

Preventing Heroin Use: Facts, Factors, and Strategies

ISSUES BRIEF

Heroin use has increased significantly in the past few years, and it continues to rise. The number of people who die from heroin-related overdoses in the United States is nearly four times what it was a decade ago (National Survey on Drug Use and Health, 2002-2013). Yet despite these alarming numbers, promising research suggests where and how to focus efforts to prevent use and lower heroin-related overdose deaths.

This issues brief is designed to help substance abuse prevention practitioners better understand and prevent this growing problem. Specifically, it provides:

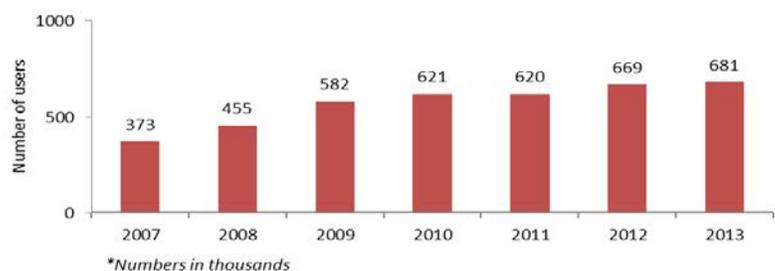
- An overview of recent trends in heroin use and related consequences,
- Information on national, state and local data sources for heroin-related indicators,
- An inventory of research-based risk and protective factors associated with heroin use, and
- Evidence-based strategies for preventing heroin use.

WHY FOCUS ON PREVENTION OF HEROIN USE?

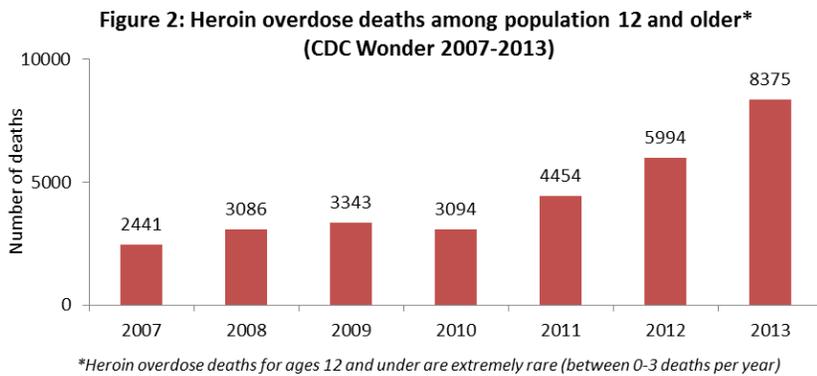
Heroin is a highly potent illegal synthetic opioid that can produce severe consequences like overdose and death. Past-month heroin use is lower (0.4%) than past-month use of other illicit drugs like marijuana (22%) and cocaine (1.5%) (Center for Behavioral Health Statistics and Quality, 2015). However, it is estimated that 23% of people who use heroin become dependent on it, making heroin one of the most addictive drugs (National Institute on Drug Abuse, 2014).

Figure 1 provides estimates on the number of people (in thousands) reporting past-year heroin use between 2007 and 2013. In 2013, approximately 681,000 people age 12 and over reported using heroin in the past year, an 83% increase from 2007.

Figure 1: Past year heroin users* among individuals 12 and over (NSDUH 2007-2013)

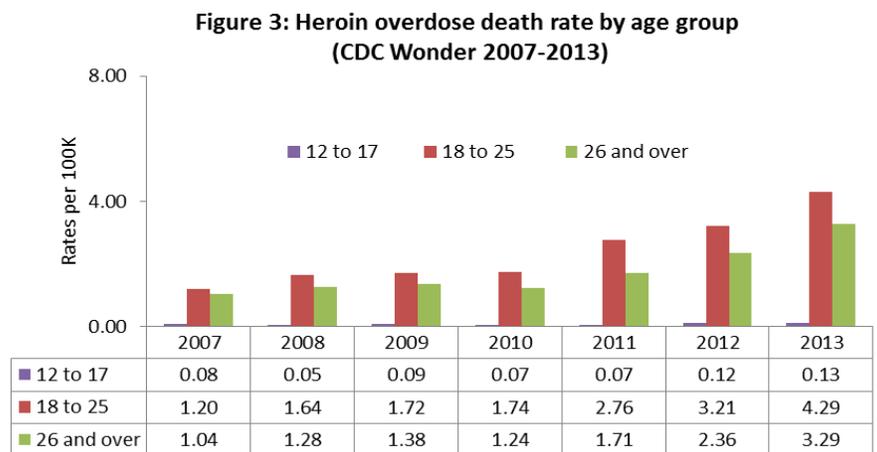


Increased heroin use has led to an alarming increase in heroin-related deaths in recent years. Figure 2 below presents the number of deaths due to heroin overdose between 2007 and 2013 for individuals age 12 and older. In 2013 alone, there were 8,375 deaths reported from heroin overdose; this is more than three times the number of deaths reported in 2007.



When examined by age group, young adults (ages 18 to 25) have the highest rate of heroin overdose deaths. Figure 3 describes heroin overdose death rates (per 100,000) by age groups, from 2007 through 2013. In 2013, the death rate due to heroin overdose among individuals 18 to 25 was 4.29 per 100,000—more than triple the 2007 death rate (1.2 per 100,000).

For further information on heroin use, please refer to SAMHSA’s short report on trends in heroin use at http://www.samhsa.gov/data/sites/default/files/report_1943/ShortReport-1943.html. For further information on heroin overdose deaths, please refer to CDC’s report on heroin epidemic at <http://www.cdc.gov/vitalsigns/heroin/>.



FINDING DATA ON HEROIN-RELATED INDICATORS

There are a number of national sources that provide data on heroin-related indicators. Table 1 below presents a list of key national data sources that provide these data, the heroin-related indicators available from them, level of reporting (e.g., national, state, regional, county), and where to go for more information. New data or data reports are typically released annually.

Table 1: National data sources for heroin-related indicators

Data Source	Indicators	Level of Reporting	Link
National Vital Statistics System Mortality Data (NVSS-M)	<ul style="list-style-type: none"> Number of deaths due to heroin overdose, dependence, and abuse 	National, state, county	http://www.cdc.gov/ncs/deaths.htm

Data Source	Indicators	Level of Reporting	Link
Poison Control Centers	<ul style="list-style-type: none"> Number of heroin-related overdose calls 	Regional, state	http://www.aapcc.org/data-system/
Treatment Episode Data Sets (TEDS)	<ul style="list-style-type: none"> Number of admissions involving heroin Number of admissions for heroin as the primary drug 	National, state	https://www.samhsa.gov/data/data-we-collect/teds-treatment-episode-data-set
Uniform Crime Report (UCR)	<ul style="list-style-type: none"> Number of arrests for robberies, burglaries, property, violent crimes, and drug law violations 	National, state, county	http://www.fbi.gov/about-us/cjis/ucr/ucr
National Survey on Drug Use and Health (NSDUH)	<ul style="list-style-type: none"> Lifetime, past-year, and past-month use of heroin (ages 12-17, 18-25, 26 or older) Perception of great risk associated with heroin, by age group Drove while under the influence of medication and/or drug 	National, state	https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health
Monitoring the Future (MTF)	<ul style="list-style-type: none"> Lifetime, past-year, past-month use of heroin (among 8th, 10th, and 12th graders) Perception of harmfulness of heroin use 	National	http://www.monitoringthefuture.org/

While the sources presented in Table 1 provide a wealth of information to describe heroin use at the national, state, and regional levels, they are less useful sources of community-level data. Only a few of these sources provide county-level data, and the indicator estimates available from them are often unstable or suppressed given the low case counts.

To address these data gaps, communities may find it helpful to connect with the following agencies or departments in their respective states, jurisdictions, or tribes, as many routinely collect relevant information:

- Substance abuse and mental/behavioral health agencies
- Department of health/public health
- Hospitals and emergency rooms
- Medical examiner or coroner's office
- Prescription drug monitoring programs
- Police departments and drug courts

Communities may also consider collecting data from qualitative sources, such as case studies, focus groups, and key informant interviews. Qualitative data can help communities understand the local nature of their heroin problems by providing insight into behavior trends and perceptions.

For more information on local data source and qualitative data collection methods, visit the SAMHSA website.

WHAT RISK AND PROTECTIVE FACTORS ARE ASSOCIATED WITH HEROIN USE?

Research suggests that dependence on, or abuse of, opioid pain relievers is the strongest risk factor for heroin abuse or dependence (Jones et al., 2015), with many heroin users reporting nonmedical use of opioid pain relievers prior to initiating heroin use (Jones, 2013; Muhuri, Gfroerer, & Davies, 2013). Because of this strong connection, it is important to consider risk and protective factors related to the nonmedical use of prescription drugs when assessing where and how to focus heroin prevention efforts. In this area, research demonstrates that the following characteristics put individuals at increased risk:

- Experiencing mental health disorders (i.e., depression, anxiety, high attentional impulsivity, suicidal ideation) is associated with increased risk for prescription opioid misuse and/or dependence (Boscarino et al., 2010; Edlund, Steffick, Hudson, Harris, & Sullivan, 2007; Ford & Rigg, 2015; Grattan, Sullivan, Saunders, Campbell, & Von Korff, 2012; Koyyalagunta et al., 2013; Marino et al., 2013; Mowbray & Quinn, 2015; Rhoades, Winetrobe, & Rice, 2014).
- Experiencing and having a high level of pain or chronic pain is associated with prescription opioid misuse (Cepeda, Fife, Kihm, Mastrogiovanni, & Yuan, 2014; Edlund et al., 2007; Sullivan et al., 2010; Rosenblum et al., 2007).
- Having a previous history of alcohol or other drug use and/or abuse increases the likelihood of opioid misuse and/or addiction (Arkes & Iguchi, 2008; Boscarino et al., 2010; Edlund et al., 2010; Matzger & Weisner, 2007; Novy et al., 2012).
- Having poor health, illness, or injury is related to opioid misuse and abuse (Edlund et al., 2007; Jeffrey, Babeu, Nelson, Kloc, & Klette, 2013; Green, Black, Serrano, Budman & Butler, 2011).
- Genetic and physiological reactions are associated with increased use, abuse and/or addiction (Bieber et al., 2008; Gelernter et al., 2014; Harlé et al., 2014).
- Youth between the ages of 12 to 17 who associate with peers that misuse drugs are at increased risk for prescription drug misuse (Collins, Abadi, Johnson, Shamblen, & Thompson, 2011; Ford & Rigg, 2015; Schroeder & Ford, 2012).
- Experiencing discrimination has been associated with increased prescription drug misuse (Gee, Delva & Takeuchi, 2007)

There also exist factors that have been shown to buffer and protect against prescription drug misuse. For example:

- Having a long-acting opioid prescription, a lower dosage prescription, or only being prescribed Schedule III or IV opioids is associated with lower misuse, abuse, and dependence (Edlund et al., 2010; Sullivan et al., 2010).
- Committing to do well in school and achieving high school and college degrees are protective against prescription drug misuse and abuse (Collins et al., 2011; Arkes & Iguchi, 2008).
- Attending a prevention class is associated with less misuse (Ford & Rigg, 2015).
- Having greater perception of substance abuse risks prevents opioid misuse (Ford & Rigg, 2015)
- Youth who have a strong parental bond (Schroeder & Ford, 2012) and have parents who disapprove of misuse (Collins et al., 2011) are less likely to misuse prescription drugs.
- The presence of a Gay-Straight Alliance (GSA) in school protects sexual minority youth from misusing prescription drugs (Heck et al., 2014).
- Community norms against use is associated with lesser prescription drug misuse (Collins et al., 2011)

Finally, research has identified several factors that place people at increased risk for heroin use, in particular. Examples include the following:

- Personality characteristics, such as cynicism, or a high level of anger toward self and others, are associated with heroin being the “drug of choice” (Suh et al., 2008).
- Early onset of tobacco and other drug use has been associated with past-year heroin use (Wu & Howard, 2007), heroin initiation (Martins et al., 2007), and opiate use (Storr et al., 2005).
- History of poly-drug use, especially combined inhalant and marijuana use, is linked to past-year heroin use (Wu & Howard, 2007).
- Having ever been in jail or a detention center is associated with past-year heroin use (Wu & Howard, 2007).
- Engaging in multiple delinquent behaviors (i.e., getting into serious fights at school or work, engaging in group fighting, carrying guns, selling illicit drugs, stealing, or attacking someone with intent to seriously injure) makes someone more likely to have engaged in past-year heroin use (Wu & Howard, 2007).
- Ability to access heroin-using social networks makes a person more likely to have used heroin in the past six months (Rudolph, Jones, Latkin, Crawford, & Fuller, 2011).

- Having experienced a history of child abuse (sexual, physical or emotional) is associated with heroin initiation, past-year heroin use (Nomura et al., 2012), and the number of years of lifetime heroin use (Malow et al., 2006).
- Dropping out of school, participating in delinquent behaviors, or having a history of foster care placements increases the chances of past-year heroin injection use (Wu & Howard, 2007)
- Experiencing depression or having a network of injecting drug users increases the likelihood of engaging in injection heroin use (Kuramoto, Bohnert, & Latkin, 2011).

While the research predominately focuses on risk, one study identified the following factors that protect against heroin use::

- Having high IQ scores or high socioeconomic status is associated with less habitual heroin use (White et al., 2012)

Once a person has begun using heroin, additional factors place them at risk for overdose. Some examples include the following:

- Being homeless and having a long history of injection drug use increases the likelihood of experiencing a nonfatal heroin overdose during a lifetime (Sherman, Cheng, & Kral, 2007).
- Using heroin in a public space or residing in a large city has been associated with an increase in overdose death (Green, Grau, Carver, Kinzly, & Heimer, 2011).
- Recently injecting drugs, being incarcerated, poly-drug use, testing positive for hepatitis, or having witnessed an overdose increases risk of past-year-nonfatal overdose (Ochoa et al., 2005).
- Decreases in the cost of heroin and increases in availability are associated with increased heroin overdose hospitalizations (Unick, Roseblum, Mars, & Ciccarone, 2014).

WHAT WE CAN DO TO PREVENT HEROIN USE AND OVERDOSE

Strategies to reduce and prevent heroin use and its consequences fall into three “umbrella” categories: those that focus on preventing prescription drug misuse; those that focus on preventing illicit drug use, overall; and those that focus on preventing heroin use. Examples of each are provided below, drawing on a list of strategies originally developed by the Centers for Disease Control and Prevention (CDC, 2015). The strategies in green type are those included in national registries of evidence-based programs; these contain a hyperlink to the strategy in the registry or to a dedicated website.

Strategies to prevent the non-medical use of prescription drugs. Prescription drug misuse is the greatest risk factor for heroin use. Research suggests that the following programs and strategies may be effective at preventing the non-medical use of prescriptions drugs:

- *Project Lazarus* (Albert et al., 2011). This four- component model developed in North Carolina includes coalition building; epidemiological surveillance; prescriber, patient, and law enforcement training and education; and enhancing access to naloxone¹.
- *Prescription drug monitoring programs* (Reifler et al., 2012; Reisman, Shenoy, Atherly, & Flowers, 2009; Simeone & Holland, 2006). These programs establish an electronic database that tracks the prescribing and dispensing of opioid analgesics and other controlled substances.
- *Prescriber education* (Cochella & Bateman, 2011). These trainings and materials educate prescribers on the benefits and risks of prescribing opioids, including strategies to prevent abuse while maintaining legitimate and appropriate access to opioids.
- *Communities that Care* (Hawkins et al., 2009). This is a community-based prevention system designed to improve the abilities of communities to respond to youth problem behaviors.
- *Triplicate Prescription Programs* (Pearson et al., 2006). These programs require physicians to issue prescriptions for certain controlled substances using multiple copy forms, with the extra copies retained for record-keeping purposes or submitted to monitoring agencies.
- *Think Smart* (Johnson, Shamblen, Ogilvie, Collins, & Saylor, 2009). This weekly, school-based curriculum for 5th and 6th graders focuses on reducing risk factors (i.e., perception of harm) and increasing protective factors (i.e., assertiveness skills) in order to reduce use of harmful legal products.
- *Prescription drug abuse deterrent formulation packaging* (Cicero, Ellis, & Surratt, 2012). This approach involves changing prescription drug formulations to inhibit abusive properties (e.g., developing pills that can't be crushed, adding an active ingredient that reduces or prevents the "high" associated with abuse).
- *Prescription Pain Medication Program* (Johnson, Porucznik, Anderson, & Rolfs, 2011). Developed in Utah, this statewide social marketing campaign uses the slogan, "Use Only As Directed" to encourage safe use, safe storage, and safe disposal of prescription medication.
- *Strengthening Families Program: For Parents and Youth 10–14* (Spoth et al., 2013). This school-based intervention strengthens risk and protective factors related to substance abuse among school-age youth and their families.
- *Patient review and restriction programs or "lock-in" programs* (Blake, 1999; Chinn, 1985; Mitchell, 2009). These programs enable public and private insurers to restrict patients suspected of prescription drug abuse or misuse to a single designated provider and/or pharmacy.

¹ Naloxone is a medical treatment used to reverse opiate effects and avert overdose (Chamberlain & Klein, 1994)

- *State-level opioid dosing guidelines* (Franklin et al., 2012). These guidelines are designed to educate and help prescribers adhere to best practices when prescribing opioids.

Strategies to prevent illicit drug use. Because heroin is an illicit drug, evidence-based universal² prevention programs that prevent initiation of illicit drug use, in general, can be effective in preventing heroin use and abuse. Examples of these include the following:

- *LifeSkills Training (LST)*. This school-based program addresses multiple risk and protective factors by promoting personal and social skills-building resilience
- *Good Behavior Game*. This classroom-based behavior management strategy for elementary school teachers is designed to socialize children and reduce disruptive classroom behavior.
- *Project SUCCESS (Schools Using Coordinated Community Efforts to Strengthen Students)*. This multi-component program youth relies on educational sessions, individual/group counseling, parent educational sessions, and referrals to treatment to reduce and prevent substance use among high-risk students.
- *Residential Student Assistance Program*. This program prevents and reduces alcohol and other drug use among high-risk multi-problem youth (ages 12 to 18) who reside in a residential facility.
- *Project Venture*. This outdoor experiential youth development program for Native American youth aims to develop social and emotional competence.
- *Promoting School-Community-University Partnerships to Enhance Resilience (PROSPER)*. This program links land-grant university researchers and experts with community organizations to develop and support youth substance abuse prevention programming.

Strategies to prevent heroin overdose. For individuals already using heroin, programs exist that attempt to reduce death from overdose. Examples include the following:

- *The MORE Project* (Bowser, Jenkins-Barnes, Dillard-Smith, & Lockett, 2010). This program promotes harm reduction among current heroin users through street outreach, risk-reduction education, discussion sessions, and psychological counseling.
- *Overdose education and naloxone distribution programs* (OEND; Doe-Simkins et al., 2014; Green, Heimer, & Grau, 2008; Jones, Roux, Stancliff, Matthews, & Comer, 2014; Kerr, Kelly, Dietze, Jolley, & Barger, 2009; Walley et al., 2013). These programs expand education and access to antidotes that can reduce mortality from overdose.

² Strategies that focus on the general public or the whole population

REFERENCES

- Albert, S., Brason, F. W., 2nd, Sanford, C. K., Dasgupta, N., Graham, J., & Lovette, B. (2011). Project Lazarus: Community-based overdose prevention in rural North Carolina. *Pain Med, 12 Suppl 2*, S77-85. doi: 10.1111/j.1526-4637.2011.01128.x
- Blake, S.G. (1999). Drug expenditures: The effect of the Louisiana Medicaid lock-in on prescription drug utilization and expenditures. *Drug Benefit Trends*.
- Bowser, B. P., Ryan, L., Smith, C. D., & Lockett, G. (2008). Outreach-based drug treatment for sex trading women: The Cal-Pep risk-reduction demonstration project. *International Journal of Drug Policy, 19*(6), 492-495. doi: 10.1016/j.drugpo.2007.07.007
- Center for Behavioral Health Statistics and Quality. (2015). *Behavioral health trends in the United States: Results from the 2014 National Survey on Drug Use and Health (HHS Publication No. SMA 15-4927, NSDUH Series H-50)*. Retrieved from <http://www.samhsa.gov/data/sites/default/files/NSDUH-FRR1-2014/NSDUH-FRR1-2014.pdf>
- Centers for Disease Control and Prevention (CDC). (2015). Today's heroin epidemic: More people at risk, multiple drugs abused. *CDC Vital Signs*. Retrieved September 14, 2015 from: <http://www.cdc.gov/vitalsigns/pdf/2015-07-vitalsigns.pdf>
- Chamberlain, J. M., & Klein, B. L. (1994). A comprehensive review of naloxone for the emergency physician. *American Journal of Emergency Medicine, 12*, 650 – 660.
- Chinn, F. J. (1985). Medicaid recipient lock-in program— Hawaii's experience in six years. *Hawaii Medical Journal, 44*(1), 9–18.
- Cicero, T. J., Ellis, M. S., & Surratt, H. L. (2012). Effect of abuse-deterrent formulation of OxyContin. *New England Journal of Medicine, 367*(2), 187-189. doi: doi:10.1056/NEJMc1204141
- Cochella, S., & Bateman, K. (2011). Provider detailing: an intervention to decrease prescription opioid deaths in Utah. *Pain Med, 12 Suppl 2*, S73-76. doi: 10.1111/j.1526-4637.2011.01125.x
- Doe-Simkins, M., Quinn, E., Xuan, Z., Sorensen-Alawad, A., Hackman, H., Ozonoff, A., & Walley, A. Y. (2014). Overdose rescues by trained and untrained participants and change in opioid use among substance-using participants in overdose education and naloxone distribution programs: A retrospective cohort study. *BMC Public Health, 14*, 297. doi: 10.1186/1471-2458-14-297
- Franklin, G. M., Mai, J., Turner, J., Sullivan, M., Wickizer, T., & Fulton-Kehoe, D. (2012). Bending the prescription opioid dosing and mortality curves: Impact of the Washington State opioid dosing guideline. *American Journal of Industrial Medicine, 55*(4), 325-331.
- Green, T. C., Heimer, R., & Grau, L. E. (2008). Distinguishing signs of opioid overdose and indication for naloxone: an evaluation of six overdose training and naloxone distribution programs in the United States. *Addiction, 103*(6), 979-989. doi: 10.1111/j.1360-0443.2008.02182.x
- Hawkins, J. D., Oesterle, S., Brown, E. C., Arthur, M. W., Abbott, R. D., Fagan, A. A., & Catalano, R. F. (2009). Results of a type 2 translational research trial to prevent adolescent drug use and delinquency: A test of Communities That Care. *Archives of pediatrics & adolescent medicine, 163*(9), 789-798. doi: 10.1001/archpediatrics.2009.141.
- Johnson, E. M., Porucznik, C. A., Anderson, J. W., & Rolfs, R. T. (2011). State-level strategies for reducing prescription drug overdose deaths: Utah's prescription safety program. *Pain Medicine, 12*(Suppl 2), S66-S72. doi: 10.1111/j.1526-4637.2011.01126.x

- Johnson, K. W., Shamblen, S. R., Ogilvie, K. A., Collins, D., & Saylor, B. (2009). Preventing youths' use of inhalants and other harmful legal products in frontier Alaskan communities: A randomized trial. *Prevention science : the official journal of the Society for Prevention Research*, 10(4), 298-312. doi: 10.1007/s11121-009-0132-2
- Jones, C.M. (2013). Heroin use and heroin use risk behaviors among nonmedical users of prescription opioid pain relievers – United States, 2002-2004 and 2008-2010. *Drug and Alcohol Dependence*, 132, 95-100.
- Jones, C. M., Logan, J., Gladden, R. M., & Bohm, M. K. (2015). Vital signs: Demographic and substance use trends among heroin users – United States, 2002-2013. *Morbidity and Mortality Weekly Report*, 64(26), 719-725.
- Jones, J. D., Roux, P., Stancliff, S., Matthews, W., & Comer, S. D. (2014). Brief overdose education can significantly increase accurate recognition of opioid overdose among heroin users. *The International Journal on Drug Policy*, 25(1), 166–170. doi:10.1016/j.drugpo.2013.05.006
- Kerr, D., Kelly, A.-M., Dietze, P., Jolley, D., & Barger, B. (2009). Randomized controlled trial comparing the effectiveness and safety of intranasal and intramuscular naloxone for the treatment of suspected heroin overdose. [Article]. *Addiction*, 104(12), 2067-2074. doi: 10.1111/j.1360-0443.2009.02724.x
- Malow, R. M., et al. (2006). History of traumatic abuse and HIV risk behaviors in severely mentally ill substance abusing adults. *Journal of Family Violence*, 21(2), 127-135.
- Martins, S. S., et al. (2007). Pathways between ecstasy initiation and other drug use. *Addictive Behaviors*, 32(7), 1511-1518.
- Mitchell, L. (2009). Pharmacy lock-in program promotes appropriate use of resources. *Oklahoma State Medical Association Journal*, 102(8): 276.
- Muhuri, P. K., Gfroerer, J. C., & Davies, M. C. (2013). Associations of nonmedical pain reliever use and initiation of heroin use in the United States. Center for Behavioral Health Statistics and Quality (CBHSQ) Data Review, Substance Abuse Mental Health Services Administration (SAMHSA). Retrieved September 14, 2015 from <http://archive.samhsa.gov/data/2k13/DataReview/DR006/nonmedical-pain-reliever-use-2013.pdf>.
- National Institute on Drug Abuse (2014). *DrugFacts: Heroin*. Retrieved from <http://www.drugabuse.gov/publications/drugfacts/heroin> on November 20, 2015
- Nomura, Y., et al. (2012). Life-time risk for substance use among offspring of abusive family environment from the community. *Substance Use & Misuse*, 47(12), 1281-1292.
- Pearson, S. A., Soumerai, S., Mah, C., Zhang, F., Simoni-Wastila, L., Salzman, C., ... & Ross-Degnan, D. (2006). Racial disparities in access after regulatory surveillance of benzodiazepines. *Archives of Internal Medicine*, 166(5), 572-579.
- Reifler, L. M., Droz, D., Bailey, J. E., Schnoll, S. H., Fant, R., Dart, R. C., & Bucher Bartelson, B. (2012). Do prescription monitoring programs impact state trends in opioid abuse/misuse? *Pain Medicine*, 13(3), 434-442. doi: 10.1111/j.1526-4637.2012.01327.x
- Reisman, R. M., Shenoy, P. J., Atherly, A. J., & Flowers, C. R. (2009). Prescription opioid usage and abuse relationships: An evaluation of State Prescription Drug Monitoring Program efficacy. *Substance Abuse: Research and Treatment*, 3, 41-51.
- Rudolph, A. E, Jones, K.C., Latkin, C., Crawford, N.D., & Fuller, C.M. (2011). The association between parental risk behaviors during childhood and having high risk networks in adulthood. *Drug and Alcohol Dependence*, 118(2-3), 437-443.
- Simeone, R. & Holland, L. (2006). *An evaluation of prescription drug monitoring programs*. Washington, DC: U.S. Department of Justice, Office of Justice Programs. Retrieved February 20, 2015, from <http://www.simeoneassociates.com/simeone3.pdf>

- Spoth, R., Redmond, C., Shin, C., Greenberg, M., Clair, S., & Feinberg, M. (2007). Substance-use outcomes at 18 months past baseline: The PROSPER community-university partnership trial. *American Journal of Prevention Medicine* 32(5), 395-402. Retrieved March 3, 2015, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2869212/>
- Spoth, R., Trudeau, L., Shin, C., Ralston, E., Redmond, C., Greenberg, M., & Feinberg, M. (2013). Longitudinal effects of universal preventive intervention on prescription drug misuse: Three randomized controlled trials with late adolescents and young adults. *American Journal of Public Health*, 103(4), 665-672. doi: 10.2105/10ajph.2012.301209
- Storr, C. L., et al. (2005). Early onset inhalant use and risk for opiate initiation by young adulthood. *Drug and Alcohol Dependence*, 78(3), 253-261.
- Suh, J. J., et al. (2008). Self-medication hypothesis: Connecting affective experience and drug choice. *Psychoanalytic Psychology*, 25(3), 518-532.
- Walley, A. Y., Xuan, Z., Hackman, H. H., Quinn, E., Doe-Simkins, M., Sorensen-Alawad, A., . . . Ozonoff, A. (2013). Opioid overdose rates and implementation of overdose education and nasal naloxone distribution in Massachusetts: Interrupted time series analysis. *BMJ*, 346. doi: 10.1136/bmj.f174
- White, J., et al. (2012). Cognitive ability in early adulthood as a predictor of habitual drug use during later military service and civilian life: The Vietnam Experience Study. *Drug and Alcohol Dependence* 125(1-2), 164-168.
- Wu, L. T. & Howard, M.O. (2007). Is inhalant use a risk factor for heroin and injection drug use among adolescents in the United States? *Addictive Behaviors*, 32(2), 265-281.