



## Polypharmacy Among Prescription Drug Users

### SUMMARY

- Polypharmacy – the use of multiple medications within a given period – is common in the United States.
- Although polypharmacy as a result of legitimate management of a medical condition is an important topic, the focus of this issue brief is on polypharmacy as an aspect of prescription drug misuse.
- Misuse of prescription opioids has been associated with use of illicit drugs, especially heroin. Results from recent studies showed that almost one-half of heroin-injecting individuals abused prescription opioids before switching to heroin.
- Misuse of multiple drugs can lead to adverse effects including addiction; drug-drug interactions; and overdose, potentially resulting in death.
- Fatal overdose is the most severe consequence of multiple-drug use. A large share of drug-related deaths is attributable to opioids (both prescription and illegal) and also involve multiple substances, primarily opioids and benzodiazepines.
- Polypharmacy is also not uncommon in Indiana; almost 84% of prescription drug misusers receiving substance abuse treatment reported using at least one additional substance, most commonly alcohol or marijuana.

### WHAT IS POLYPHARMACY?

Polypharmacy – the use of multiple medications within a given period - is common in the United States [1]. While there is no universal definition, polypharmacy is generally determined based on either the number of medications involved or whether the usage of the medications is deemed unnecessary [2, 3]. Polypharmacy is frequently an indicator or consequence of prescription drug abuse; however, it can also simply refer to individuals dealing with multiple health conditions who require a variety of medications.

An analysis of a nationally representative multi-year survey showed that over half of all U.S. adults (about 117 million individuals)

were being treated for a minimum of two chronic diseases [4]. Every year about one-third of all the prescribed medications in the United States are consumed by the elderly [5]. Also, a study of Medicaid-dependent youths indicated that up to 50% of children in outpatient settings and 85% in inpatient and residential settings were prescribed two or more medications [6, 7]. Polypharmacy, regardless of whether it is the result of legitimate treatment or prescription drug abuse, can have significant negative consequences, such as adverse drug reactions, drug-drug interactions, and other complications [3]. Although polypharmacy as a result of legitimate management of a medical condition is an important topic, the focus of this

issue brief is on polypharmacy as an aspect of prescription drug abuse.

**PRESCRIPTION DRUG MISUSE**

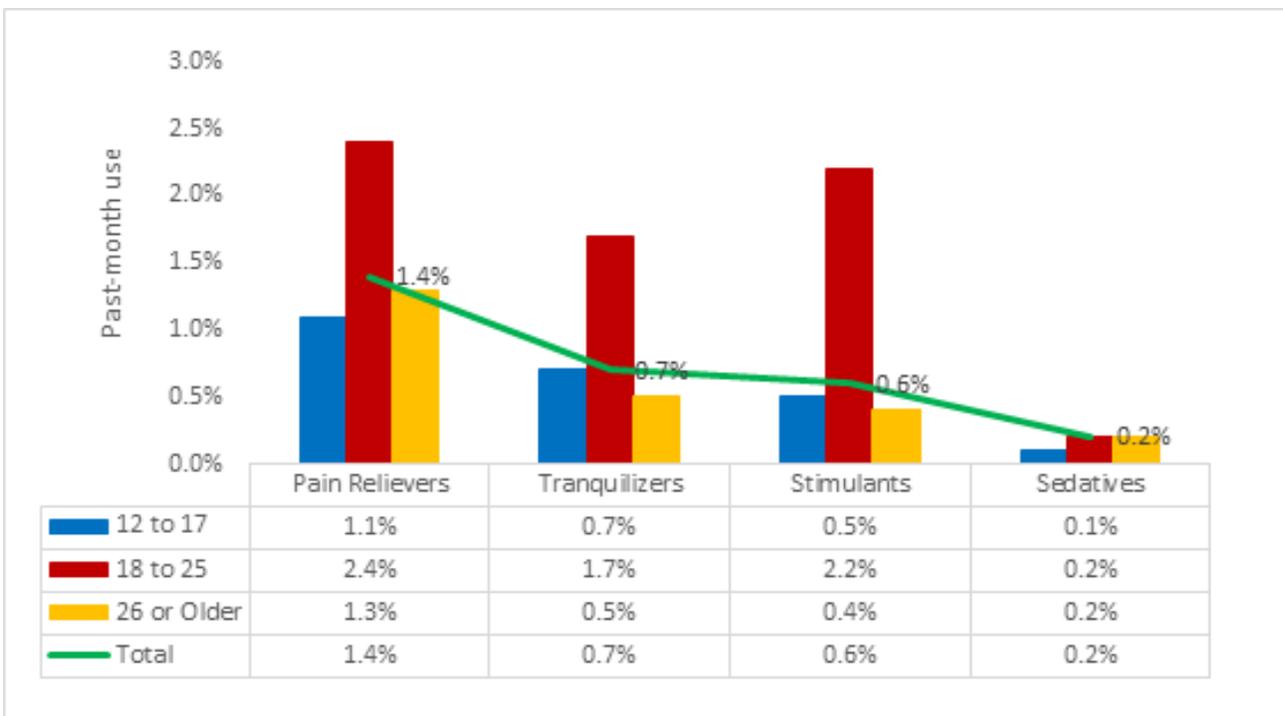
Prescription drug misuse has several definitions, but all of them describe it as the deliberate use of prescribed medications possessing intoxicating or mood-altering effects, in manners or for purposes different from those intended by the prescription providers [8, 9]. Prescription drugs are misused for various reasons, including to induce euphoria, alter mental states, or increase physical performance. Though prescription drugs are frequently viewed as “safe,” abuse of these pharmaceuticals can result in dependence and addiction [10-12].

One of the reasons for the rise in prescription drug abuse, particularly prescription pain relievers (opioid analgesics), is the accessibility of

these medications. From 1991 to 2010, the number of prescriptions for pain-related treatment jumped from 30 million to 180 million – a six-fold increase [11]. Many individuals who abuse prescription drugs report obtaining them from family members or friends for whom the drugs were prescribed [13, 14]. Furthermore, the prescription drug abuse epidemic is linked to a lack of consumer knowledge about the addictive effects of these medications. Once they are prescribed by physicians, many patients readily classify them differently from illegal drugs, and assume that little or no risk is involved in taking them [10].

More than 52 million Americans reported having abused prescription drugs at some point in their lifetime [9, 15]. According to findings from the National Survey on Drug Use and Health (NSDUH), pain relievers were the most commonly

**Figure 1: Past-month misuse of prescription pain relievers, tranquilizers, stimulants, and sedatives among the U.S. population ages 12 or older, by age group (National Survey on Drug Use and Health, 2015)**



Source: Center for Behavioral Health Statistics and Quality, 2016

abused prescription drug category. Young adults ages 18 to 25 years had the highest prevalence rates of prescription drug abuse across all categories (Figure 1) [15].

Pain reliever abuse has been identified as the second most common type of drug use in the United States, behind marijuana use [16], frequently leading to visits to emergency departments, substance abuse treatment admissions, and fatal overdoses [17, 18].

The progression from prescription drug use to abuse and addiction is based on different factors such as individual vulnerability (e.g., genetics, certain medical disorders), age, gender, and ease of access [12, 19, 20]. Studies have found that medical use of prescription drugs, especially pain relievers, is associated with an increased risk of subsequent illicit use of the drug [21]. Safe initial use of these pharmaceuticals tends to lower the user's perceived risk, and therefore, encourages subsequent usage [22]. Furthermore, opioid analgesics affect the brain by not only producing both pain relief and euphoria, but also concurrently forming a link between the brain's receipt of the drugs and their perceived effects [23]. This conditioning can lead to uncontrollable cravings for the drugs' effects, whether for pain relief or euphoria. Medical users of prescription opioids for pain management are vulnerable to this; the use of prescription opioids often leads to unintended consequences, including physical dependence and addiction [24]. Physical dependence is a physiological response to regular use of a psychoactive substance, in which the body requires more and more of the drug to achieve the same effect (tolerance) and abrupt cessation of use leads to drug-specific physical and mental withdrawal symptoms. Addiction is the compulsive and continued use of a drug despite harmful consequences. Though dependence is not the same as addiction, it generally is a feature of

addiction [25].

Abuse of prescription opioids has been associated with use of illicit drugs, especially heroin. Results from recent studies showed that almost one-half of heroin-injecting individuals abused prescription opioids before switching to heroin. One of the reasons mentioned for switching was that heroin was cheaper and easier to obtain than prescription medications [26].

### **POLYPHARMACY IN INDIANA'S SUBSTANCE ABUSE TREATMENT POPULATION**

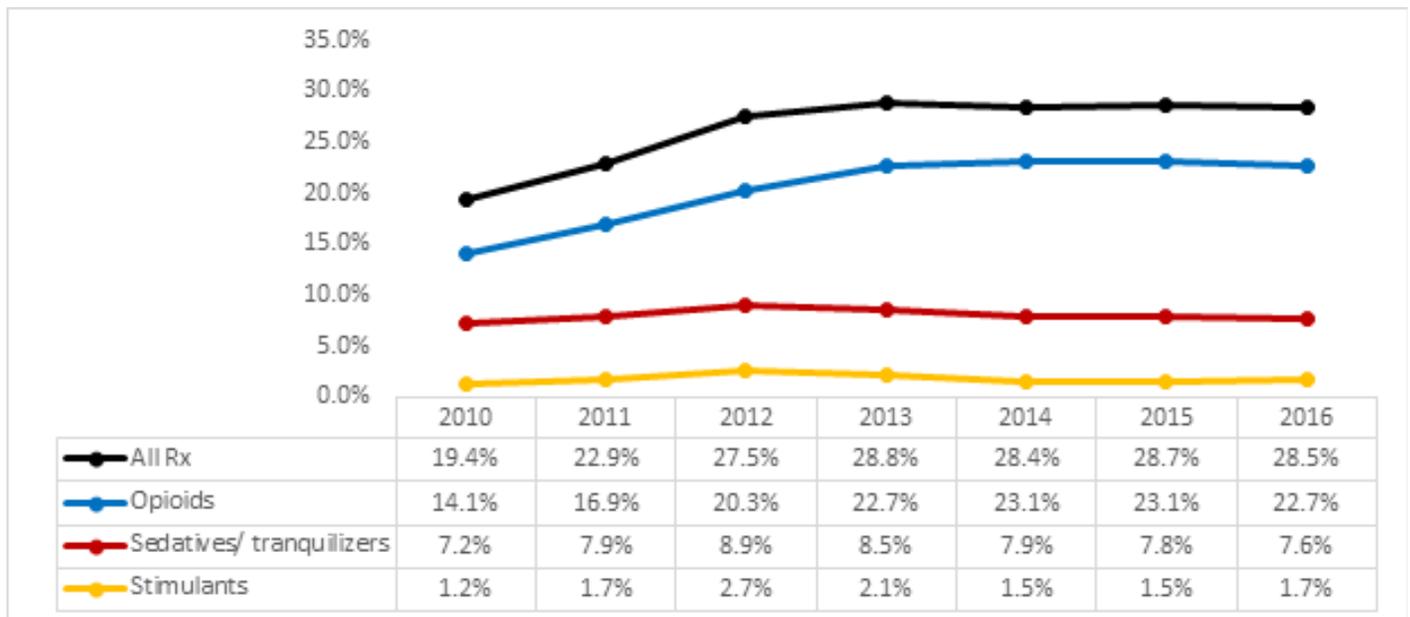
The following analyses are based on information from Indiana's Treatment Episode Data Set (TEDS). State law requires publicly funded drug treatment programs to routinely collect information on the number and characteristics of persons admitted to their programs and report these data to the Indiana Family and Social Services Administration's Division of Mental Health and Addiction. TEDS records represent admissions rather than individuals; individuals may be admitted to treatment more than once in a given year. Several limitations of the data have been identified. Only publicly funded substance abuse treatment providers are required to collect and submit client information. Additionally, Indiana only collects data on clients that are at or below the 200% federal poverty level. Hence, findings presented in this report may not be representative of the state's entire treatment population.

The nonmedical use of prescription drugs increased in Indiana's treatment population from 19.4% in 2010 to 28.5% in 2016. This increase was primarily driven by the rise in the misuse of opioid medications (Figure 2). The problematic use of multiple drugs was particularly evident in this population group. Use of two or more substances was reported in 83.6% of prescription drug mis-

ers, compared to 54.0% of the rest of the substance abuse treatment population. Overall, marijuana and alcohol were the most commonly co-used

substances among prescription drug misusers (see Table 1 for a detailed list of the most frequently co-used drugs).

**Figure 2: Percentage of Indiana treatment admissions reporting nonmedical use of prescription drugs, by drug category (TEDS, 2010-2016)**



Source: Indiana Division of Mental Health and Addiction, 2017

**CONSEQUENCES OF POLYPHARMACY**

Prescription drugs that are used illicitly, especially when combined with other drugs, pose significant health risks, potentially leading to harmful or even lethal outcomes [8, 27]. Polypharmacy has been linked to greater drug-related problems compared to single drug use [28, 29] and is associated with poorer mental health, including psychological distress, anxiety, and depression [30]; risk-taking behaviors [31, 32]; and suicide attempts [33].

Drugs, whether illicit or pharmaceutical, are responsible for 90% of all poisoning deaths in the nation [34], and drug overdose mortality

rates have increased significantly from 12.3 per 100,000 population in 2010 to 16.3 in 2015 [35]. The top 10 drugs involved in overdose deaths include opioids (fentanyl, heroin, hydrocodone, methadone, morphine, and oxycodone), benzodiazepines (alprazolam and diazepam), and stimulants (cocaine and methamphetamine) [12]. Prescription pain medications account for much of the surge in drug-poisoning or overdose deaths. In 2015, 63.1% (33,091) of the 52,404 deaths from drug overdoses in the United States involved an opioid; this represents an increase of nearly 5,000 opioid-based fatalities from the previous year

[35]. According to a study by Warner et al., almost half (48%) of the drug overdose deaths in 2014 involved multiple drugs [12].

In Indiana, the number of fatal drug overdoses increased substantially over the past years, resulting in at least 1,236 deaths in 2015; though contributing drug(s) were not always identified. Of the deaths where at least one specific drug was identified, prescription opioids contributed to 274

deaths and heroin to 239 in 2015 (Figure 3). In addition to the deaths, there were 1,430 nonfatal hospitalizations due to opioid overdoses in 2015, and more than 11,000 nonfatal emergency department visits due to opioid overdoses between 2011 and 2015 (ISDH, 2016). It is important to note that a large part of these overdoses, fatal or otherwise, likely resulted from use of multiple drugs [12].

**Table 1: Co-use of prescription drugs and other substances in Indiana’s treatment population (TEDS, 2010-2016)**

Co-use of other drugs among patients reporting misuse of prescription opioids <sup>1</sup>	
Marijuana	37.6%
Alcohol	29.2%
Prescription sedative/tranquilizers	16.3%
Heroin	15.4%
Methamphetamine	12.9%
Cocaine	12.9%
Prescription stimulants	10.6%

Source: Indiana Division of Mental Health and Addiction, 2017

Co-use of other drugs among patients reporting misuse of prescription stimulants <sup>3</sup>	
Marijuana	37.2%
Alcohol	30.8%
Prescription opioids	20.8%
Cocaine	18.5%
Heroin	18.3%
Methamphetamine	10.8%
Prescription sedative/tranquilizers	10.6%

Source: Indiana Division of Mental Health and Addiction, 2017

Co-use of other drugs among patients reporting misuse of prescription sedatives/tranquilizers <sup>2</sup>	
Marijuana	43.9%
Prescription opioids	41.9%
Alcohol	36.0%
Heroin	14.8%
Methamphetamine	13.4%
Cocaine	6.7%
Prescription stimulants	2.4%

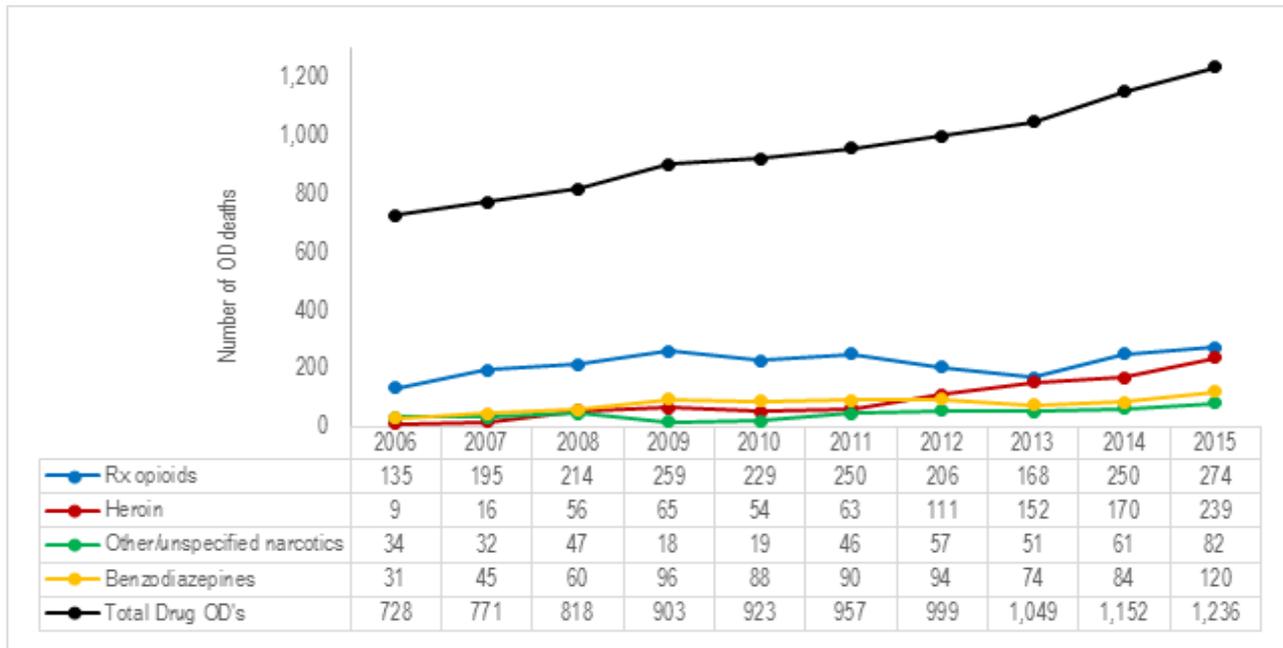
Source: Indiana Division of Mental Health and Addiction, 2017

<sup>1</sup> We used TEDS variables “nonprescription methadone” and “other opiates/synthetics” to define the prescription opioids category (excludes heroin).

<sup>2</sup> We used TEDS variables “benzodiazepines,” “other tranquilizers,” “barbiturates,” and “other sedatives/hypnotics” to define the prescription sedatives/tranquilizers category.

<sup>3</sup> We used TEDS variables “other amphetamines” and “other stimulants” to define the prescription stimulants category.

Figure 3: Drug overdose deaths involving opioid pain relievers and other drugs, Indiana, 2006-2015



Note: Based on ICD-10 drug overdose/poisoning underlying causes of death X40-X44, X60-X64, X85, or Y10-Y14, as well as contributing causes of T40.2-T40.4 (prescription opioids), T40.1 (heroin), T40.6 (other and unspecified narcotics), and T42.4 (benzodiazepines).

Source: ISDH, 2017

**CONCLUSION**

Polypharmacy, i.e., the misuse of multiple prescription drugs or prescription medication with other substances, is highly problematic. Whether unintentional or deliberate, misuse of multiple drugs can lead to adverse effects including addiction; drug-drug interactions; and overdose, potentially resulting in death. Polypharmacy is not uncommon; almost 84 percent of prescription drug misusers receiving substance abuse treatment in Indiana reported using at least one additional substance, most commonly alcohol or marijuana.

Fatal overdose is the most severe consequence of multiple-drug use. A large share of drug-related

deaths is attributable to opioids (both prescription and illegal) and also involves multiple substances, primarily opioids and benzodiazepines [36].

Despite efforts at the federal, state, and local levels to contain the problem of prescription drug misuse, the issue persists. The problem is quite complex, especially since many people’s treatment relies on prescription drugs that are legitimately prescribed by their health care providers. The fact that misuse of prescription drugs can arise from both legitimate and illegitimate sources hampers efforts to create legislation to address the problem.

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