Years 1997-2013. Data extracted 2014.
- IMS Health, Vector One: National, Years 1991-1996. Data extracted 2014.
- Johnson H, Paulozzi L, Porucznik C, Mack K, Herter B. Decline in drug overdose deaths after state policy changes – Florida, 2010-2012. *Morbidity and Mortality Weekly Report (MMWR)*. Atlanta, GA: Centers for Disease Control and Prevention; 2014.
- Jones CM, Campopiano M, Baldwin G, McCance-Katz E. National and state treatment need and capacity for opioid agonist medication-assisted treatment. *Am J Public Health*. 2015;105(8):e55-e63.

Jones CM, Logan J, Gladden RM, Bohm MK. Vital signs: demographic and substance use trends among heroin users – United States, 2002-2013. *Morbidity and Mortality Weekly Report (MMWR)*. Atlanta, GA: Centers for Disease Control and Prevention; 2015.

Jones CM. Heroin use and heroin use risk behaviors among nonmedical users of prescription opioid pain relievers – United States, 2002-2004 and 2008-2010. *Drug Alcohol Depend*. 2013;132(1-2):95-100.

Kane-Willis K, Schmitz SJ, Bazan M, Narloch, VF, Wallace CB. *Understanding suburban heroin use*. Roosevelt University. [https://www.robertcrown.org/files/Understanding\\_suburban\\_heroin\\_use.pdf](https://www.robertcrown.org/files/Understanding_suburban_heroin_use.pdf). Accessed October 8, 2015.

Klevens RM, Hu DJ, Jiles R, Holmberg SD. Evolving epidemiology of hepatitis C virus in the United States. *Clin Infect Dis*. 2012;55(S1):S3-S9.

Lankenau SE, Teti M, Silva K, Jackson Bloom J, Harocopos A, Treese M. Initiation into prescription opioid misuse amongst young injection drug users. *Int J Drug Policy*. 2012;23(1):37-44.

Mars SG, Bourgois P, Karandinos G, Montero F, Ciccarone D. "Every 'never' I ever said came true": transitions from opioid pills to heroin injecting. *Int J Drug Policy*. 2014;25(2)257-266.

Muhuri PK, Gfroerer JC, Davies MC; Substance Abuse and Mental Health Services Administration. Associations of nonmedical pain reliever use and initiation of heroin use in the United States. *CBHSQ Data Review*. <http://www.samhsa.gov/data/2k13/DataReview/DR006/nonmedical-pain-reliever-use-2013.pdf>. Published August 2013. Accessed October 8, 2015.

National Drug Intelligence Center, U.S. Department of Justice. National Drug Threat Assessment 2011. <http://www.justice.gov/archive/ndic/pubs44/44849/44849p.pdf>. Published August 2011. Accessed October 8, 2015.

Stanley MM, Guilfoyle S, Vergeront JM, et al. Notes from the field: hepatitis C virus infections among young adults – rural Wisconsin, 2010. *Morbidity and Mortality Weekly Report (MMWR)*. Atlanta, GA: Centers for Disease Control and Prevention; 2012.

Suryaprasad AG, White JZ, Xu F, et al. Emerging epidemic of hepatitis C virus infections among young nonurban persons who inject drugs in the United States, 2006-2012. *Clin Infect Dis*. 2014;59(10):1411-1419.

U.S. Drug Enforcement Administration (DEA) ARCOS. Data extracted October 8, 2015.

Unick G, Rosenblum D, Mars S, Ciccarone D. The relationship between US heroin market dynamics and heroin-related overdose, 1992-2008. *Addiction*. 2014;109(11):1889-1898.

Volkow ND, Frieden TR, Hyde PS, and Cha SS. Medication-assisted therapies—tackling the opioid-overdose epidemic. *N Engl J Med*. 2014;370(22):2063-2066.

## Where can I get further information about prescription opioids and heroin?

To learn more about prescription opioids and heroin, visit the NIDA website at [www.drugabuse.gov](http://www.drugabuse.gov) or contact *DrugPubs* Research Dissemination Center at 877-NIDA-NIH (877-643-2644) (TTY/TDD: 240-645-0228).

NATIONAL INSTITUTE ON DRUG ABUSE



RESEARCH DISSEMINATION CENTER

### NIDA's website includes:

- Information on drugs of abuse and related health consequences
- NIDA publications, news, and events
- Resources for health care professionals, educators, and patients and families
- Information on NIDA research studies and clinical trials
- Funding information (including program announcements and deadlines)
- International activities
- Links to related websites (access to websites of many other organizations in the field)
- Information in Spanish (en español)

### NIDA Websites and Webpages

[www.drugabuse.gov](http://www.drugabuse.gov)  
[www.teens.drugabuse.gov](http://www.teens.drugabuse.gov)  
[www.easyread.drugabuse.gov](http://www.easyread.drugabuse.gov)  
[www.drugabuse.gov/drugs-abuse/opioids](http://www.drugabuse.gov/drugs-abuse/opioids)  
[www.drugabuse.gov/publications/finder/t/160/drugfacts](http://www.drugabuse.gov/publications/finder/t/160/drugfacts)  
[www.hiv.drugabuse.gov](http://www.hiv.drugabuse.gov)  
[www.researchstudies.drugabuse.gov](http://www.researchstudies.drugabuse.gov)  
[www.irp.drugabuse.gov](http://www.irp.drugabuse.gov)

### For Physician Information

**NIDAMED** 

[www.drugabuse.gov/nidamed](http://www.drugabuse.gov/nidamed)

### Other Websites

Information on prescription opioids and heroin is also available through:

- Substance Abuse and Mental Health Services Administration: [www.samhsa.gov](http://www.samhsa.gov)
- Drug Enforcement Administration: [www.dea.gov](http://www.dea.gov)
- Monitoring the Future: [www.monitoringthefuture.org](http://www.monitoringthefuture.org)
- Partnership for Drug-Free Kids: [www.drugfree.org/drug-guide/](http://www.drugfree.org/drug-guide/)

Updated December 2015