

Injection Drug Use in Indiana: A Major Risk for HIV Transmission

INTRODUCTION

Illicit drug use is a significant public health issue. In 2014, approximately 27 million people, or 10.2 percent of the United States population 12 years of age or older, were currently using some type of illicit substance, while 7.1 million people 12 years of age or older could be classified as either abusing or being dependent on an illicit drug.¹ Abuse of illicit drugs is associated with adverse health consequences. These consequences may be tied directly to the drug itself (e.g., “meth mouth”), the effect of the drug when taken in a particular way (e.g., overdose due to injecting opioids), or due to the selected method of drug administration. Persons who use drugs may choose to swallow, inhale/smoke, snort, or inject them. Of the available routes for drug administration, injection is associated with higher rates of illness and death primarily due to the ease with which bacterial, fungal, or viral agents can enter the body when injectors use needles and drug preparation equipment previously used by others.³ The two most significant viruses transmitted through injection drug use (IDU) are human immunodeficiency virus (HIV), the virus that causes Acquired Immune Deficiency Syndrome (AIDS) and the Hepatitis C virus (HCV).^{5,6} IDU is an efficient way for HIV, HCV and other viruses to quickly spread among groups of users. When a user injects, they often draw a small amount of blood into the syringe to ensure the needle is in a vein before continuing with the injection resulting in blood remaining both in the syringe and on the needle.⁷ Therefore, if a user is HIV or HCV positive and shares his or her syringes with others, they are simultaneously injecting drugs and trace amounts of infected blood directly into their body, which places them at high risk for infection.^{5,6} HIV- or HCV-tainted blood can also be spread through IDU by using contaminated syringes to “backload” (or fill syringes of other users) and by sharing drug preparation equipment, particularly rinse water, cotton filters, and mixing and “cooking” equipment, all of which

often come in contact with used syringes and blood residue.⁸

Starting in December of 2014, the Indiana State Department of Health (ISDH) began documenting an alarmingly high number of new and suspected cases of HIV in the rural, southeastern part of the state primarily in and around Scott County. By April 20, 2015 the number of new confirmed HIV infections had risen to epidemic proportions from 30, in late 2014, to 135; leading Governor Mike Pence to declare a public health emergency. Interviews with affected persons revealed the majority (80 percent) of infected individuals were abusing the powerful extended release form of the prescription opioid analgesic oxycodone (a.k.a., Opana-ER) through dissolving and injecting it—although some were also injecting other drugs such as heroin or methamphetamine. Of the 135 persons found to be HIV+, 114 (84.4 percent) were co-infected with the HCV. The average age of those infected was 35 years, and just over half were male (54.8 percent). Affected individuals were generally White. Each affected person typically reported nine other individuals he or she had shared needles with, had sexual contact with, or knew might be at risk for HIV. Of the 373 persons enumerated, ISDH located and tested 230; 109 (47.4 percent) tested positive for HIV.⁹ In its most recent report regarding the HIV epidemic, ISDH indicated that an additional 46 Hoosiers had tested positive for HIV, bringing the total number of new HIV cases within and around Scott County to 181.¹⁰

Southern Indiana’s HIV outbreak has drawn Hoosiers’ attention not only to the many hazards linked to IDU and the need for resources to better address them but also to the significant role prescription opioids have played in the epidemic. The following brief report will discuss the prevalence of IDU, the primary health consequences associated with it, and the main public health methods that can be used to reduce them.



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INJECTION DRUG USE AND RELATED HIGH-RISK BEHAVIORS

In the United States, prevalence estimates of IDU are difficult to calculate as most federally-conducted national health-related surveys do not regularly assess it. One survey, the National Survey on Drug Use and Health (NSDUH) has consistently asked participants to report lifetime and past year IDU. In 2009, the Substance Abuse and Mental Health Services Administration (SAMHSA) provided national estimates of IDU by combining data from the 2006, 2007, and 2008 NSDUH. At that time, SAMHSA indicated that nationally, approximately 425,000 individuals 12 years of age or older had injected drugs at least once within the past year.¹¹ In order to establish a more up-to-date estimate of IDU, we replicated SAMHSA's estimation methodology using data from the 2011, 2012, and 2013 NSDUH. From these data, we determined 1.6 percent (CI = 1.5 to 1.8 percent) of the United States population 12 years of age or older (4.2 million citizens) had engaged in IDU at least once in their lifetime. We further calculated that an overall average of 580,000 persons 12 or older (0.22 percent; CI = 0.19 - 0.26) used a needle to inject at minimum one of the following drugs: heroin, cocaine, methamphetamine, or another stimulant during the past year. Our estimate of past year IDU is statistically similar to other recently published estimates of past year IDU that have included data from the NSDUH.¹²

The rate of past year IDU was significantly higher for men (0.32 percent; CI = .26 - .39 percent) than for women (0.13 percent; CI = .09 - .16 percent; see Figure 1). Use of injection drugs in the past year was greatest in adults between the ages

of 18 to 25 (0.50 percent; CI = .40 - .59 percent) and the ages of 26 to 34 (0.50 percent; CI = .35 - .63 percent). Race was also associated with past year IDU. Native American/Alaska Natives had the highest rate (0.96 percent; CI = .10 - 1.82 percent) followed by persons who were Native Hawaiians or

Pacific Islanders (0.49 percent; CI = -.08 = 1.07; see Figure 2). Given the small number of individuals from both groups in the overall three-year sample the validity of these estimates is questionable. In terms of the specific drug injected, we determined that within persons 12 years of age and older, approximately 350,000 injected heroin in the past year; 260,000 injected methamphetamine; 204,000 injected cocaine; and 101,000 injected other stimulants.

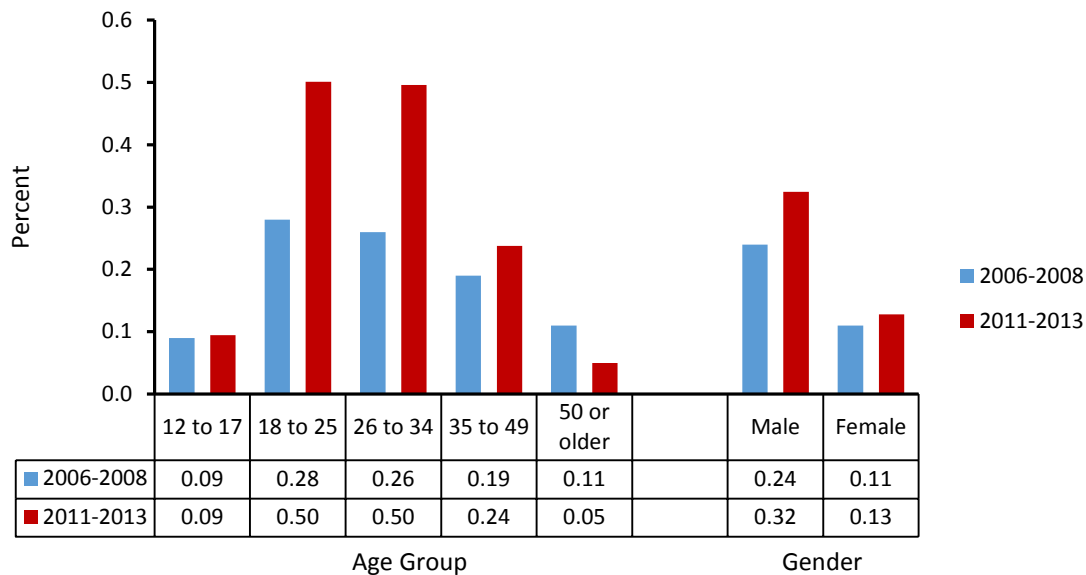
While the NSDUH does not directly ask about injection use of prescription opioids, the survey does have respondents indicate if they ever injected a drug other than heroin, cocaine, methamphetamine, or another stimulant. Respondents can then specify up to five other drugs. Using these data, we concluded that roughly 504,000 U.S. citizens 12 and older (0.19 percent, CI = 0.16 - 0.23) had injected a prescription opioid in their lifetime. This estimate represents approximately 1.4 percent of the 35.5 million persons who ever used prescription opioids illicitly in the United States in 2013.¹³ Although

the available data did not allow us to determine geographically where rates of injection use of prescription opioids are greatest, studies examining the phenomena suggest it is significantly more common in economically disadvantaged, rural areas of states in and around Appalachia where heroin has traditionally been less available¹⁴⁻¹⁶ and the prescribing rate for opioid analgesics is high.¹⁷

What is Opana?

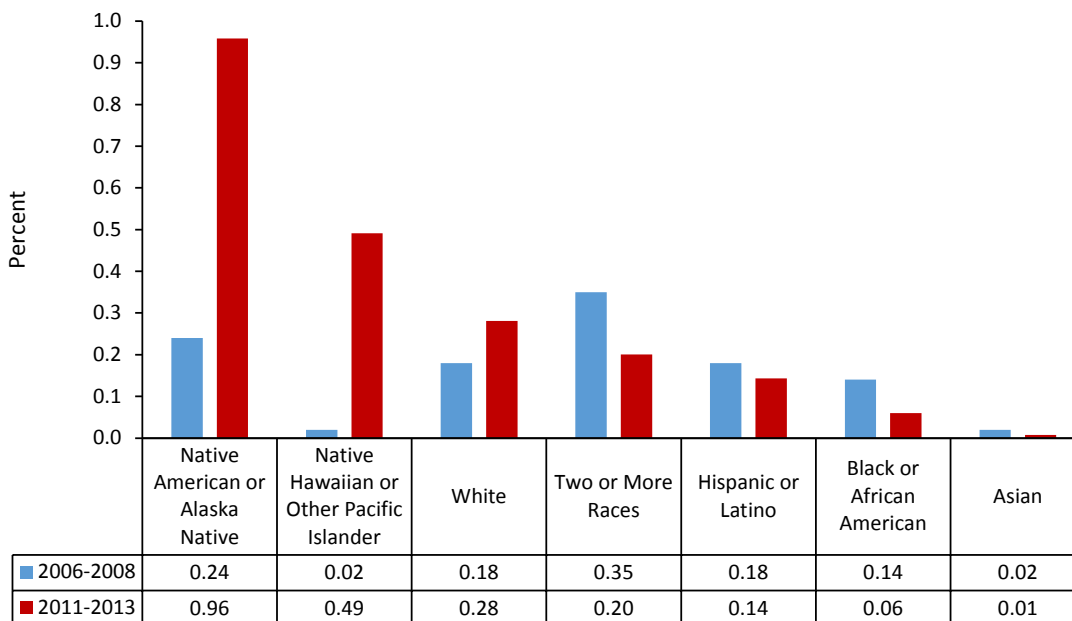
Opana (Oxymorphone Hydrochloride) is an opioid analgesic introduced by Endo Pharmaceuticals in 2007. Opana is available in both an immediate release and extended release formulation. Opana is six to eight times more powerful than morphine and is an active metabolite of oxycodone. Unlike other opioids, Opana when taken with alcohol can result in up to a 100 percent increase in oxymorphone blood levels; creating a significant risk for overdose from seemingly non-lethal amounts. Opana, and in particular Opana-ER, have become popular drugs of abuse due to the high level of medication they contain.² Illicit users of oxymorphone will typically crush an extended-release tablet and either inhale it or inject it. Although Endo Pharmaceuticals released a tamper-proof version of Opana-ER in 2011 and ceased production of the original formula in 2012, generic versions of the original formulation continue to be available. Intravenous injection of Opana-ER, apart from being a risk factor for HIV and HCV infection, has recently been linked to the development of a serious blood disorder known as thrombotic thrombocytopenic purpura which causes microscopic blood clots to form in the small blood vessels throughout the body, potentially causing organ failure and death.⁴

Figure 1. Injection Drug Use in the U.S. in the Past 12 Months by Age and Gender (NSDUH 2006-2008, 2011-2013)



Source: SAMHSA, Center for Behavioral Health Statistics and Quality

Figure 2. Injection Drug Use in the U.S. in the Past 12 Months by Ethnicity (NSDUH 2006-2008, 2011-2013)



Source: SAMHSA, Center for Behavioral Health Statistics and Quality

One significant public health concern associated with IDU is the transmission of blood-borne viruses such as HIV and HCV through the use of non-sterile needles and other injection equipment.⁹ Using pooled data from the 2011-2013 NSDUH, we concluded that in their most recent injection episode, nearly 60 percent of persons who injected drugs in the past year in the United States used a needle they had used before; 19.9 percent used a needle that they knew or suspected had been used by someone else; and 21.5 percent indicated the last time they injected, someone else proceeded to use the same needle to inject drugs. Per our estimates, only one quarter of past-year injection drug users used bleach to clean their needle prior to their most recent injection episode. According to the 2011-2013 NSDUH, nearly 60 percent of injection drug users got their most recent needle from a pharmacy; 12 percent bought their most recent needle on the street; 6.5 percent received their needle from a needle exchange program; 1.0 percent got their needle in a shooting gallery; 6.2 percent did not know from where they got their most recent needle; and 21.4 percent relied on a range of sources for their most recent needle.

In Indiana, data on IDU are scarce and reliable state-level prevalence estimates of IDU cannot be calculated using NSDUH data due to the overall low prevalence of IDU nationally (0.22 percent) and the small number of survey respondents sampled in each state. If we make the assumption that Indiana's pattern of IDU is similar to the nation's, we can conclude roughly 88,900 Hoosiers 12 years of age or older have engaged in IDU at least once in their lifetime and 12,100 have injected drugs one or more times in the past year. Focusing on specific drugs of abuse used in the past year, close to 7,200 Indiana citizens 12 and older injected heroin; 5,400 injected methamphetamine; 4,200 injected cocaine; and 2,100 injected other stimulants. In terms of prescription opioids, we estimated that 10,500 Hoosiers 12 years of age or older had injected prescription opioids at some point in their lifetime.

The CDC's Youth Risk Behavior Surveillance System (YRBSS) provides estimates of lifetime IDU for Indiana high school students (grades 9 through 12). In 2011, the YRBSS indicated that 2.7 percent of Hoosier high school students had injected drugs at least once in their lifetime. Estimates of lifetime IDU for Indiana high school students have remained stable since 2003 and are consistently similar to national estimates.¹⁸

DEMOGRAPHIC CHARACTERISTICS OF PEOPLE WHO INJECT DRUGS

Due to the hidden nature of the injection-drug-using population, determining the gender, race, ethnicity, and age of the typical injection drug user is difficult. A recent analysis of NSDUH data from 2005 through 2007 noted people who injected heroin, cocaine, or methamphetamine in the past year were more likely to be non-Hispanic white men and women 35 years of age or older.¹⁹ However, analyses of other data sources reveal a steady rise in IDU by young people between the ages of 15 and 29.^{20,21} These findings parallel increases over the past decade in heroin use by young, non-Hispanic white men and women most of whom initially became dependent on opioids through opioid pain medication and subsequently transitioned to first inhaling and then injecting heroin due to its lower cost and more powerful effect.²²⁻³²

U.S. substance abuse treatment data for 2012 support trends seen in the research literature, as more than half (55.0 percent) of self-reported users of any drug through injection were 18- to 34-year-old, non-Hispanic, white males (32.3 percent) and females (22.7 percent).³³ Though little is known about persons who primarily inject prescription opioids; those seeking help are similar to other injection drug users entering treatment as nearly three quarters (72.8 percent) of admissions for the use of opiates, other than heroin or non-prescription methadone, through injection were 18 to 34-year-old, non-Hispanic, white males (40.4 percent) and females (32.4 percent). Studies of small samples of prescription opioid injectors generally concur with the treatment data, describing the typical user as white, somewhat more likely to be male (53.8 percent - 58.6 percent of injectors) generally between the ages of 28 to 33,^{14-16,34} and as having used prescription opioids and/or other drugs for several years prior to initiating injection use.¹⁵

Indiana substance abuse treatment data show that similar to the rest of the nation, Hoosiers in treatment who reported IDU were primarily 18- to 34-year-old, non-Hispanic, white males (35.1 percent) and females (35.7 percent). This pattern remained for Hoosiers who primarily injected opioids other than heroin or non-prescription methadone.³³

Although reliable county-level prevalence rates of IDU are not available, using Treatment Episode Data System (TEDS) data for 2015, we were able to calculate the percentage of individuals entering substance abuse treatment within each of Indiana's 92 counties who said they ever injected drugs.³⁵ Table 1 lists the counties in the top 20 percent for persons who reported injection use at treatment admission.

Table 1. Individuals Reporting IDU at Treatment Admission (Treatment Episode Data System, 2015)

County	Total Number of Admissions	Number of Admissions Reporting IDU	Percent of Admissions with IDU
Blackford	76	31	41%
Jasper	127	50	40%
Union	31	11	35%
Newton	40	14	35%
Warren	386	129	33%
Fayette	223	74	33%
Starke	255	78	31%
Jay	159	48	30%
Scott	144	42	29%
Daviess	252	73	29%
Howard	596	164	28%
Miami	268	68	25%
Porter	679	171	25%
Dearborn	493	122	24%
LaPorte	451	108	24%
Delaware	1067	255	24%
Morgan	469	112	24%
Fountain	43	10	23%

Source: Indiana Division of Mental Health and Addictions, 2015

CONSEQUENCES OF INJECTION DRUG USE

IDU is a high-risk behavior that can lead to multiple negative outcomes, including addiction and dependence, significant health problems, and death.

Addiction and Dependence[†]

According to the National Institute on Drug Abuse,³⁶ drug

addiction is a chronic, often relapsing brain disease that leads to compulsive drug seeking and use, regardless of harmful consequences to the addicted person and to those around him or her. Drug addiction is considered a brain disease as, over time, the use of drugs changes both the structure and function of the brain. From a neurobiological perspective, drug use affects structures and neurotransmitters associated with the brain's pleasure and reward system. With continued use, these brain structures and neurotransmitters begin to rely on the presence of the drug in order to function normally, resulting in dependence. When individuals who have developed a dependence on a specific drug stop taking it, several physiologic reactions can occur as part of what is known as the withdrawal syndrome. The withdrawal syndrome for a drug can be mild such as for caffeine or life threatening as for alcohol.³⁷

The NSDUH estimated that in 2013, slightly more than eight percent of the United States population age 12 or older met the criteria for substance abuse or dependence.¹³ Over 1.7 million substance use treatment episodes occurred in the United States in 2012. In 15.5 percent of these treatment episodes, IDU was noted as the usual route of administration for the primary substance of abuse. Within the IDU treatment episodes, 75.5 percent were for heroin use, 10.8 percent for methamphetamine use, and 10.7 percent for the use of opiates/synthetics other than heroin or methadone.³³

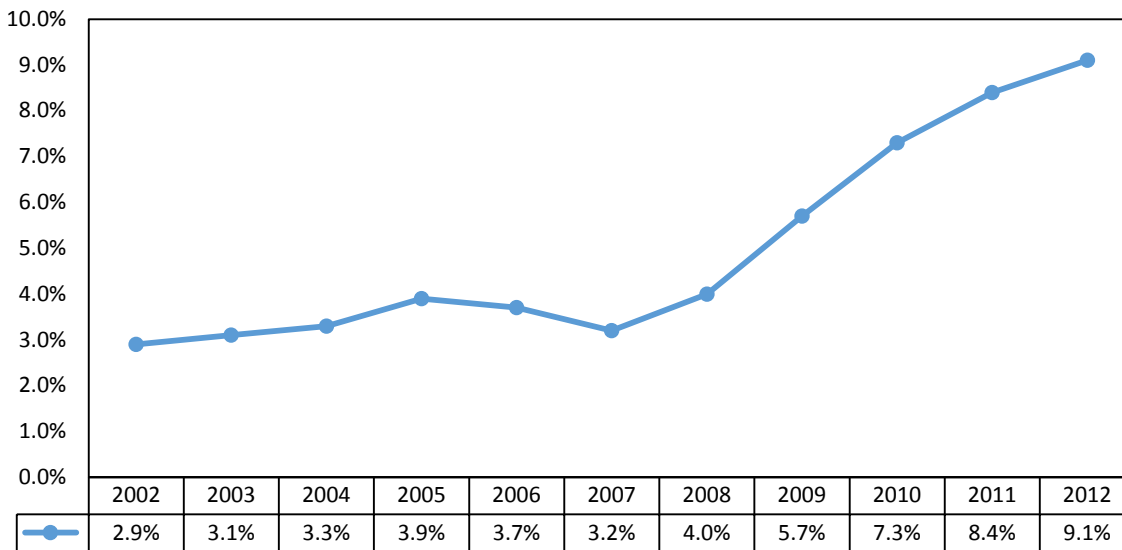
In Indiana, the 2013 NSDUH estimated nearly nine percent of Indiana's population ages 12 and older (477,000 Hoosiers) abused and/or were dependent on alcohol or drugs.³⁸

In 2012, just over 25,000 substance abuse treatment episodes^{††} were recorded in Indiana. In 2,247 (9.1 percent) of these episodes, intravenous or intramuscular injection was reported as the typical route of administration for the primary substance of abuse.³³ The percentage of treatment episodes indicating injection of the primary substance of abuse has more than tripled since 2002 (see figure 3).

[†] The terms addiction and dependence as used in this issue brief may be regarded as equivalent to a severe substance use disorder as defined by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5, 2015).

^{††} This information is based on the 2012 Treatment Episode Data Set (TEDS), a national database maintained by the Substance Abuse and Mental Health Services Administration. In Indiana, TEDS data are limited to information on individuals entering substance abuse treatment who are 200 percent below the poverty level and receive state-funded treatment; therefore, the data are not representative of all individuals in drug and alcohol treatment.

Figure 3. Percent of Treatment Admissions with Injection as the Route of Administration for Primary Substance of Abuse (TEDS, 2002-2012)



Source: SAMHSA Center for Behavioral Health Statistics and Quality

Within treatment episodes where the primary drug was injected, heroin was the drug injected most frequently (63.2 percent) followed by methamphetamine (17.3 percent), other opiates/synthetics (15.2 percent), and other injectable drugs (4.2 percent).³³

MORBIDITY AND MORTALITY

IDU is a well-documented source of morbidity and mortality.^{39,40} Injection drug users are at risk of developing a number of adverse health conditions including abscesses, cellulitis, and other skin infections. If untreated these infections can cause septicemia, abscesses in various internal organs, and bacterial endocarditis. Other health consequences tied to IDU include respiratory problems stemming from the formation of granulomas (small masses of inflamed tissue) after injecting a drug mixed with insoluble adulterants; complications from drug-induced blood clots; and gangrene and limb loss from accidental injection into an artery.^{3,41} Of all the health consequences, however, the most significant and most prevalent are blood-borne infections and drug-related overdoses.

HIV/AIDS—In the United States there are an estimated 914,826 persons living with HIV of whom 20.2 percent became infected through IDU. In 2013, injection drug users accounted for 16.3 percent of new AIDS cases and for almost one quarter (23.6 percent) of United States residents currently living with a diagnosis of AIDS (n = 508,845). During 2013, of the 47,352 new HIV infections reported in the United States—a total of 4,366 were tied to IDU.⁴² The percentage of United States residents newly infected with HIV through IDU has declined in recent years from a high of 14.3 percent

of new HIV infections in 2004 and 2006 to 9.2 percent of new HIV infections in 2013.^{43,44}

Despite the drop in IDU-related HIV cases, injection drug users, in particular those unaware of their HIV status, continue to take part in behaviors that promote the spread of HIV with 30 percent receptively sharing needles, 55 percent sharing injection equipment, and 70 percent engaging in unprotected sexual activity.⁴⁵ Reports of these and other HIV-related risk behaviors (e.g., engaging in sexual activity with another injection drug user) are highest among young injectors under the age of 30, placing this group in greater danger of acquiring and then spreading the virus.⁴⁶ Hoosiers should be particularly concerned in light of Indiana's recent HIV outbreak with findings that prescription opioid injectors are more likely than other injection drug users to share and reuse nonsterile syringes and injection-related equipment⁴⁷⁻⁴⁹ and that those who began their drug use careers by abusing prescription opioids report poorer knowledge of safer injection practices and perceive themselves as less likely than other injection drug users to contract HIV.^{30,32}

HCV—Infection with HCV is a significant cause of chronic liver disease, including liver cancer and cirrhosis and accounts for more deaths annually than HIV. HCV has become endemic to injection drug users due to its ease of transmission via sharing of needles and drug preparation equipment.⁶ The CDC estimates that approximately 33 percent of young (ages 18 to 30 years) and 70 percent to 90 percent of current and former injection drug users over 30 years of age have contracted HCV.⁵⁰ Between 2010 and 2013, the number of new HCV infections in the United States increased by 151.5

percent. Those affected were predominantly non-Hispanic, White men and women under 30 years of age residing in suburban and rural areas of several Eastern and Midwestern states. Affected individuals were current or past injection drug users who mainly injected heroin and/or prescription opioids and who reported a history of abusing prescription opioids prior to initiating injection use.⁵⁰⁻⁵³ A more detailed examination of this new population of injection drug users, indicated individuals who injected prescription opioids were two to five times more likely to test positive for HCV than those who injected other drugs.⁵²⁻⁵⁴ The higher likelihood of syringe and equipment sharing combined with a lack of knowledge of safer injection practices noted among people who inject prescription opioids may partially account for the higher rates of HCV within this population.

Non-Fatal Overdoses—Non-fatal drug overdoses, or episodes where users take more than the normal or recommended amount of a drug, are common among injection drug users with lifetime prevalence typically between 45 percent to 60 percent.⁵⁵⁻⁶⁰ A number of factors have been associated with experiencing an overdose including frequent heroin injection, injection of heroin along with methamphetamine, cocaine, or prescription opioids; heavy alcohol use, non-injection cocaine/crack use, younger age, forced abstinence due to recent incarceration or drug treatment; witnessing an overdose, having a larger drug-using social network, and social marginalization.⁵⁸⁻⁶⁴ Despite these factors, within injection drug users, having a past history of overdose is by far the best predictor of future non-fatal overdoses.⁶⁵ Those who had at least one non-fatal overdose are 29 times more likely to experience subsequent overdoses and repeated non-fatal overdoses are directly linked to an increased risk of death from overdose.^{55,66} Non-fatal overdose is a significant concern among injection drug users as it can result in severe health consequences such as aspiration pneumonia, peripheral neuropathy, temporary limb paralysis, renal failure, rhabdomyolysis, seizures, and hypoxic brain injury all of which can require significant and costly treatment.^{65,67,68}

Mortality—Mortality rates for those who inject drugs are much greater than those seen in the general population.^{39,40,69,70} An injection drug user is 13 to 15 times more likely to die prematurely compared to similar individuals who do not inject drugs.⁷⁰ In the United States, the mortality rate for injection drug users between the ages of 15 to 35 is approximately 8.28 deaths per 1,000 person years,^{†††} significantly higher than the one death per 1,000 person years which is typical for this age group.^{71,72} The single greatest cause of mortality among injection drug users in the United States is overdose, account-

ing for more than half of all deaths among opiate injectors and far exceeding the proportion due to HIV/AIDS and viral hepatitis.^{64,73} According to the National Institutes of Health, 8,257 people in the United States died from a heroin overdose in 2013 and past research suggests that a substantial proportion of these deaths were among injection drug users.^{74,75} Based on our prevalence estimates and available mortality data, we determined that within the population of people who ever injected drugs in the United States, approximately 29,745 died in the past year. Of these deaths, 58 percent were likely caused by overdose, 15 percent were related to HIV/AIDS, and 27 percent could be attributed to various other conditions such as self-inflicted injuries, accidents, or drug-related medical conditions.⁷¹

In Indiana, a total of 506 Hoosiers were newly diagnosed with HIV disease in 2013; 4.5 percent of transmissions (23 cases) were solely a result of IDU while an additional 2.0 percent (10 cases) could be linked to male injection drug users who also had sex with men (MSM). Additionally, 276 individuals were diagnosed with stage-3 HIV or AIDS; 5.8 percent (16 cases) were among injection drug users and 4.0 percent (11 cases) occurred in MSM who inject drugs. Table 2 provides additional HIV/AIDS related incidence and prevalence information for the number of Hoosiers currently living with HIV disease, the number of HIV deaths in Indiana, the number of Indiana residents living with Stage-3 HIV (AIDS), and the number of deaths attributable to Stage-3 HIV (AIDS) Indiana.⁷⁶

Table 2. Hoosiers Affected by HIV/AIDS

Disease*	Number Affected	Rate per 100,000 population [‡]	Number (%) of IDU	Number (%) of IDU and MSM
Living with HIV Disease	9,268	171.6	755 (8.1%)	604 (6.6%)
HIV Deaths ^{††}	187	3.5	31 (16.6%)	15 (8.0%)
Living with Stage-3 HIV (AIDS)	4,946	91.6	446 (9.0%)	359 (7.3%)
Stage-3 HIV (AIDS) Deaths	142	2.6	22 (15.5%)	7 (4.9%)

*All data are from 2012 (the most recent year for which data are available), available from CDC National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention⁷⁶

[‡]Rates are age-adjusted

^{††}Deaths of persons with diagnosed HIV infection may be due to any cause (may or may not be HIV-related)

^{†††} 8.28 deaths per 1,000 person-years would indicate that if a group of 1,000 injection drug users age 15 to 35 years were followed for one year, 8.28 persons would be expected to die in that year whereas in a sample of 1,000 persons ages 15 to 35 who did not inject drugs, approximately one would be expected to die during the course of a one-year period.

A total of 5,289 Hoosiers (3,945 in the civilian population and 1,344 in correctional facilities) were diagnosed with HCV in 2014 and 104 with HBV in 2013 (the most recent year for which data were available).⁷⁷ Although data on the number of Hoosiers who contracted HCV through IDU are not available from ISDH, because IDU is the most common means through which the virus is spread, the likelihood is high that the majority of Hoosiers who are HCV-positive are current or former injection drug users. Table 3 lists the counties in the top 20 percent for rates of HCV infection in 2014. In 2013, 104 Indiana residents died from viral hepatitis, 95 from HCV and 9 from HBV, for an age adjusted mortality rate of 1.3 deaths per 100,000 population.⁷⁸

Table 3. Indiana Counties in the Top 20 Percent for Rate of HCV among the Civilian Population, 2014 (ISDH, 2015)

County	Number of Cases	Rate per 100,000 Population
Scott	57	240
Vigo	255	236
Jay	43	203
Fayette	46	196
Wayne	122	180
Blackford	22	177
Jackson	64	146
Washington	38	136
Clark	150	131
Delaware	148	126
Jefferson	41	126
Vanderburgh	202	111
Lawrence	45	98
Monroe	139	97
Dearborn	48	97
Union	7	97

Source: Indiana State Department of Health Spotlight on HIV/STD/Viral Hepatitis, December 2014

During 2013, the ISDH documented 2,157 emergency department visits for non-fatal opioid overdoses, resulting in an age-adjusted prevalence rate of 33 non-fatal opioid overdoses per 100,000 Hoosiers. Mortality data from the CDC revealed 1,179 Hoosiers died from a drug overdose in 2013; opioids accounted for 334 deaths (5.3 deaths per 100,000 population) with heroin responsible for 149 deaths and other opiates associated with 185 deaths. Cocaine and psychostimulants such as methamphetamine accounted for 54 (0.9 deaths per 100,000) and 30 overdose deaths (0.5 deaths per 100,000) respectively.⁷⁸ Due to the nature of the data, the number of fatal and non-fatal overdoses related to IDU could not be de-

termined. Using our prevalence estimates from the NSDUH along with available mortality rates for injection drug users, we concluded that approximately 624 deaths occurred in the past year among Hoosiers who ever injected drugs.

PREVENTION STRATEGIES

One of the most effective ways to reduce morbidity and mortality associated with IDU is through the use of harm reduction interventions. Harm reduction is a practical public health approach with the specific aim of reducing the negative outcomes connected to IDU. Harm reduction is driven by public health's goals of preventing disease, promoting health and wellbeing, and prolonging life. Harm reduction strategies achieve these goals by placing the overall health, safety, and wellbeing of injection drug users and society over the often difficult to achieve goal of abstinence.⁷⁹ Evidence-based harm reduction interventions for injection drug users include needle/syringe access and exchange programs, opioid substitution therapy (also known as medication-assisted treatment), over-the-counter access to syringes, safer injection facilities, and the use of the overdose-reversing medication Naloxone (Narcan).

Needle Exchange Programs—Needle exchange programs are organizations established at the state or local level which provide injection drug users with access to sterile injecting equipment including not only needles and syringes but also alcohol swabs, tourniquets, sterile water, “cookers”, and cotton filters. Most needle exchange programs also offer many other services such as education on safer injection practices, safe syringe disposal, referrals to drug treatment, mental health services, HIV testing, and condoms among others.⁸⁰ Needle exchange programs have consistently been shown to effectively reduce the frequency of needle sharing among injection drug users without causing an increase in the use of illicit drugs or an increase in injection use by non-injectors,^{81,82} reduce the incidence of HIV infection in injection drug users⁸²⁻⁸⁵ and reduce the risk that injection drug users will contract HCV,⁸⁶⁻⁸⁸ HBV⁸⁶ and other serious infections associated with the use of non-sterile injecting equipment⁸⁹. Injection drug users who attend needle exchange programs may also be more likely to enter drug treatment.⁹⁰ Nationally, there are 228 needle exchange programs operating in 35 states, the District of Columbia, Puerto Rico, and the Indian Nations.⁹¹

Over-The-Counter Access to Syringes—Having syringes available for purchase over-the-counter at pharmacies is another way to reduce the number of injection drug users who inject with used syringes. Increasing access to sterile syringes through additional sources such as pharmacies is associated with decreases in receptive syringe sharing and other unsafe injection practices^{92,93} and lower prevalence and incidence of HIV among injection drug users.⁹⁴

Safer Injection Facilities—Safer injection facilities are a relatively new harm reduction approach. In a safer injection facility, injection drug users consume their pre-obtained illicit drugs under the supervision of health-care professionals who provide sterile syringes and referrals to primary health services, as well as emergency care in case of overdose (e.g., oxygen and naloxone administration). In cases of severe overdose, staff at safer injection facilities are instructed to call emergency medical providers. Only one safer injection facility currently exists in North America. Data from this site indicates that the program has been able to reduce HIV risk behavior, including syringe sharing; increase the use of addiction services; improve access to health and social services, and reduce the number of deaths from overdose.⁹⁵⁻⁹⁹

Opioid Substitution Therapy—Opioid substitution therapy uses medications for treating addiction to opioids such as prescription pain killers and illicit opioids such as heroin. These medications work by interacting with some of the same receptors in the brain that are stimulated by the abused drug. The two most widely used medications in opioid substitution therapy are Methadone and Buprenorphine. Although they work slightly differently, both Methadone and Buprenorphine serve to suppress drug cravings and eliminate the withdrawal symptoms that result from discontinuing use of heroin or other opioids. Methadone can only be dispensed at a Drug Enforcement Agency-registered, SAMHSA-certified outpatient opioid treatment program. Buprenorphine can be distributed by physicians at opioid treatment programs that are authorized to provide Methadone and it can also be prescribed by physicians in office settings who have received proper training and a waiver by the Drug Enforcement Agency.¹⁰⁰

For injection drug users, opioid substitution therapy with either Methadone or Buprenorphine is associated with a significant reduction in injection drug use, frequency of injecting, and in risky injection practices such as sharing needles, sharing drug preparation equipment, and in failing to clean injection equipment with bleach.^{101,102} Injection drug users who engage in Methadone-based opioid substitution therapy are significantly less likely to contract HIV and can reduce their risk of HIV infection by up to 54 percent compared to those who are untreated.^{101,103} Opioid substitution therapy using either Methadone or Buprenorphine can help to protect injection drug users from acquiring HCV.¹⁰⁴ Injection drug users on opioid substitution therapy are over five times less likely to contract HCV and have an incidence rate of new HCV infection that is 60 percent lower than injection drug users not on opioid substitution therapy.^{105,106} Participation

in opioid substitution therapy has also been shown to reduce non-fatal overdoses among injection drug users and decrease their overall risk of death from overdose or other drug-related causes.¹⁰⁷⁻¹⁰⁹

Naloxone—Naloxone is an opioid antagonist medication that has the ability to reverse opioid-related overdoses by displacing opioids from receptors in the brain and stopping their toxic effects. Naloxone's primary side effect is to induce opioid withdrawal; however, it produces no symptoms of dependence or tolerance and can be quickly administered intramuscularly or intranasally.¹¹⁰ During the late 1990s, needle exchange programs and other social service agencies began distributing Naloxone kits to injection drug users as well as to individuals who are at increased risk for witnessing an overdose. As of 2014, 644 organizations in the United States are known to operate Naloxone training and distribution programs. Since 1996, these programs have provided Naloxone to 152,283 laypeople who subsequently reversed 26,463 overdoses.¹¹¹ Among injection drug users, Naloxone availability is associated with significant reductions in overdose mortality rates.^{112,113}

THOUGHTS FOR POLICYMAKERS

There is a dire need for increased substance abuse treatment throughout the United States as well as in Indiana. Nationally, only 20 percent and locally just 15 percent of individuals who needed substance abuse treatment for illicit drug use in 2013 actually received it.^{13,38} According to SAMHSA's substance abuse provider database, 60 percent of Indiana's counties have either no substance abuse treatment provider (15 counties) or only one provider (40 counties) listed. Of the 55 counties with very limited or no substance abuse treatment services, 64 percent (35 counties) are considered rural counties.¹¹⁴ Following published methodology¹¹⁵ and using our estimate of the number of past-year injection drug users in Indiana along with data from the TEDS and the National Survey of Substance Abuse Treatment Services,¹¹⁶ we determined that in 2012, less than one quarter (24.2 percent) of Hoosiers who reported injecting drugs in the past year received treatment. Apart from enhancing access to substance abuse treatment, policy makers need to consider improving access to needle exchange programs, over-the-counter access to syringes, opioid substitution treatment, and Naloxone kits; interventions which lessen the need for risky injection practices, decrease the transmission of illnesses such as HIV and HCV, and reduce other adverse health consequences among injection drug users.

Needle Exchange Programs—Historically, Indiana law has prohibited the operation of needle exchange programs; with only one organization choosing to run such a program in spite of the law.⁹¹ In response to the HIV outbreak in Scott County, Indiana legalized the operation of needle exchange programs, under certain circumstances, with the passage of Senate Enrolled Act (SEA) 461 in May of 2015. Under SEA 461, entities such as local health departments and certain non-profit organizations can operate a needle exchange program under the following conditions.¹¹⁷

- The community is experiencing an epidemic of HIV or HCV
- The primary mode of transmission of HIV or HCV is through IDU
- Other measures to control the epidemic have proven ineffective
- The state health commissioner has declared a public health emergency for the community

SEA 461 imposed other restrictions on needle exchange programs in particular that needle exchange programs cannot be supported through state funds. Since the passage of SEA 461, legal needle exchange programs have been established in Scott, Madison, and Fayette Counties.

While SEA 461 is a move in the right direction, policy makers should consider removing the legal restrictions which prevent needle exchange programs from being established only in the presence of a HIV or HCV epidemic. Allowing counties to create needle exchange programs regardless of whether an epidemic of HIV or HCV exists could help to prevent the development of situations similar to those which occurred in Scott County.

Over-the-Counter Access to Syringes—Indiana allows adults to buy syringes over-the-counter from pharmacies; however, individuals are required to provide identification prior to purchase. Under Indiana law, syringes are considered drug paraphernalia and individuals found in possession of syringes can face criminal prosecution if it is believed they are using or distributing them for the purpose of injecting drugs.¹¹⁸ In order to enhance the effectiveness of non-prescription syringe sales, policy makers should work to remove the requirement that syringe buyers need to provide identifying information in order to obtain syringes. Removing such a requirement may help motivate individuals who inject drugs to purchase syringes without worrying that their identity could become known. Additionally, policy makers need to consider revising Indiana law and remove syringes as items which are considered to be drug paraphernalia. Revising drug paraphernalia laws would allow injection drug users

the freedom to purchase syringes without fear of prosecution and further serve to reduce risky injection behavior and many of the conditions which lead to the transmission of HIV and other blood-borne illnesses.

Opioid Substitution Treatment—In 2012, an estimated 67,900 Hoosiers 12 years of age or older had a diagnosis of opioid abuse or dependence; many of these Hoosiers were likely engaged in injection use.¹¹⁹ Indiana's opioid treatment capacity is limited. SAMHSA's buprenorphine prescriber database indicates that 261 Indiana physicians can provide office-based buprenorphine treatment. Of these physicians, 110 can treat up to 30 people and 151 physicians can treat up to 100 people for a maximum office-based buprenorphine treatment capacity of 18,400 Hoosiers.¹²⁰ During 2013, 9,711 Indiana residents received outpatient opioid treatment in one of Indiana's 14 OTPs; primarily with Methadone (92.3 percent)¹²¹. Jones et al.,¹¹⁹ reported that in 2012, most of Indiana's OTPs (83.3 percent) were operating at or above 80.0 percent of their capacity, making access to treatment difficult for many Hoosiers. Based on current opioid treatment availability there is a difference of 33,900 Indiana residents who potentially need opioid treatment services but may be unable to get them. Indiana policy makers need to propose ways to expand opioid substitution treatment services in order to ensure that all individuals who would benefit from such treatment can access it. Easier access to opioid substitution treatment could limit the number of Hoosiers who transition from oral or intranasal use of opioids to injection use and consequently reduce the potential spread of HIV and HCV, particularly in rural areas where access to opioid treatment is limited. The time, expense, and employment difficulties associated with potentially daily travel to treatment could deter citizens who would benefit from care from seeking it. One alternative model to standard office-based treatment which policy makers should consider supporting is the use of mobile opioid substitution treatment. Mobile treatment could be provided in vans staffed by doctors or other qualified healthcare professionals who travel daily to under-served, rural areas of the state potentially allowing more opioid-dependent individuals to access and receive this vital service. Results from New Jersey, Vermont and Maryland, three states where mobile treatment has been tried, show increases in the number of hard-to-reach injection drug users who have been enrolled and maintained in opioid substitution treatment.¹²²⁻¹²⁵

Naloxone—Until recently, access to Naloxone in Indiana was limited primarily to emergency workers such as police and emergency medical technicians. With the passage of Senate Bill (SB) 406 in April of 2015, anyone in Indiana can legally

administer Naloxone to a friend or family member who is experiencing an opioid overdose. Physicians may prescribe Naloxone to injection drug users at risk of overdose or to anyone who could assist an injection drug user at risk of overdose¹²⁶. Naloxone prescriptions can be filled at any pharmacy. Hoosiers can also obtain Naloxone from approved organizations, such as overdose prevention organizations, that have obtained a standing order from a medical prescriber and registered with the state. Since April 2015, four organizations have been approved.¹²⁷ Anyone receiving Naloxone must be trained to administer it, be instructed to call 911 after administering it, and be given a list of resources for treatment. First responders such as paramedics and police officers can also carry Naloxone.¹²⁶ Currently, 13 law enforcement departments in Indiana provide Naloxone kits to their officers.¹²⁸ Despite the recent advances made in the distribution of Naloxone, individuals who fill Naloxone prescriptions are required to provide identifying information to Indiana's prescription drug monitoring database (INSPECT) even though Naloxone is not a controlled substance. Policy makers should work to lift this requirement in order to allow all individuals who need Naloxone to fill their prescriptions which in turn could significantly reduce the number of opioid-related overdoses and deaths in Indiana.

CONCLUSION

Injection drug use is a significant public health concern for Indiana as evidenced by the recent HIV and HCV epidemic among injection drug users in Scott County. Although HIV and HCV are significant health consequences related to IDU, IDU is also associated with other adverse health outcomes such as overdoses which result in the deaths of several hundred Hoosiers each year. Based on available data it appears that IDU may be increasing in Indiana. If IDU is in fact increasing in Indiana, in order to reverse this trend, prevent future HIV and HCV epidemics among IDU, and reduce the number of deaths related to IDU in the state, policy makers need to consider doing the following: work to increase Hoosiers' access to substance abuse treatment services so that individuals currently addicted to substances, particularly prescription opioids, can receive treatment prior to transitioning to injection use; increase access to opioid substitution treatment which has been shown to effectively reduce the risk of HIV and HCV transmission as well as overdose deaths among injection drug users; and remove stringent restrictions on the implementation of intervention strategies, such as needle exchange programs, that are proven methods for decreasing the spread of blood-borne illnesses and other causes of mortality among injection drug users.

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The mission of the Center for Health Policy is to conduct research on critical health-related issues and translate data into evidence-based policy recommendations to improve community health. The CHP faculty and staff collaborate with public and private partners to conduct quality data driven program evaluation and applied research analysis on relevant public health issues. The Center serves as a bridge between academic health researchers and federal, state and local government as well as healthcare and community organizations.

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Edit and Layout: Lyndy Kouns

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