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The Opioid Epidemic: State Trends in Opioid-Related Overdose Deaths from 2000 to 2017

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SUMMARY

This brief examines the United States opioid epidemic analyzing trends in overdose deaths from heroin and other opioids, such as prescription painkillers. Using vital statistics data, it also looks at differences in opioid deaths by state.

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COMPANION BRIEF

To read SHADAC's analysis of National data on opioid-related overdose deaths, visit: **www.shadac.org/2017OpioidBriefs**.

INTRODUCTION

Over the past two decades, the United States has experienced a growing crisis of substance abuse and addiction that is illustrated most starkly by the rise in deaths from drug overdoses. Since 2000, the annual number of drug overdose deaths has quadrupled from 17,500 to 70,000 in 2017.[1,2] Most of these deaths involved opioids, including heroin, prescription painkillers, and synthetic opioids such as fentanyl.[3] In the years since the U.S. Centers for Disease Control and Prevention (CDC) declared overdoses from prescription painkillers an "epidemic" in 2011, the opioid overdose crisis has evolved rapidly from a problem tied mostly to prescription opioid painkillers to one increasingly driven by illicitly trafficked heroin and synthetic opioids. More recently, early evidence suggests that the problem also may be spreading beyond opioids to other illicit drugs, such as cocaine and methamphetamine.

This brief provides high-level information about opioids and opioid addiction, presents the historical context for the epidemic of opioid and related addiction and mortality in the United States, and examines trends in opioid-related mortality across the country and among the states.

Background

Addictive properties of opioids

To better understand the development of the opioid crisis, it is important to recognize the addictive properties of opioids and the relationship between different opioid types. Generally, there are three kinds of opioids: 1) natural opiates, like morphine, which are made from the opium poppy plant; 2) semi-synthetic opioids, like hydrocodone and oxycodone, which are chemically derived from natural opiates; and 3) fully synthetic opioids, like fentanyl, which are chemically created to mimic natural opiates but are typically much more potent. In addition, opioids can be segmented into illicit opioids (such as heroin) and legal opioids (such as painkillers including oxycodone and hydrocodone).[4] Illicit and legal opioids are chemically similar, stimulating the same opioid receptors in the reward centers in the brain and creating similar feelings of euphoria.[5] Repeated use of opioids can affect the chemistry and wiring of the brain, causing addiction that prompts people to crave and use opioids habitually, even if they recognize their opioid use is causing them harm, and can cause symptoms of withdrawal if people stop using opioids.[6]

Because all opioids act similarly in the same parts of the brain, someone who is chemically dependent on a prescription opioid painkiller and unable to obtain it may switch to an illicit opioid, such as heroin, to relieve their cravings or withdrawal symptoms. In fact, studies have shown that many people who use heroin or misuse prescription opioids began with legitimate prescriptions for their own pain treatment or obtained these painkillers from friends or family members with prescriptions.[7,8] For example, a national study found that 80 percent of people who reported using heroin also reported earlier misuse of prescription opioids.[9] Research also shows that people often advance from misuse of prescription opioids to heroin because heroin provides stronger effects and is often less expensive than prescription opioids.[10]

Rise of the epidemic

The rise of the opioid crisis is commonly attributed to an increase in the prescribing of opioid painkillers, which was driven by a confluence of several factors:

First, during the 1980s a few peer-reviewed journals published letters and articles suggesting that opioids were an effective way to treat pain with little risk of addiction. Specifically, a commonly cited 1980 letter published in the *New England Journal of Medicine* and another commonly cited research article published in the journal *Pain* in 1986 are believed to have contributed to a belief that opioids did not pose a high risk for addiction.[11,12,13,14]

Second, in the 1990s and 2000s there was an increased emphasis among health care professionals on the importance of recognizing and treating pain. In 1996, the president of the American Pain Society raised the idea of "pain as a vital sign," stating that "quality care means that pain is measured and treated"—a concept that was adopted by many health professionals and throughout many health care organizations.[15] For example, the Veterans Health Administration undertook efforts beginning in 1999 to regularly measure and record patients' self-reported pain on a scale of 0 to 10, and health care accreditation organization The Joint Commission introduced pain-management standards that encouraged the assessment and treatment of pain.[16,17]

In 1995, around the same time that health professionals were focusing on under-treatment of pain, the Food and Drug Administration (FDA) approved the opioid painkiller OxyContin, which has become one of the most commonly dispensed controlled substances in the U.S. and the FDA has since described as "a focal point of opioid abuse issues."[18] In 2007, the maker of OxyContin, Purdue Pharma, settled criminal and civil claims by the U.S. Department of Justice that the company knowingly made false marketing claims that OxyContin was less addictive than other medications.[19,20] Despite its renown, the case of OxyContin is not unique; use of other opioid painkillers also has increased substantially, and other pharmaceutical companies have settled charges of misrepresenting the abuse-resistance and addictive properties of their medications.[21,22] Currently, multiple state and local governments are suing Purdue Pharma and other opioid drug makers, alleging wrongdoing such as downplaying their opioid medications' risk of addiction and death to patients and health care providers.[23,24]

Opioids and Related Drugs

For nearly two decades, the U.S. has experienced statistically significant increases in overdose deaths related to opioids; as this report will describe, these increases have occurred throughout the country, with nearly every state having experienced increases in overdose deaths from one or more types of opioids since 2000. However, data on overdose deaths show a nuanced story, with state variation in the severity of the crisis and in the types of opioids (and other substances) most commonly associated with overdose deaths.

The following sections use vital statistics data from the CDC to examine increases in overdose deaths from opioids and other selected drugs across states since 2000. The analysis below focuses on the opioids that account for the bulk of opioid overdose deaths, as well as two other categories of drugs that evidence suggests are related to the opioid crisis, and are grouped according to how overdose data are collected.

Natural and semi-synthetic opioids: Natural and semi-synthetic opioids include most prescription opioid painkiller pill-type medications, such as oxycodone and hydrocodone. Although these may be taken legitimately with a prescription, they are also sometimes used illicitly. For example, a person with a prescription may give them away or sell them, or a health care provider may improperly prescribe them (commonly known as "pill mills"). Additionally, drug traffickers manufacture and traffic counterfeit "prescription" opioid pills, which may include the purported opioids or may contain different drugs entirely.[25]

Synthetic opioids (except methadone): Some synthetic opioids, such as fentanyl, can be used legitimately as a medication. However, because they are usually much more potent than their natural and semi-synthetic counterparts, synthetic opioids are often administered in more-controlled settings, such as in a hospital. Recently, drug cartels have begun producing and trafficking synthetic opioids that are illicitly manufactured overseas, which are sometimes mixed with other drugs such as counterfeit painkillers and heroin as a cheap way to increase their potency.

Methadone is one of three medications approved by the FDA for treatment of opioid use disorders and is also used as a prescription pain reliever medication. Although methadone is a synthetic opioid, our analysis has excluded methadone deaths from the category of deaths from synthetic opioids, mainly because it has not followed the same trend of increasing overdose deaths, and methadone deaths have remained at a relatively low rate compared to other opioids described in this brief.[26]

Heroin: Heroin is a form of opioid derived from opium poppies and trafficked by international drug cartels. Most heroin sold in the U.S. comes from Latin America, with a smaller amount coming from Afghanistan and Southeast Asia.[27] Heroin is illegal in the U.S. but is typically cheaper to obtain than prescription opioid painkillers, so it is sometimes used as a substitute by people who began their addictions with painkillers. Since the rise of illicit, synthetic opioid trafficking, deaths from heroin have become closely intertwined with synthetic opioids due to drug traffickers frequently mixing heroin with fentanyl or related drugs—either purposefully to cheaply increase the potency of the heroin they are selling, or accidentally through sloppy packaging of their drugs.[28,29,30] Additionally, synthetic opioids are sometimes falsely sold as heroin, either purposefully or because street-level drug traffickers aren't aware of the provenance of the drugs they are selling.[31]

Cocaine: Cocaine is a stimulant drug that is derived from the coca plant.[32] Although U.S. law classifies cocaine as a "narcotic" (another term for an opioid), cocaine is not chemically an opioid but an entirely separate type of drug that mainly affects the human brain's dopamine system rather than the opioid receptors. The U.S. allows limited legal use of cocaine as a medication, such as a topical anesthetic, but non-medical use is illegal. In the U.S., illicit supplies of cocaine originate predominantly from Latin America and are smuggled into the U.S. by drug traffickers, similar to heroin. Illicit cocaine is generally trafficked both in powder form and as "crack" cocaine, which are small "rocks" that can be smoked—either of which may be adulterated with synthetic opioids or other substances.

Psychostimulants: "Psychostimulants with abuse potential" is a class of stimulant drugs that includes prescription medications such as Ritalin and Adderall, which are used to treat attention-deficit/hyperactivity disorder (ADHD), as well as methamphetamine, which also has approved medical uses in the U.S. but is frequently produced and used illicitly.[33,34] A recent study by the CDC examining the specific drugs most-frequently cited in overdoses found that methamphetamine was much more commonly listed than other psychostimulants.[35] Until the mid-2000s, illicit methamphetamine consumed in the U.S. was largely produced domestically by small-scale operations, but current methamphetamine trafficking in the U.S. is now dominated by international drug cartels—such as those that also traffic illicit opioids and cocaine.[36]

Opioid and Related Overdose Deaths

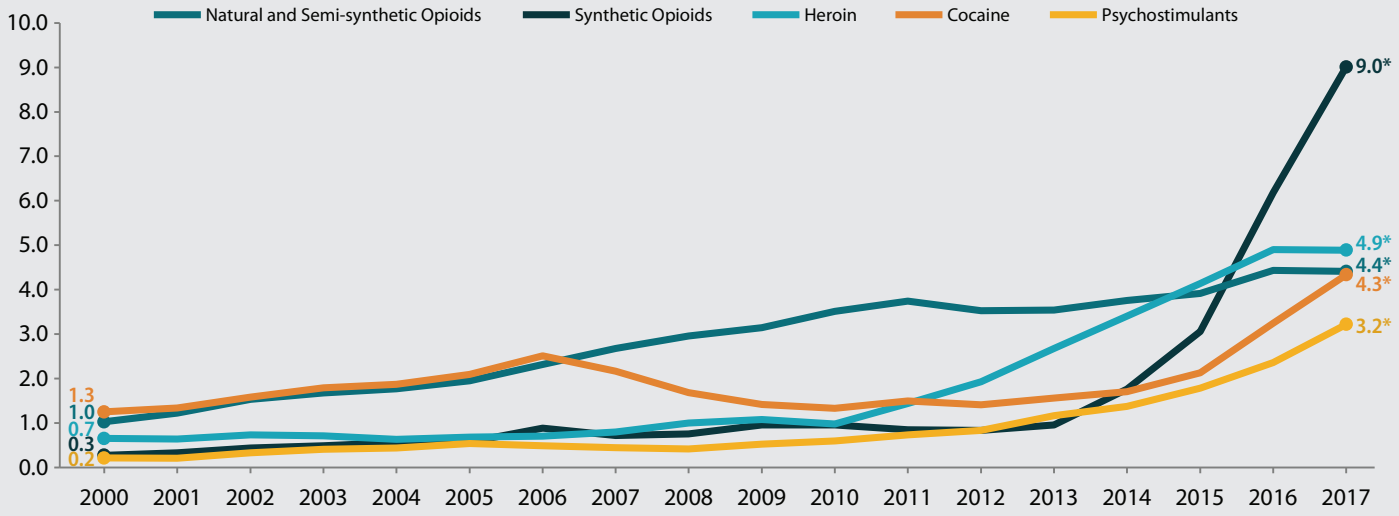
Using vital statistics data published by the CDC, we examined rates of drug overdose deaths from three types of opioids (natural and semi-synthetic opioids, heroin, and synthetic opioids) and two types of non-opioids (cocaine and psychostimulants). Because of evidence that drug overdose deaths frequently involve multiple different types of drugs (e.g., heroin and fentanyl, or cocaine and fentanyl), it is important to recognize that the data reported in this brief are not mutually exclusive. For example, if death records recorded that an overdose involved both cocaine and heroin, then it would appear in these data as both a cocaine and a heroin death. Our analysis found that between 2000 and 2017, rates of U.S. drug poisoning deaths related to all three types of opioids increased significantly, as did death rates from cocaine and psychostimulants.

Opioid death trends

Drug overdose deaths from natural and semi-synthetic opioids grew more than four times between 2000 and 2017, from 1.0 to 4.4 per 100,000 people (Figure 1). Deaths from heroin increased seven times, from 0.7 to 4.9 per 100,000 people.[37] Notably, deaths rates from heroin and from natural and semi-synthetic opioids were unchanged from 2016 to 2017, representing a rare pause in growth of death rates since the opioid crisis began. However, death rates from synthetic opioids increased from 6.2 per 100,000 people in 2016 to 9.0 per 100,000 people in 2017. Since 2000, deaths from synthetic opioids have grown 30 times, from 0.3 to 9.0 per 100,000 people.

Although deaths from all three forms of opioids have increased since 2000, their trends have differed—developing over two main waves. During the first wave, which was driven by prescription opioid painkillers, death rates from natural and semi-synthetic opioids increased gradually but continuously from 1.0 per 100,000 people in 2000 to 3.7 per 100,000 people in 2011, after which death rates largely plateaued, peaking at 4.4 deaths per 100,000 people in 2016 and 2017. The slowed growth in death rates from natural and semi-synthetic opioids is likely due at least in part to efforts to curb abuse of prescription painkillers through a variety of interventions, such as pharmaceutical companies' introduction of new tamper-resistant formulations, law enforcement efforts to shut down "pill mills," and more stringent prescribing practices by health care providers. However, trends suggest that rather than abating entirely, the opioid crisis instead shifted to illicit opioids.

Figure 1: U.S. Overdose Death Rates Per 100,000 People, 2000-2017



* Statistically significant at 95% level.
Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

During the second wave, which is being driven primarily by illicit opioids, death rates from heroin and synthetic opioids began to outpace those from natural and semi-synthetic opioids. The illicit opioid wave started with heroin, which began to experience a dramatic increase in death rates in 2011, around the same time that growth in death rates from natural and semi-synthetic opioids started to slow. Heroin overdose death rates increased from 1.0 deaths per 100,000 people in 2010 to 4.9 deaths per 100,000 people in 2016 and 2017. Synthetic opioid death rates also have contributed to the second wave of the opioid crisis, with their rise beginning slightly later than that of heroin but increasing even more rapidly. From 2013 to 2017, death rates from synthetic opioids grew from 1.0 to 9.0 per 100,000 people. That rise is broadly attributed to fentanyl and similar drugs that are illegally produced and trafficked, and commonly mixed with heroin, counterfeit painkillers, and non-opioid illicit drugs such as cocaine and methamphetamine.

Some research is available to support the hypothesis that the increase in illicit opioid death rates since 2010 may be due, at least in part, to people switching from prescription painkillers to illicit opioids.[38,39,40] For example, studies have found that most people who use heroin began by abusing prescription painkillers and that rates of heroin use have increased in recent years among people who use prescription opioids for non-medical purposes.[41,42] Other studies also have found evidence that a reformulation of the popular prescription opioid OxyContin in 2010, designed to make the medication abuse-resistant, may have caused some people to adopt heroin as a substitute.[43,44,45]

The newest annual opioid overdose data present a more ambiguous picture about how the crisis is developing. From 2016 to 2017, death rates from natural and semi-synthetic opioids and from heroin experienced no growth, remaining steady at 4.4 and 4.9 deaths per 100,000 people respectively. However, death rates from synthetic opioids grew substantially during that same time, from 6.2 to 9.0 deaths per 100,000 people. The leveling out of death rates from heroin and natural and semi-synthetic opioids between 2016 and 2017 could be early indications of progress in curtailing the opioid crisis, but considering the steep increase in deaths from synthetic opioids during the same time period, it's also possible that the crisis is simply shifting to different types of opioids rather than truly experiencing improvements.

Cocaine and psychostimulant death trends

Looking beyond opioids, data on other drug overdose death rates show that cocaine and psychostimulants have mirrored the growth in death rates from heroin and synthetic opioids during the illicit opioid wave of the crisis. Overdose deaths from cocaine have grown more than three times since 2000, from 1.3 to 4.3 per 100,000 people in 2017. Overdose deaths from psychostimulants have grown 16 times during the same period, from 0.2 to 3.2 per 100,000 people in 2017. Until around 2013, death rates from cocaine and psychostimulants did not demonstrate sustained large increases. Cocaine death rates began in 2000 at 1.3 per 100,000 people, increased to 2.5 per 100,000 people in 2006, then declined again to 1.4 per 100,000 people in 2012. Death rates from psychostimulants increased from 0.2 deaths per 100,000 people in 2000 to 0.8 per 100,000 people

in 2012. But since 2012—around the same time as increases in deaths from heroin and synthetic opioids—death rates from cocaine and psychostimulants have grown more quickly, reaching 4.3 deaths per 100,000 people for cocaine and 3.2 deaths per 100,000 people for psychostimulants in 2017.

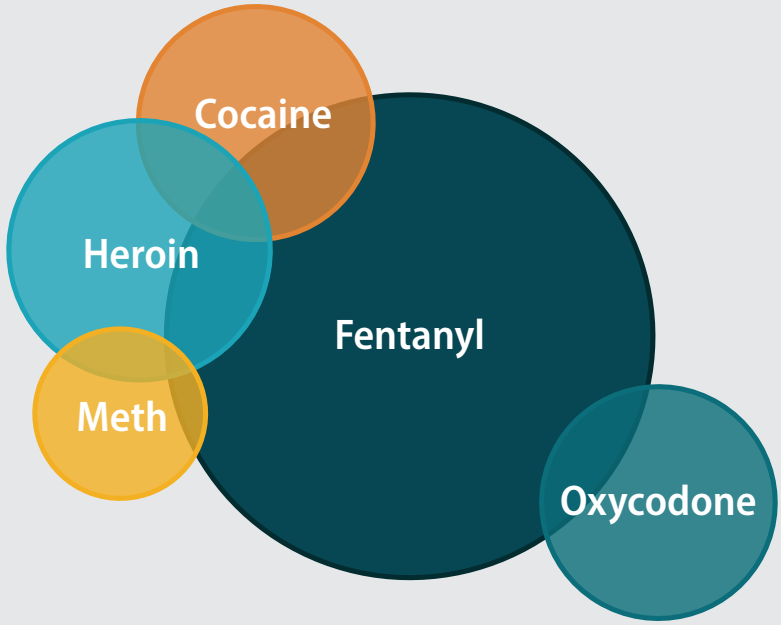
The overlapping trends between illicit opioids, cocaine, and psychostimulants—when viewed in combination with other evidence—suggest that increased deaths from these non-opioid illicit drugs are likely related to the evolving opioid crisis. A recent study by the CDC found that cocaine deaths between 2011 and 2016 frequently involved opioids, with approximately 40 percent of cocaine deaths also involving fentanyl and 34 percent also involving heroin in 2016 (Figure 2).[46] Those cocaine-opioid combination drug overdoses likely result from individuals using cocaine with opioids both knowingly and unknowingly. For example, some drug users historically have taken cocaine in combination with opioids (typically heroin) to produce a high that mixed the different effects of the two types of drugs. That longstanding combination drug use pattern, known as a "speedball," may now carry a higher risk of overdose since heroin is increasingly contaminated with potent synthetic opioids. Additionally, even people who typically use cocaine exclusively may now be at higher risk of opioid overdoses, as law enforcement agencies have reported increases in illicitly trafficked cocaine being mixed with synthetic opioids, something that buyers may not know when purchasing and using cocaine.[47] The same CDC study also found that methamphetamine overdoses likewise commonly involved opioids, albeit less frequently than for cocaine, with approximately 22 percent of methamphetamine overdoses also involving heroin and 11 percent also involving fentanyl.[48] Other recent research also has found evidence consistent with growth in combined use of opioids and psychostimulants such as methamphetamine, including increases in hospitalizations from combined opioid and amphetamine complications and increases in reported methamphetamine use among people seeking treatment for opioid use disorder.[49,50] The likely explanations again include both deliberate combination drug use and use of methamphetamine that is contaminated with synthetic opioids.[51]

Overlapping Opioid, Cocaine and Psychostimulant Overdose Deaths

A 2018 study by the CDC found that opioid overdose deaths commonly involve more than one substance.[52] Those deaths sometimes involve multiple opioids (e.g., fentanyl and heroin), and they sometimes involve opioids and other non-opioid substances, especially cocaine and psychostimulants (e.g., methamphetamine).

Figure 2 illustrates common patterns in opioid-involved overdose death, with the size of the circles roughly illustrating the relative rates of deaths from the named substances and the amount of overlap indicating frequency of multi-drug overdose deaths.[53] For example, because the study found that about 37 percent of heroin deaths also involved fentanyl, the heroin is overlapped by fentanyl roughly that amount.[54]

Figure 2: Common Patterns in Overlapping Drug Overdose Deaths



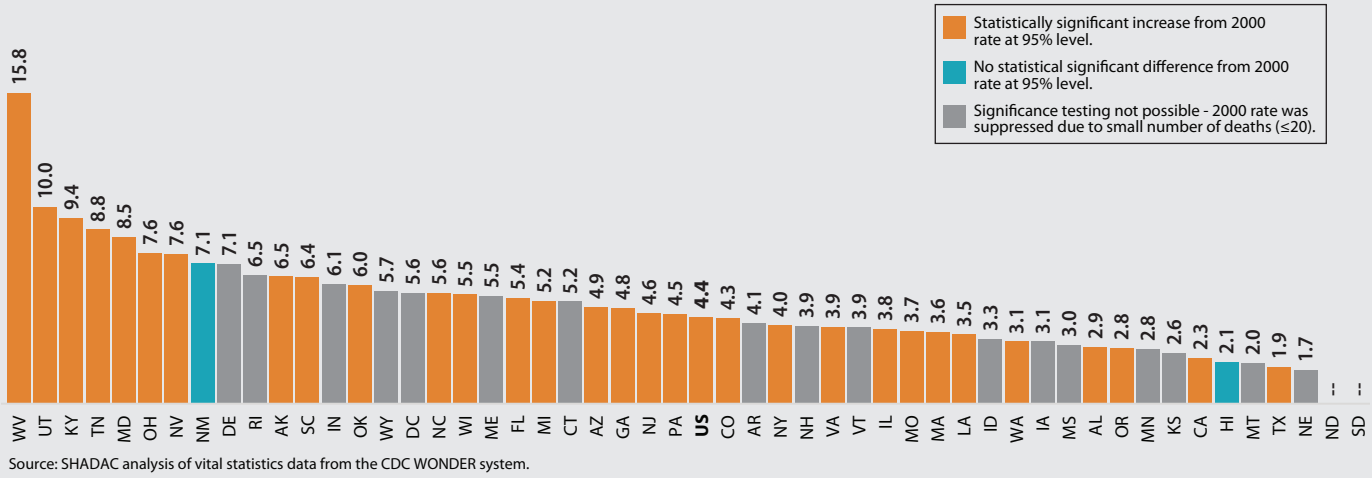
Opioid Overdose Deaths at the State Level

Similar to the U.S., most states have experienced increases in opioid-related deaths and deaths related to cocaine and psychostimulants. The following section examines differences in opioid-related death rates across states from 2000 to 2017. (Additional national-level analysis, including analysis by age, gender, race/ethnicity, and rurality/urbanicity can be found in a companion brief, *The Opioid Epidemic: National Trends in Opioid-Related Overdose Deaths from 2000 to 2017*).[55]

Natural and semi-synthetic opioids

Between 2000 and 2017, 30 states saw statistically significant increases in deaths from natural and semi-synthetic opioids (Figure 3). Overdose death rates from natural and semi-synthetic opioids remained statistically stable in only two states (Hawaii and New Mexico),[56] and no states experienced significant declines. Statistical testing for increases from 2000 to 2017 was not possible for 18 states and the District of Columbia because overdose death rates from 2000 were suppressed due to small numbers of deaths.[31]

Figure 3: Natural and Semi-synthetic Opioid Death Rates Per 100,000 People, 2017

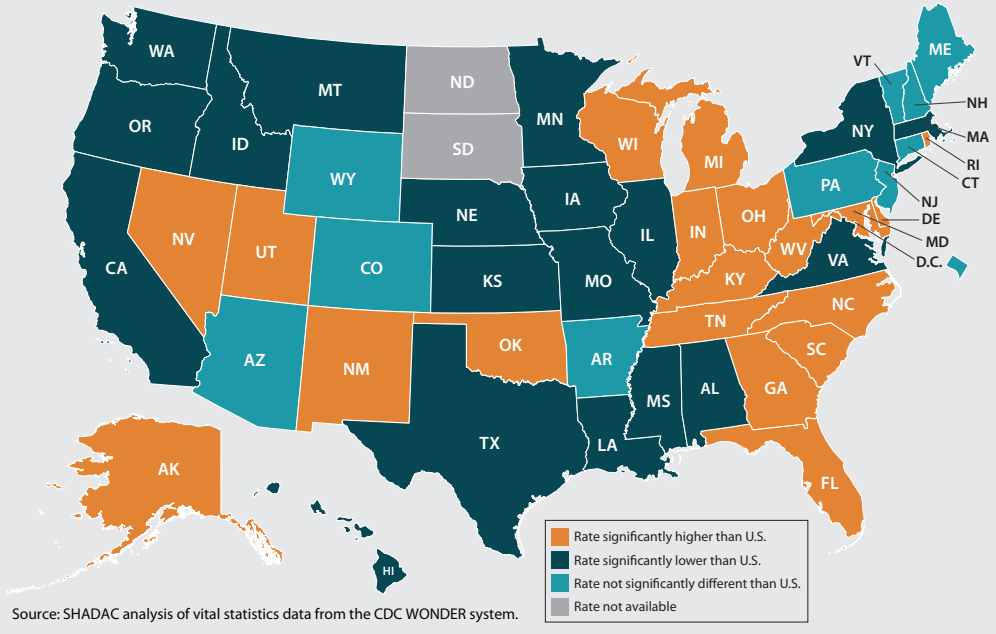


Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Despite widespread increases in overdose death rates from natural and semi-synthetic opioids, individual states' death rates were broadly varied. In 2017, Nebraska's rate of 1.7 deaths per 100,000 people was the lowest in the U.S., while West Virginia's rate of 15.8 deaths (the highest) was more than nine times that of Nebraska.

Although most states have experienced significant increases in death rates from natural and semi-synthetic opioids, the highest deaths rates are more concentrated in the eastern portion of the U.S. Of the 27 states (including the District of Columbia) east of the Mississippi River, 21 had death rates statistically equivalent to or higher than the U.S. rate in 2017.[32] Of the 24 states west of the Mississippi, only nine had rates at or above the U.S. rate (Figure 4). However, some of the highest death rates do appear in western states such as Utah, with the second-highest death rate, and Nevada and New Mexico, with the seventh- and eighth-highest death rates, respectively.

Figure 4: State Rates of Natural and Semi-synthetic Opioid-related Deaths, 2017

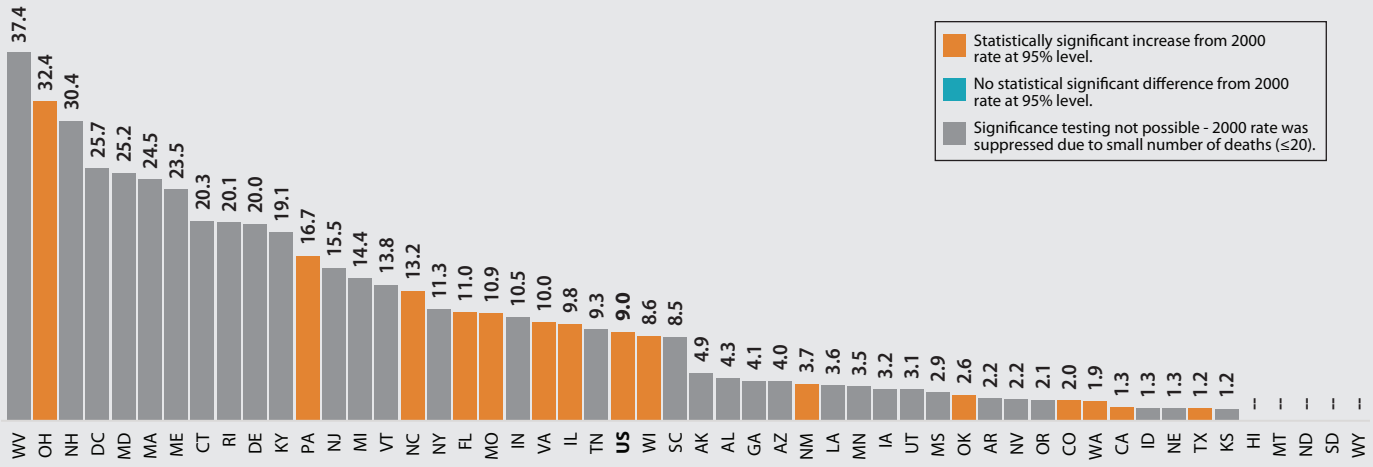


Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Synthetic opioids

Because deaths from synthetic opioid overdoses were relatively rare in 2000, statistical testing for significant changes between 2000 and 2017 was only possible for 14 states. However, all of those 14 states experienced statistically significant increases in death rates from synthetic opioids (Figure 5). As the number of deaths from synthetic opioids have grown, data on death rates have become increasingly available; 2017 death rates from synthetic opioid overdoses are available for 46 states, including the District of Columbia. Of these 46 states, 41 have overdose death rate data in 2013 as well, so it is possible to test for statistically significant changes over the period from 2013 to 2017 in these cases. Among these 41 states, 39 experienced statistically significant increases in death rates from synthetic opioids, and two (Kansas and Oklahoma) were statistically unchanged (see Appendix Table 2).[33]

Figure 5: Synthetic Opioid Death Rates Per 100,000 People, 2017

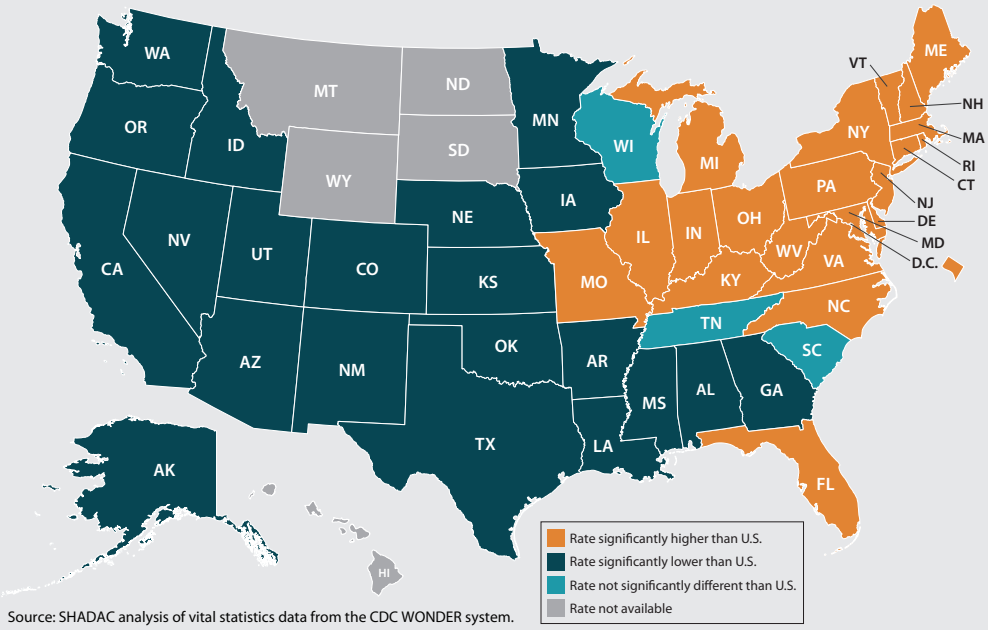


Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Compared to natural and semi-synthetic opioids, death rates from synthetic opioids range more widely across states. In 2017, Kansas and Texas had the lowest rates of deaths from synthetic opioids in the U.S., at 1.2 deaths per 100,000 people. The rate in West Virginia, with the highest rate of deaths from synthetic opioids, was 37.4 per 100,000 people—more than 31 times the lowest rate.

In 2017, the states with the highest death rates from synthetic opioids were more regionally concentrated—mostly in the Northeast and part of the Midwest—than deaths from natural and semi-synthetic opioids. Of the 25 states (including the District of Columbia) with synthetic opioid death rates statistically equivalent to or higher than the U.S. rate, 24 appear in a contiguous block and all but one are located east of the Mississippi (Figure 6).

Figure 6: State Rates of Synthetic Opioid-related Deaths, 2017

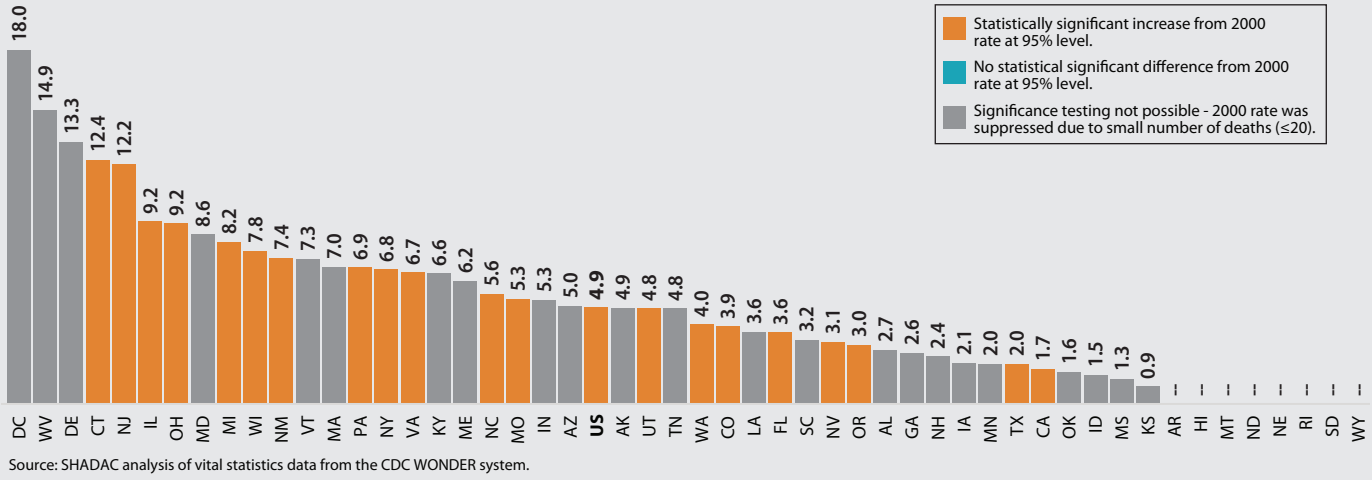


Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Heroin

Similar to synthetic opioids, deaths from heroin overdoses were relatively rare in 2000, so statistical testing for significant changes between 2000 and 2017 was only possible for 20 states. However, all of those 20 states experienced statistically significant increases in death rates from heroin (Figure 7). As the numbers of deaths from heroin have grown, data on death rates have become increasingly available; 2017 death rates from heroin overdoses are available for 43 states, including the District of Columbia. Of these 43 states, 39 have overdose death rate data available in 2013 as well, so it is possible to test for statistically significant changes over the period from 2013 to 2017 in these cases. Among these states, 32 experienced statistically significant increases in death rates from heroin from 2013 to 2017, one saw a significant decrease in death rates (New Hampshire), and six were statistically unchanged (see Appendix Table 3).[34]

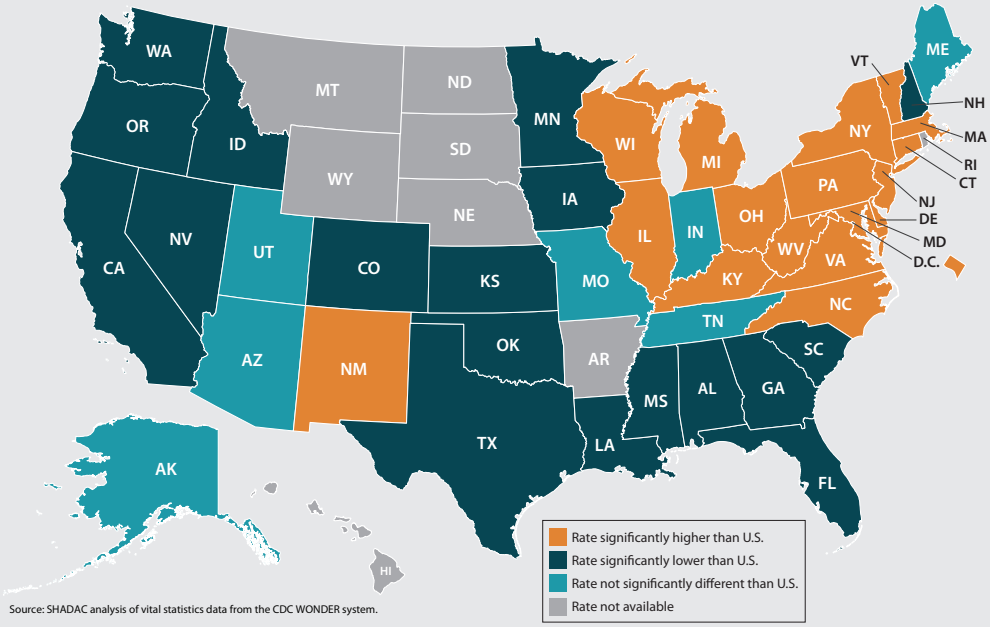
Figure 7: Heroin-related Opioid Death Rates Per 100,000 People, 2017



Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

In 2017, death rates from heroin overdoses ranged from a low of 0.9 per 100,000 people in Kansas to a high of 18.0 per 100,000 in the District of Columbia—20 times higher than the lowest rate. The national map of 2017 state heroin death rates closely resembles the map of synthetic opioid death rates. The states with the highest death rates from heroin were mostly regionally concentrated—predominantly in the Northeast and part of the Midwest. Of the 25 states (including the District of Columbia) with heroin death rates statistically equivalent to or higher than the U.S. rate, 20 are found east of the Mississippi in an almost perfectly contiguous block (Figure 8). That similarity hints at a close relationship between overdoses from heroin and synthetic opioids. According to the U.S. Drug Enforcement Agency, illegal drug cartels now frequently traffic synthetic opioids such as fentanyl along with heroin, and they sometimes mix synthetic opioids into heroin to increase the potency.[35]

Figure 8: State Rates of Heroin-related Deaths, 2017



Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

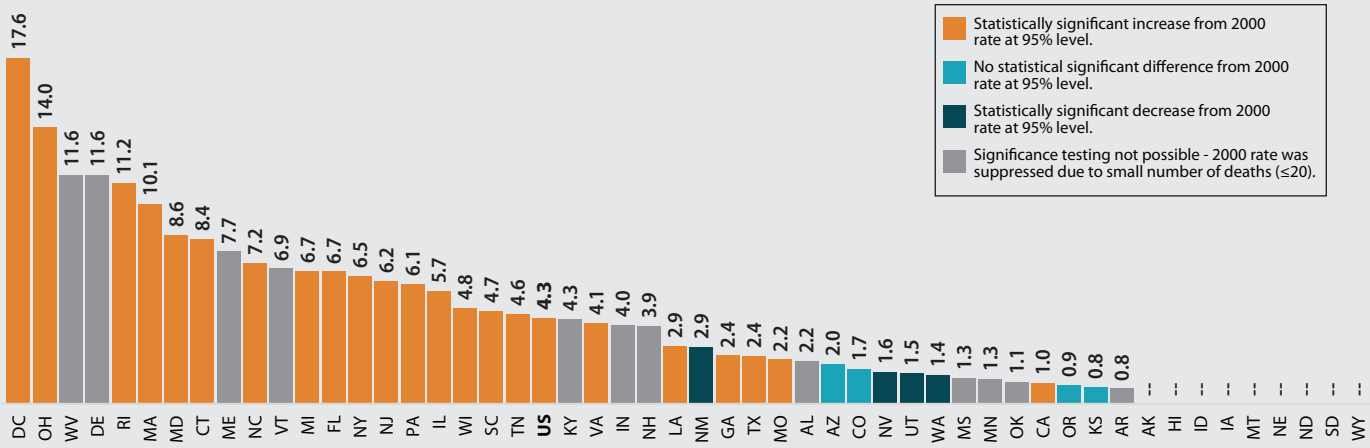
Additionally, geographic differences in heroin distribution in the U.S. may also play a role in the relationship between heroin and synthetic opioid death rates. Heroin is generally trafficked in both powder form and as "black tar" heroin, which describes its appearance and consistency.

In the U.S., black tar heroin is available primarily west of the Mississippi, while powder heroin, which is more readily adulterated with other substances (e.g., fentanyl), is primarily available east of the Mississippi River.[57] It may be that death rates from heroin and synthetic opioids both are high east of the Mississippi because powder heroin in that portion of the country is easier to mix with synthetic opioids.

Cocaine

As with heroin and synthetic opioids, deaths from cocaine overdose were relatively rare in 2000, and statistical testing for significant changes between 2000 and 2017 was only possible for 30 states, including the District of Columbia. Between 2000 and 2017, 22 of these states experienced statistically significant increases in death rates from cocaine overdose (Figure 9). Overdose death rates were statistically unchanged in four states, and four states saw significant declines in death rates.[58]

Figure 9: Cocaine-related Death Rates Per 100,000 People, 2017



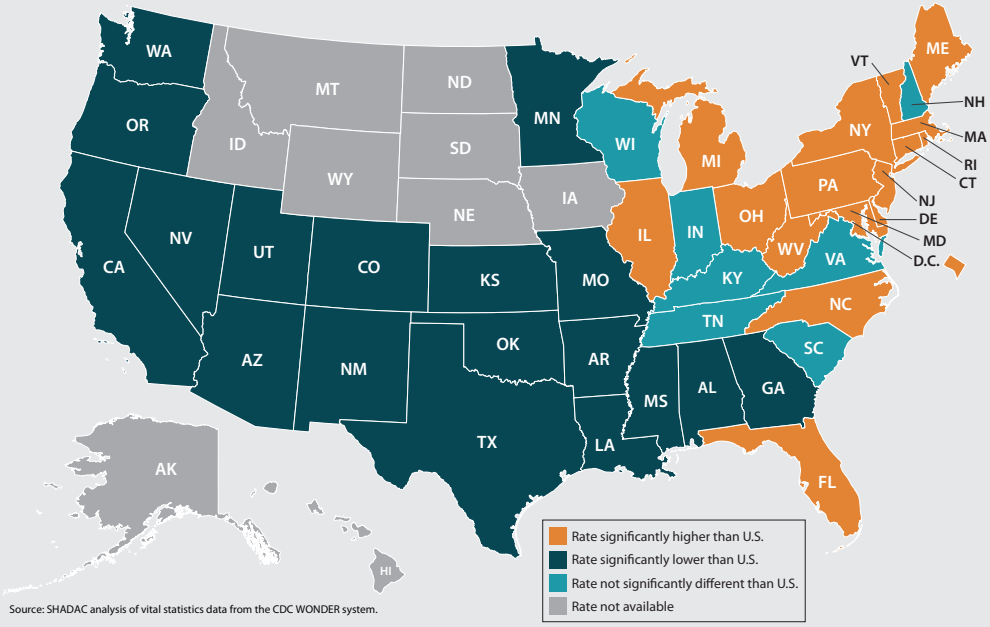
Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

As the number of deaths from cocaine overdose have grown, data on death rates have become increasingly available; 2017 death rates from cocaine overdoses are available for 42 states, including the District of Columbia. Of these 42 states, 35 have overdose death rate data available in 2013 as well, so it is possible to test for statistically significant changes over the period from 2013 to 2017 in these cases. Among these states, 30 saw statistically significant increases in death rates from cocaine from 2013 to 2017, and five were statistically unchanged (see Appendix Table 4).

Death rates from cocaine vary substantially across states. In 2017, death rates from cocaine overdoses ranged from a low of 0.8 per 100,000 people in Arkansas and Kansas to a high of 17.6 per 100,000 people in the District of Columbia—22 times the lowest rate.

Much like synthetic opioids and heroin, deaths from cocaine overdose were concentrated in the eastern portion of the U.S. in 2017. Of the 24 states with overdose death rates statistically equivalent to or higher than the U.S., all were found east of the

Figure 10: State Rates of Cocaine-related Deaths, 2017



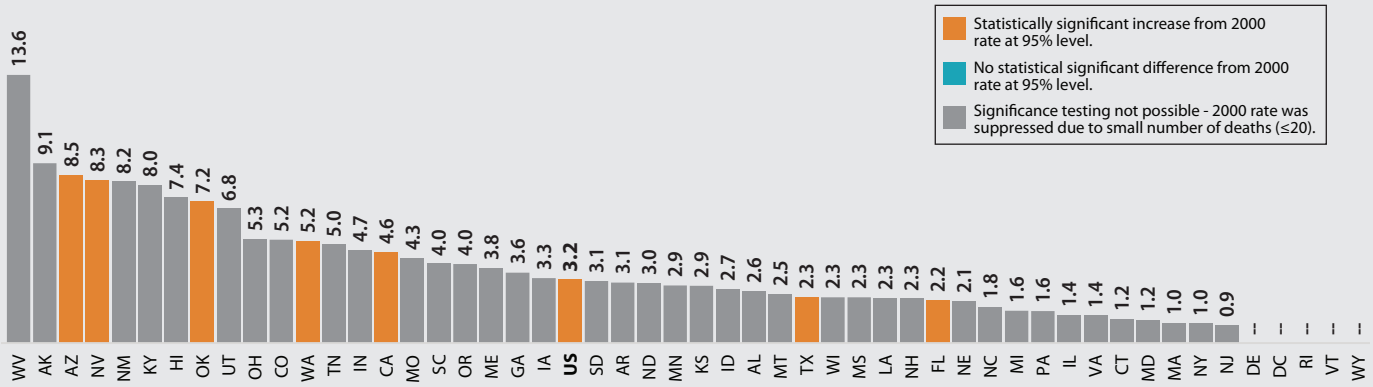
Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Mississippi in a nearly perfectly contiguous block (Figure 10). The similarity in maps of state death rates from cocaine and synthetic opioids is consistent with other evidence that cocaine overdose deaths frequently also involve synthetic opioids, as described earlier in this brief.

Psychostimulants

Because deaths from psychostimulant overdoses were somewhat rare in 2000, statistical testing for significant changes between 2000 and 2017 was only possible for seven states. However, each of those seven states experienced statistically significant increases in death rates from psychostimulants (Figure 11). As the numbers of deaths from psychostimulants have increased, more data on death rates has become available; 2017 death rates from psychostimulants are available for 46 states. Of these 46 states, 36 have overdose death rate data in 2013 as well, so it is possible to test for statistically significant changes in death rates from psychostimulants over the period from 2013 to 2017 in these cases. Among the 36 states, 35 experienced statistically significant increases in death rates from psychostimulants and one (Idaho) was statistically unchanged. No states saw statistically significant decreases in death rates over this period (see Appendix Table 5).[59]

Figure 11: Psychostimulant Death Rates Per 100,000 People, 2017

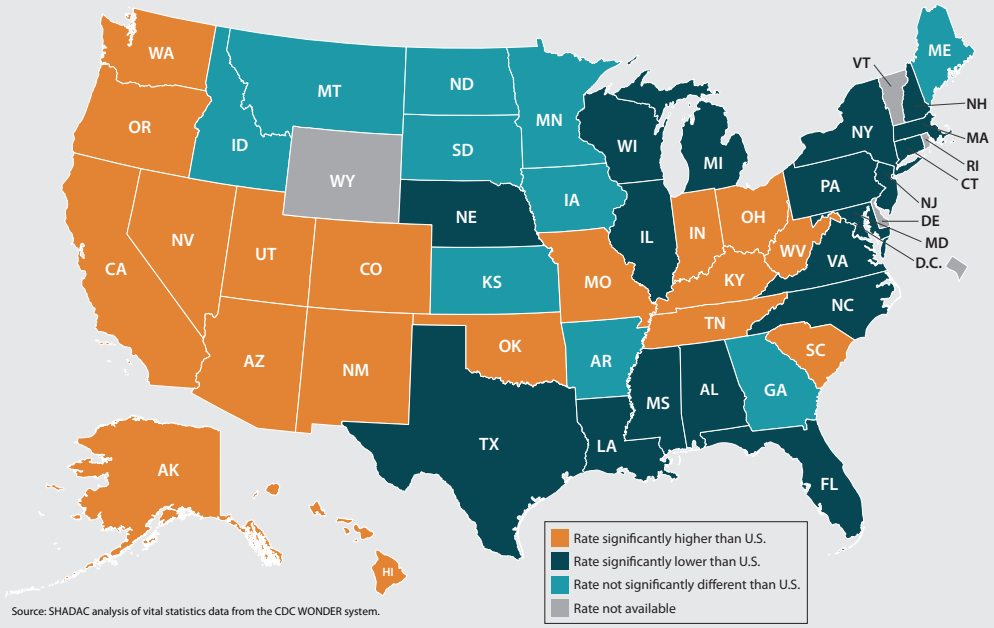


Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

As with the other substances examined in this brief, there is a great deal of variation in rates of deaths from psychostimulants across states. In 2017, New Jersey had the lowest rate of deaths from psychostimulants in the U.S. at 0.9 deaths per 100,000 people. West Virginia had the highest rate of deaths from psychostimulants, at 13.6 deaths per 100,000 people—more than 15 times the lowest rate.

Though most states have experienced increases in psychostimulant overdose deaths rates, the western part of the U.S. has been more severely affected. Of the 28 states with psychostimulant death rates statistically equivalent to or higher than the U.S. rate, 20 were west of the Mississippi River—an especially notable difference from the maps for synthetic opioids, heroin, and cocaine, where a concentration of overdose deaths occured in the Northeast and a portion of the Midwest (Figure 12).

Figure 12: State Rates of Psychostimulant-related Deaths, 2017



Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Discussion

Since 2000, the U.S. has experienced statistically significant increases in opioid-related overdose deaths. While the opioid crisis began with natural and semi-synthetic opioids (e.g., prescription painkillers), it has evolved over the past several years; deaths from heroin and synthetic opioids now outpace natural and semi-synthetic opioids. Despite limited signs of progress, such as plateauing death rates from heroin and natural and semi-synthetic opioids from 2016 to 2017, our analysis also found signs of concern that other areas of the opioid crisis may be accelerating and expanding.

From 2016 to 2017, deaths from synthetic opioids such as fentanyl continued to increase, from 6.2 to 9.0 deaths per 100,000 people. Additionally, our study found increasing death rates from cocaine and psychostimulants such as methamphetamine that parallel recent increases in death rates from illicit opioids. Combined with reports from law enforcement agencies of non-opioid illicit drugs being contaminated with synthetic opioids and recent research from the CDC finding that cocaine and methamphetamine overdose deaths also frequently involve opioids such as fentanyl and heroin, there is reason to believe the opioid crisis may be spreading to other non-opioid drugs.

Although data are more limited at the state level than at the national level, they illustrate a similar story to the U.S. epidemic: Nearly every state has been measurably affected by the opioid crisis, and the crisis appears to be evolving in most states—spreading to new substances and accelerating overall. Whereas in 2000, deaths from heroin and synthetic opioid overdoses were so uncommon that reliable data weren't available for most states, by 2017 deaths from heroin and synthetic opioids had increased to the point that overdose data are available for almost all states. Additionally, as death rates from heroin and synthetic opioids have increased in recent years, deaths from cocaine and psychostimulants (such as methamphetamine) have also plotted a similar upward trajectory in many states. As previously described, there is some evidence suggesting that the growth in cocaine and psychostimulant deaths is an indication that the opioid crisis is taking a new turn—interacting with or even contributing to a growing crisis of non-opioid substance use.

Though our analysis revealed that overdose deaths from the specific drugs highlighted in this brief have affected states broadly, those hardest hit have been relatively regionally concentrated in different ways, with states in some areas of the U.S. being more severely affected by deaths from heroin, synthetic opioids, and cocaine, and others more impacted by deaths from psychostimulants such as methamphetamine. But even those states that have been less severely affected should remain vigilant. The first hints of today's national opioid crisis first appeared two decades ago with natural and semi-synthetic opioids, mostly in a relatively small Appalachian region of Kentucky, Ohio, Virginia, and West Virginia. But that initially small and concentrated regional crisis has since expanded to virtually all corners of the U.S. Based on that history, it is reasonable to believe that without proper policy interventions, overdose deaths from drugs that have been regionally concentrated may continue to expand nationwide.

As both overdose deaths and awareness of the opioid crisis have grown, many states have adopted policies aimed at restricting access to prescription opioids. For example, 49 states have created prescription drug monitoring programs (PDMPs), which allow health care professionals to identify patients who may be "doctor shopping" in order to obtain multiple opioid prescriptions from different providers and also allow regulators and law enforcement to identify physicians or clinics that inappropriately prescribe large quantities of opioids, commonly known as "pill mills." But research evidence and the history of the opioid crisis suggest that an approach that leans too heavily on reducing oversupply of prescription opioids may have unintended consequences that could make the crisis harder to address or even worsen it outright. For example, one recent study found that simply reducing prescribing of opioid painkillers—now that nearly two million people in the U.S. report substance use disorders involving prescription painkillers—would result in higher deaths from heroin because many people would turn to risky illicit opioids as a result of their addictions.[60,61]

Instead, some states are undertaking more-comprehensive, multi-pronged approaches. For example, many states have complemented their efforts to reduce opioid painkiller prescribing with efforts to increase access to evidence-based substance use disorder treatment, including with medication-assisted treatment, which uses drugs approved by the Food and Drug Administration (methadone, buprenorphine and naltrexone) to reduce the risk of relapse. And many states also have attempted to mitigate the serious harms of opioid use disorder, such as by expanding access to naloxone, which can save lives by reversing opioid overdoses, and by implementing needle-exchange programs, which can reduce transmission of blood-borne infections, including hepatitis C and HIV.

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[53] Though the figure uses names of specific substances from the CDC study (e.g., fentanyl, oxycodone, methamphetamine), the relative size of the circles are based on those substances' larger drug categories. For example, the size of the methamphetamine circle relative to the others is based on the rate of overdose deaths from "psychostimulants with abuse potential"—the parent drug category that includes methamphetamine.

[54] For ease of presentation, this figure treats fentanyl as the diagram "hub" because synthetic opioid deaths (the category including fentanyl) account for the most overdose deaths; while the amount that satellite substances overlap with fentanyl roughly corresponds to findings from the cited CDC study, the converse is not necessarily true. For example, approximately 37 percent of heroin deaths involve fentanyl, so the figure shows heroin overlapped roughly that amount by fentanyl. However, approximately 32 percent of fentanyl deaths involve heroin, which the figure does not reflect. Additionally, because the figure treats fentanyl as the hub, it was unable to illustrate the overlap between methamphetamine and cocaine overdose deaths.

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[58] Of the four states that experienced declines in cocaine overdose death rates from 2000 to 2017 (Nevada, New Mexico, Utah, Washington), each had relatively high cocaine overdose death rates in 2000. Similar to the U.S. trend, each of these four states also experienced lower cocaine overdose death rates beginning around 2007 to 2009. But even as cocaine overdose death rates have increased nationally in recent years, the rates in these states have not reached their earlier levels from 2000.

[59] Unlike with heroin, synthetic opioids, cocaine and psychostimulants, we do not present an alternative statistical test for changes in natural and semi-synthetic opioid death rates from 2013 to 2017. That is because, in contrast with those other substances, growth in death rates from natural and semi-synthetic opioids occurred mostly during an earlier period, from approximately 2000 to 2011.

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APPENDIX TABLE 1: NATURAL AND SEMI-SYNTHETIC OPIOID OVERDOSE DEATHS PER 100,000 PEOPLE

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2000 2017 test	2013 2017 test
Alabama	0.6	0.5	0.7	0.5	0.7	0.5	1.0	1.4	1.6	2.0	1.8	1.9	1.3	1.3	1.8	1.8	2.0	2.9	*	*
Alaska	3.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.2	8.1	5.4	4.8	5.7	5.2	5.6	6.5	6.1	6.5	*	
Arizona	1.9	1.6	2.5	2.5	2.7	3.1	3.2	3.6	4.1	5.0	5.2	4.9	5.0	3.9	4.2	4.5	4.8	4.9	*	*
Arkansas	N/A	N/A	1.6	1.9	2.4	2.2	2.5	3.2	4.0	4.5	4.2	4.2	4.2	3.8	4.3	5.1	4.0	4.1	--	
California	1.9	0.9	2.7	2.3	2.1	2.1	2.2	2.5	2.9	3.0	2.8	3.0	2.4	2.6	2.6	2.4	2.3	2.3	*	*
Colorado	1.3	2.1	1.5	1.6	1.7	2.2	2.5	3.7	3.4	3.3	2.6	3.7	4.2	4.1	4.6	4.5	3.7	4.3	*	
Connecticut	N/A	N/A	0.7	0.7	0.8	0.8	1.1	0.9	1.0	0.9	1.1	1.2	1.0	3.8	4.3	4.8	5.5	5.2	--	*
Delaware	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.3	4.8	5.4	7.0	4.0	4.0	4.2	3.8	3.4	7.1	--	*
DC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.1	7.4	5.6	--	--
Florida	1.6	2.8	2.5	2.6	3.1	2.8	3.2	4.2	4.7	5.5	6.4	5.6	4.4	3.8	3.5	3.8	5.1	5.4	*	*
Georgia	0.7	1.0	1.1	1.0	1.1	1.3	1.4	1.5	2.0	2.6	3.1	3.3	3.0	3.1	3.8	4.2	4.3	4.8	*	*
Hawaii	1.8	2.2	2.2	2.0	2.4	2.9	2.2	3.6	2.4	2.5	2.8	3.3	2.6	2.7	2.4	2.4	2.9	2.1		
Idaho	N/A	2.4	2.0	2.3	1.6	1.9	2.2	2.2	3.1	2.4	2.8	3.1	2.2	3.1	2.7	3.3	3.9	3.3	--	
Illinois	0.4	0.6	0.6	0.5	0.6	0.8	0.8	1.1	1.4	1.5	1.4	1.3	1.3	1.4	1.9	2.0	2.9	3.8	*	*
Indiana	N/A	0.4	0.4	0.6	0.8	0.9	0.8	1.3	1.7	2.3	2.2	2.7	2.1	1.7	2.3	2.2	3.5	6.1	--	*
Iowa	N/A	N/A	N/A	N/A	1.1	1.2	1.8	1.8	2.7	2.9	2.6	3.0	3.4	3.6	2.7	2.5	2.7	3.1	--	
Kansas	N/A	0.8	1.5	1.5	2.3	2.0	2.3	2.1	1.7	2.2	1.9	2.6	3.1	3.2	3.2	2.7	2.8	2.6	--	
Kentucky	1.3	2.1	2.0	2.3	2.1	3.1	4.1	4.4	5.5	6.8	10.3	11.1	9.0	8.0	7.7	8.9	9.3	9.4	*	*
Louisiana	0.5	1.0	0.9	1.2	1.2	1.2	1.5	2.1	1.4	1.3	1.5	1.2	1.6	1.9	2.0	2.3	2.3	3.5	*	*
Maine	N/A	N/A	1.9	2.2	2.1	2.9	3.1	4.1	3.5	5.6	4.0	3.2	4.7	4.9	6.1	7.7	10.8	5.5	--	
Maryland	0.4	0.4	0.4	0.5	1.3	1.6	1.9	2.2	2.9	3.2	3.5	4.0	4.2	4.9	6.2	6.5	10.7	8.5	*	*
Massachusetts	0.5	1.1	1.1	1.3	1.0	1.4	2.3	2.5	2.1	2.2	2.5	2.4	2.5	2.6	2.6	3.3	3.7	3.6	*	*
Michigan	0.4	0.6	0.8	0.8	1.0	1.5	1.7	1.8	2.2	2.1	2.5	2.3	2.8	2.8	3.3	3.9	5.7	5.2	*	*
Minnesota	N/A	0.8	0.8	0.8	1.2	1.2	1.1	1.5	1.6	2.1	1.8	1.8	2.0	2.0	1.9	2.2	2.5	2.8	--	*
Mississippi	N/A	N/A	N/A	N/A	N/A	N/A	1.0	1.6	2.0	1.5	1.7	1.8	2.1	1.8	2.1	2.5	3.2	3.0	--	*
Missouri	0.9	1.0	1.5	2.5	2.4	2.5	2.6	2.9	3.8	3.2	4.1	3.8	3.4	4.0	4.0	3.9	3.8	3.7	*	
Montana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.6	2.8	4.3	3.7	3.4	2.4	4.6	2.2	2.7	N/A	2.0	--	*
Nebraska	N/A	N/A	N/A	N/A	1.2	1.5	N/A	1.4	N/A	2.1	2.0	1.7	1.6	1.8	1.8	1.7	1.2	1.7	--	
Nevada	4.9	4.0	4.2	5.0	4.0	6.2	6.8	7.1	7.9	9.3	10.8	10.7	10.6	8.3	7.4	8.6	7.6	7.6	*	
New Hampshire	N/A	N/A	N/A	1.6	2.1	1.7	2.7	3.8	3.5	3.4	4.6	4.9	4.2	4.3	5.8	4.4	5.0	3.9	--	
New Jersey	0.9	1.1	1.1	1.3	1.0	1.4	1.6	1.5	1.4	N/A	2.0	2.5	2.4	2.6	2.7	2.6	3.8	4.6	*	*
New Mexico	5.5	4.7	7.6	8.0	5.3	7.0	8.6	8.9	10.4	6.0	5.6	6.1	9.0	10.1	10.9	8.1	7.5	7.1		*
New York	0.2	0.4	0.2	0.3	0.4	0.5	1.4	2.0	2.3	2.3	2.6	3.1	3.0	3.1	3.0	3.4	4.4	4.0	*	*
North Carolina	1.4	1.8	1.6	1.6	1.9	2.4	2.7	3.3	4.4	4.5	4.4	4.5	4.2	4.1	4.7	5.5	6.1	5.6	*	*
North Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Ohio	0.9	1.3	1.7	1.4	1.6	1.8	2.2	2.5	2.9	2.6	4.5	5.1	4.4	4.5	5.4	6.1	6.9	7.6	*	*
Oklahoma	2.0	2.8	2.4	4.2	4.2	4.9	6.0	8.0	6.9	9.4	9.3	9.4	10.1	9.8	9.6	7.2	7.4	6.0	*	*
Oregon	0.8	1.2	1.4	2.2	1.8	2.1	3.2	2.4	2.4	3.2	3.4	4.0	3.6	2.9	3.2	3.6	3.0	2.8	*	
Pennsylvania	0.8	0.6	0.8	1.1	1.3	1.3	1.2	1.7	2.1	2.4	2.6	2.6	2.9	3.2	3.3	3.7	5.2	4.5	*	*
Rhode Island	N/A	N/A	N/A	N/A	N/A	2.2	3.0	N/A	2.7	2.1	4.2	5.8	6.5	7.4	6.7	8.3	8.1	6.5	--	
South Carolina	1.0	1.3	0.9	1.3	1.4	1.4	2.6	2.5	2.6	2.7	3.2	3.2	3.2	3.0	6.5	6.5	7.0	6.4	*	*
South Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9	2.8	N/A	3.5	2.4	N/A	2.8	N/A	--	--
Tennessee	1.0	1.5	1.4	2.4	3.1	3.7	3.5	3.8	4.2	5.4	6.7	7.2	7.7	8.1	8.6	9.7	10.2	8.8	*	
Texas	0.7	1.0	1.4	1.6	1.6	1.8	2.5	2.2	1.8	2.2	2.2	2.0	1.8	1.7	1.7	1.7	1.8	1.9	*	
Utah	5.3	4.9	5.9	7.1	6.7	8.0	8.1	9.8	9.1	10.3	8.5	10.8	12.6	13.3	13.6	12.7	11.5	10.0	*	*
Vermont	N/A	N/A	N/A	4.7	3.9	N/A	4.1	4.6	4.7	3.6	4.3	4.7	4.0	5.9	3.4	3.9	3.9	3.9	--	
Virginia	1.4	1.9	1.9	1.9	2.3	2.0	2.1	2.7	2.7	2.6	2.4	3.9	3.4	3.5	3.9	3.3	4.0	3.9	*	
Washington	1.6	2.0	2.2	2.6	3.3	3.6	4.0	4.1	4.4	4.7	4.1	4.5	4.6	3.7	3.8	3.5	3.7	3.1	*	
West Virginia	1.3	4.1	5.0	6.8	6.5	3.1	8.6	10.2	12.4	5.5	19.4	25.2	20.0	19.3	20.2	19.8	18.5	15.8	*	*
Wisconsin	0.9	1.2	1.7	1.9	1.9	2.4	2.9	3.2	3.1	3.3	4.0	3.9	3.9	4.8	4.8	4.3	5.7	5.5	*	
Wyoming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.6	4.8	4.3	5.9	4.6	5.0	4.4	5.7	--	
United States	**1.0**	**1.2**	**1.5**	**1.7**	**1.8**	**1.9**	**2.3**	**2.7**	**3.0**	**3.1**	**3.5**	**3.7**	**3.5**	**3.5**	**3.8**	**3.9**	**4.4**	**4.4**	*	*

N/A: Death rate is suppressed because it is based on 20 or fewer deaths.
-- Significance testing not possible because rate from 2000 was suppressed.
* Difference between 2000/2013 and 2017 rates is statistically significant at the 95% level.

APPENDIX TABLE 2: SYNTHETIC OPIOID OVERDOSE DEATHS PER 100,000 PEOPLE

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2000 2017 test	2013 2017 test
Alabama	N/A	N/A	N/A	N/A	N/A	N/A	0.5	0.4	N/A	0.7	0.7	N/A	N/A	0.6	1.0	1.6	3.5	4.3	--	*
Alaska	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.9	--	--
Arizona	N/A	0.4	0.4	0.4	0.5	0.6	0.9	0.6	0.8	0.9	1.0	0.6	0.6	0.8	0.8	1.1	1.8	4.0	--	*
Arkansas	N/A	N/A	0.9	1.0	1.1	1.0	1.1	1.0	1.6	2.1	2.1	1.0	0.7	1.1	1.2	1.5	1.3	2.2	--	*
California	0.2	0.1	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.9	1.3	*	*
Colorado	0.6	N/A	0.7	0.5	0.5	0.7	0.5	0.9	0.8	1.3	1.1	1.6	0.9	1.2	1.5	1.2	1.3	2.0	*	*
Connecticut	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6	N/A	0.5	0.6	N/A	N/A	1.4	2.7	6.1	14.8	20.3	--	*
Delaware	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.5	3.0	4.3	8.7	20.0	--	*
DC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.9	19.2	25.7	--	--
Florida	0.5	0.7	0.8	1.1	0.9	0.8	0.7	0.7	0.7	0.9	0.8	0.7	0.8	1.0	1.8	3.2	8.3	11.0	*	*
Georgia	N/A	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.6	0.9	1.0	0.9	0.6	0.8	1.7	2.8	2.7	4.1	--	*
Hawaii	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Idaho	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.3	1.3	--	--
Illinois	0.2	0.3	0.3	0.3	0.3	0.5	3.0	0.8	0.7	0.9	0.9	0.7	0.6	0.6	1.0	2.2	7.2	9.8	*	*
Indiana	N/A	N/A	N/A	0.4	0.4	0.4	0.8	0.8	0.9	1.0	0.8	0.6	0.7	0.5	1.3	1.9	4.9	10.5	--	*
Iowa	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	1.2	1.5	1.0	1.3	1.0	1.0	1.5	2.0	3.2	--	*
Kansas	N/A	N/A	N/A	N/A	0.8	N/A	N/A	N/A	N/A	1.3	N/A	0.8	1.6	1.3	1.4	1.3	1.0	1.2	--	
Kentucky	N/A	N/A	0.7	0.7	0.8	0.7	1.2	0.9	1.0	1.5	1.3	1.7	1.6	1.7	4.3	7.9	11.5	19.1	--	*
Louisiana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	N/A	N/A	0.5	0.4	N/A	0.6	0.7	0.8	2.0	3.6	--	*
Maine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.7	N/A	N/A	1.8	5.2	9.9	17.3	23.5	--	*
Maryland	N/A	N/A	N/A	N/A	N/A	0.4	0.9	0.6	0.6	0.9	0.9	1.0	0.8	1.5	3.8	5.8	17.8	25.2	--	*
Massachusetts	N/A	N/A	0.3	0.4	0.5	0.6	1.4	1.1	0.8	0.9	1.0	0.9	1.0	1.4	6.9	14.4	23.5	24.5	--	*
Michigan	N/A	N/A	0.4	0.3	0.5	0.9	2.0	0.7	0.7	0.9	0.9	0.9	0.7	0.9	1.9	4.8	9.8	14.4	--	*
Minnesota	N/A	N/A	N/A	N/A	N/A	N/A	0.5	0.5	0.6	0.7	0.7	0.6	0.7	0.6	0.8	1.0	1.9	3.5	--	*
Mississippi	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.7	1.2	1.1	0.8	N/A	0.7	0.9	0.8	1.3	1.6	2.9	--	*
Missouri	0.5	0.7	0.5	0.6	0.9	0.8	2.5	1.2	1.0	1.2	1.5	1.1	1.0	1.6	1.9	3.1	7.8	10.9	*	*
Montana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Nebraska	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.2	N/A	N/A	N/A	N/A	N/A	N/A	1.3	--	--
Nevada	N/A	0.9	1.0	N/A	1.0	1.2	1.1	0.9	1.0	1.5	1.4	1.6	0.9	0.9	1.0	1.1	1.7	2.2	--	*
New Hampshire	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.6	1.5	1.9	1.8	2.4	12.4	24.1	30.3	30.4	--	*
New Jersey	N/A	0.4	0.3	0.3	0.3	0.3	0.4	0.4	N/A	N/A	0.4	0.3	0.4	0.6	1.2	2.8	7.9	15.5	--	*
New Mexico	1.1	N/A	N/A	1.2	N/A	N/A	1.2	N/A	1.2	1.1	0.9	0.9	1.9	1.1	3.3	2.1	4.0	3.7	*	*
New York	N/A	0.2	0.1	0.1	N/A	0.1	0.7	0.6	0.6	0.9	0.9	0.8	0.8	1.1	1.4	3.3	8.3	11.3	--	*
North Carolina	0.6	0.7	0.6	0.8	1.3	1.3	1.2	1.2	1.3	1.8	1.8	1.6	1.4	1.2	2.2	3.1	6.2	13.2	*	*
North Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Ohio	0.3	0.5	0.5	0.4	0.7	0.9	1.1	1.0	0.9	0.8	1.5	1.4	1.2	1.4	5.5	11.4	21.1	32.4	*	*
Oklahoma	0.8	0.6	0.7	1.3	1.3	1.6	1.3	1.8	2.0	4.4	3.0	2.2	2.9	2.3	1.9	2.4	2.5	2.6	*	
Oregon	N/A	N/A	N/A	N/A	N/A	0.6	0.7	N/A	0.6	0.8	0.7	0.7	0.7	0.6	0.8	0.9	1.1	2.1	--	*
Pennsylvania	0.3	0.2	0.4	0.6	0.7	0.6	0.8	0.7	0.8	0.9	0.8	0.9	0.8	0.9	1.8	3.5	10.9	16.7	*	*
Rhode Island	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9	7.9	13.2	17.8	20.1	--	*
South Carolina	N/A	N/A	0.5	N/A	0.8	0.7	0.9	0.8	0.9	1.2	1.2	1.0	1.0	1.1	2.3	3.3	5.0	8.5	--	*
South Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Tennessee	N/A	N/A	0.3	1.1	1.3	1.3	1.1	1.4	1.6	1.2	1.1	1.0	1.2	1.5	2.1	4.0	6.2	9.3	--	*
Texas	0.2	0.4	0.6	0.4	0.4	0.4	0.5	0.5	0.4	0.7	0.6	0.5	0.5	0.4	0.6	0.7	0.9	1.2	*	*
Utah	N/A	N/A	N/A	1.1	N/A	1.7	1.7	1.4	1.0	2.4	2.0	2.1	2.2	2.2	2.5	2.3	2.5	3.1	--	*
Vermont	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.6	5.6	10.1	13.8	--	--
Virginia	0.4	0.4	0.6	0.6	0.8	0.6	0.8	0.9	1.1	1.0	1.0	0.9	1.1	1.5	2.1	3.3	7.9	10.0	*	*
Washington	0.4	0.5	0.8	0.5	0.7	0.8	0.8	0.5	0.7	1.0	0.9	0.7	0.8	0.8	0.8	0.9	1.3	1.9	*	*
West Virginia	N/A	2.1	2.2	2.5	3.7	2.4	2.9	4.6	5.0	2.4	5.8	5.6	5.0	5.6	7.2	12.7	26.3	37.4	--	*
Wisconsin	0.4	0.4	0.5	0.8	0.8	0.9	1.0	1.0	1.0	1.3	1.2	1.1	0.9	1.4	1.6	2.1	5.3	8.6	*	*
Wyoming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
United States	**0.3**	**0.3**	**0.4**	**0.5**	**0.6**	**0.6**	**0.9**	**0.7**	**0.8**	**1.0**	**1.0**	**0.8**	**0.8**	**1.0**	**1.8**	**3.1**	**6.2**	**9.0**	*	*

N/A: Death rate is suppressed because it is based on 20 or fewer deaths.
-- Significance testing not possible because rate from 2000 was suppressed.
* Difference between 2000/2013 and 2017 rates is statistically significant at the 95% level.

APPENDIX TABLE 3: HEROIN-RELATED OVERDOSE DEATHS PER 100,000 PEOPLE

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2000 2017 test	2013 2017 test
Alabama	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	0.8	2.7	2.5	2.8	2.7	--	*
Alaska	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9	3.2	3.3	4.7	6.5	4.9	--	
Arizona	N/A	0.5	0.5	1.2	0.8	0.6	0.9	0.9	1.1	1.4	1.5	1.9	1.6	2.3	3.1	3.8	4.5	5.0	--	*
Arkansas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
California	1.0	0.7	1.0	1.0	0.8	0.7	0.8	0.8	0.9	0.9	0.8	0.9	0.9	1.2	1.4	1.5	1.4	1.7	*	*
Colorado	0.8	0.5	0.6	0.4	0.5	0.8	0.8	0.8	0.9	1.4	0.9	1.5	1.8	2.3	2.9	2.8	4.2	3.9	*	*
Connecticut	3.2	2.8	2.6	3.2	2.8	2.2	2.5	3.5	3.2	2.9	2.3	2.5	2.9	6.5	8.9	11.3	13.1	12.4	*	*
Delaware	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.4	4.5	6.3	7.1	6.1	13.3	--	*
DC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.6	4.4	5.1	5.5	9.9	17.3	18.0	--	*
Florida	1.1	1.3	1.3	1.3	0.9	0.7	0.5	0.5	0.6	0.5	0.3	0.4	0.6	1.0	1.9	3.1	3.6	3.6	*	*
Georgia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	0.2	N/A	0.3	0.4	0.7	1.6	2.2	2.2	2.6	--	*
Hawaii	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.4	N/A	--	--
Idaho	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.6	1.5	--	--
Illinois	0.3	0.3	0.4	0.2	0.3	0.4	0.5	0.5	0.8	0.9	1.2	1.3	2.1	4.5	5.6	6.7	8.2	9.2	*	*
Indiana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.9	1.0	0.9	1.1	1.8	2.6	2.8	3.9	4.7	5.3	--	*
Iowa	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.0	1.3	1.6	1.7	2.1	--	*
Kansas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.7	1.2	0.9	--	--
Kentucky	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6	0.9	1.3	3.4	5.1	5.5	7.4	7.6	6.6	--	*
Louisiana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.1	2.7	2.4	2.9	3.4	3.6	--	*
Maine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.1	4.5	4.7	6.2	--	--
Maryland	N/A	N/A	0.5	0.5	1.3	1.4	1.9	2.3	1.8	2.7	1.6	1.8	2.9	3.6	5.2	6.6	10.7	8.6	--	*
Massachusetts	N/A	N/A	N/A	0.4	N/A	0.3	0.6	1.1	0.9	0.9	1.1	2.2	3.8	4.4	7.2	9.6	9.5	7.0	--	*
Michigan	0.9	0.8	0.6	0.7	0.9	1.5	1.5	1.1	2.2	2.6	2.2	2.8	2.8	4.5	5.5	6.8	7.6	8.2	*	*
Minnesota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	0.9	1.7	1.9	2.2	2.8	2.0	--	
Mississippi	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	1.4	1.2	1.3	--	--
Missouri	0.9	0.4	1.0	0.7	1.0	0.9	1.1	1.1	2.1	2.8	3.2	4.4	3.7	4.6	5.8	5.3	6.7	5.3	*	
Montana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Nebraska	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Nevada	1.9	1.1	1.8	1.6	1.2	1.9	1.4	1.6	1.2	0.8	N/A	1.5	1.6	1.7	2.2	2.7	2.9	3.1	*	*
New Hampshire	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.0	N/A	3.4	3.5	5.5	8.1	6.5	2.8	2.4	--	*
New Jersey	2.4	2.3	2.7	2.5	1.4	2.0	1.2	1.2	1.3	N/A	1.1	1.5	3.6	4.4	4.8	5.8	9.7	12.2	*	*
New Mexico	2.2	1.2	1.3	1.4	1.8	2.5	1.1	1.4	3.3	2.4	1.1	3.4	5.2	4.6	7.2	8.1	8.2	7.4	*	*
New York	0.1	0.3	0.3	0.3	0.2	0.2	0.6	1.0	1.1	1.3	1.0	1.7	2.6	3.3	4.2	5.4	6.5	6.8	*	*
North Carolina	0.5	0.6	0.5	0.6	0.6	0.7	0.6	0.6	0.7	0.8	0.4	0.9	1.6	2.0	2.8	4.1	5.7	5.6	*	*
North Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Ohio	0.7	0.8	1.0	0.8	1.1	1.2	1.1	1.4	2.1	2.0	3.3	4.0	6.4	9.1	11.1	13.3	13.5	9.2	*	
Oklahoma	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.7	0.6	0.7	1.0	1.4	1.6	--	*
Oregon	0.9	1.0	1.2	1.0	1.3	1.1	1.6	3.0	2.5	3.1	2.0	3.5	3.5	2.7	3.2	2.5	2.9	3.0	*	
Pennsylvania	1.2	1.0	1.1	1.4	1.1	1.1	0.8	0.7	1.3	1.4	1.1	2.0	2.7	3.4	4.3	5.6	7.8	6.9	*	*
Rhode Island	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9	6.5	6.8	4.3	2.5	N/A	--	--
South Carolina	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.7	1.4	2.2	2.5	3.2	--	*
South Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Tennessee	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.4	N/A	N/A	0.8	1.1	2.3	3.3	4.1	4.8	--	*
Texas	0.5	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.0	1.2	1.0	1.4	1.4	1.4	1.6	1.9	1.9	2.0	*	*
Utah	2.3	1.9	1.2	1.3	0.9	1.9	1.8	1.9	2.7	2.1	1.9	2.7	3.0	4.2	3.8	4.3	5.6	4.8	*	
Vermont	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.5	5.8	5.8	8.7	7.3	--	*
Virginia	0.9	1.2	1.2	1.2	0.9	0.8	0.9	1.2	1.1	1.3	0.5	1.3	1.4	2.5	3.1	4.3	5.4	6.7	*	*
Washington	0.9	0.8	1.1	1.0	0.9	0.8	0.8	1.2	1.0	1.0	0.9	2.2	2.5	2.9	4.1	4.2	3.9	4.0	*	*
West Virginia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.2	2.1	N/A	1.7	2.0	3.8	8.7	9.8	11.8	14.9	14.9	--	*
Wisconsin	0.5	0.4	0.5	0.5	0.4	0.6	0.5	0.6	1.2	1.4	1.7	2.5	3.4	4.3	4.9	5.3	7.3	7.8	*	*
Wyoming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
United States	**0.7**	**0.6**	**0.7**	**0.7**	**0.6**	**0.7**	**0.7**	**0.8**	**1.0**	**1.1**	**1.0**	**1.4**	**1.9**	**2.7**	**3.4**	**4.1**	**4.9**	**4.9**	*	*

N/A: Death rate is suppressed because it is based on 20 or fewer deaths.
-- Significance testing not possible because rate from 2000 was suppressed.
* Difference between 2000/2013 and 2017 rates is statistically significant at the 95% level.

APPENDIX TABLE 4: COCAINE OVERDOSE DEATHS PER 100,000 PEOPLE

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2000 2017 test	2013 2017 test
Alabama	N/A	0.5	0.5	N/A	0.8	0.8	1.0	0.7	1.2	0.7	0.6	0.5	N/A	0.7	0.8	0.8	1.8	2.2	--	*
Alaska	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.7	3.5	N/A	N/A	2.7	N/A	N/A	N/A	N/A	N/A	--	--
Arizona	2.5	2.3	2.9	2.6	2.2	2.2	2.7	2.1	1.2	1.6	1.0	0.9	0.9	0.7	0.7	0.9	1.2	2.0		*
Arkansas	N/A	N/A	0.8	0.9	0.8	1.3	1.2	1.2	0.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	--	--
California	0.9	0.5	1.1	1.1	1.0	1.1	1.2	1.1	0.8	0.7	0.6	0.7	0.5	0.6	0.6	0.7	0.9	1.0	*	*
Colorado	1.8	2.0	2.3	2.7	2.6	2.9	3.6	2.8	2.3	1.7	1.3	1.7	1.2	1.0	1.3	1.0	1.9	1.7		*
Connecticut	1.1	1.5	1.7	1.8	1.7	2.3	3.0	2.8	2.0	1.7	1.4	2.2	2.0	3.9	3.5	4.7	6.9	8.4	*	*
Delaware	N/A	N/A	3.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9	N/A	2.7	N/A	2.1	2.3	5.3	11.6	--	--
DC	7.6	8.7	6.4	10.0	7.6	7.0	9.0	4.9	4.4	N/A	6.3	4.7	5.2	4.8	5.3	4.9	13.5	17.6	*	*
Florida	1.3	2.1	2.2	2.6	2.6	3.0	3.2	3.3	2.3	1.7	1.8	2.0	1.7	1.9	2.2	2.9	5.4	6.7	*	*
Georgia	1.1	1.3	1.3	1.5	1.5	1.6	1.8	1.8	1.3	1.4	1.1	1.0	1.0	1.1	1.4	1.5	2.0	2.4	*	*
Hawaii	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Idaho	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Illinois	2.8	2.6	2.9	2.7	3.5	3.4	4.4	3.2	3.1	2.6	2.2	2.4	2.6	2.2	2.1	2.5	4.0	5.7	*	*
Indiana	N/A	0.5	0.5	0.6	0.9	0.8	0.9	0.9	0.8	0.6	0.7	0.5	0.6	0.8	0.8	1.1	1.7	4.0	--	*
Iowa	N/A	N/A	N/A	N/A	N/A	N/A	0.7	0.7	N/A	N/A	0.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Kansas	0.9	N/A	0.8	1.2	1.3	1.3	1.8	1.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8		--
Kentucky	N/A	0.7	0.9	1.0	1.1	1.7	2.1	1.8	1.4	0.9	0.9	0.8	1.3	1.8	1.7	2.4	3.5	4.3	--	*
Louisiana	0.6	0.9	0.9	1.7	1.2	2.3	3.2	2.8	1.7	1.2	1.0	1.3	0.8	1.3	1.5	1.7	2.6	2.9	*	*
Maine	N/A	N/A	N/A	N/A	1.6	N/A	1.8	2.3	N/A	N/A	N/A	N/A	N/A	N/A	1.9	2.8	5.0	7.7	--	--
Maryland	2.1	2.1	2.4	3.0	2.8	2.7	3.4	2.7	1.9	1.5	1.4	1.5	1.5	1.6	2.0	2.3	5.0	8.6	*	*
Massachusetts	2.2	3.2	3.1	4.6	3.3	4.0	5.0	4.3	2.9	2.5	2.6	3.1	2.7	3.5	4.5	6.1	8.5	10.1	*	*
Michigan	0.9	0.8	1.0	1.1	1.5	2.0	2.3	1.8	1.7	1.9	1.4	1.5	1.4	1.9	2.3	3.2	5.3	6.7	*	*
Minnesota	N/A	N/A	0.4	0.5	0.6	0.5	0.5	0.9	0.4	0.4	0.5	0.7	0.5	0.7	0.7	0.7	0.8	1.3	--	*
Mississippi	N/A	N/A	N/A	N/A	1.0	1.0	1.9	N/A	0.8	0.9	N/A	N/A	N/A	N/A	N/A	0.9	1.1	1.3	--	--
Missouri	0.8	0.8	1.1	1.3	1.2	1.4	1.9	1.5	1.3	1.1	1.1	1.0	0.8	0.9	1.0	1.3	1.8	2.2	*	*
Montana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Nebraska	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Nevada	4.0	2.9	2.8	3.8	3.5	3.7	3.3	3.5	2.7	2.3	1.7	1.6	1.4	1.8	0.8	1.3	1.2	1.6	*	
New Hampshire	N/A	N/A	1.7	2.0	2.8	2.9	2.9	3.1	N/A	2.2	1.7	1.7	N/A	2.2	2.7	4.1	5.0	3.9	--	*
New Jersey	2.0	2.2	2.6	2.5	2.1	3.5	2.3	1.9	1.7	N/A	1.6	1.3	1.8	2.2	2.1	2.3	4.4	6.2	*	*
New Mexico	4.9	4.0	5.1	6.1	4.7	5.9	5.8	5.8	5.7	3.6	2.5	2.6	3.4	3.0	3.9	2.6	3.0	2.9	*	
New York	1.8	2.2	2.0	1.9	2.0	2.3	3.4	3.0	2.4	2.1	2.0	2.3	2.3	2.6	2.5	3.1	4.9	6.5	*	*
North Carolina	1.0	1.1	1.6	2.1	2.4	3.4	3.7	2.5	2.0	1.8	1.3	1.8	2.1	1.8	2.3	3.2	5.1	7.2	*	*
North Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Ohio	1.0	1.1	1.4	1.4	2.2	2.1	3.0	2.6	2.4	1.6	2.0	2.8	3.0	3.6	4.7	6.3	10.1	14.0	*	*
Oklahoma	N/A	0.6	N/A	1.3	1.6	1.1	1.2	2.0	1.0	0.9	1.0	1.0	1.0	0.7	N/A	0.7	0.8	1.1	--	
Oregon	0.7	0.7	0.8	N/A	0.8	1.0	1.0	1.3	0.8	0.6	0.5	0.9	N/A	N/A	0.5	0.6	0.7	0.9		--
Pennsylvania	1.0	0.7	1.2	1.4	1.6	1.8	1.8	1.6	1.8	1.5	1.7	1.7	1.5	1.5	1.6	2.2	4.2	6.1	*	*
Rhode Island	2.3	2.9	3.0	4.0	2.5	4.8	6.8	3.6	3.4	3.5	4.5	4.2	4.6	6.5	6.5	8.3	10.7	11.2	*	*
South Carolina	0.9	1.2	1.0	1.6	1.4	1.9	2.5	1.9	1.9	1.6	1.4	1.4	1.1	1.0	1.8	2.4	3.0	4.7	*	*
South Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Tennessee	0.9	1.1	1.5	1.8	2.5	3.3	3.8	3.2	2.0	2.1	1.9	2.1	1.6	2.0	2.1	3.0	3.8	4.6	*	*
Texas	1.2	1.6	1.9	2.1	2.2	2.2	2.9	2.5	1.8	1.7	1.6	1.8	1.6	1.5	1.5	1.7	2.1	2.4	*	*
Utah	3.2	2.3	2.3	3.2	2.8	3.4	3.7	3.2	2.7	2.2	1.4	1.6	1.9	1.0	1.4	1.5	1.7	1.5	*	
Vermont	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.0	6.9	--	--
Virginia	1.0	1.0	1.5	1.5	1.7	1.8	1.8	1.8	1.2	0.8	0.9	1.2	0.8	1.3	1.5	2.0	3.0	4.1	*	*
Washington	2.5	1.8	2.3	2.4	2.6	2.4	2.9	2.4	1.8	1.7	1.0	1.3	0.8	1.2	1.2	1.1	1.2	1.4	*	
West Virginia	N/A	N/A	2.2	2.7	3.3	2.4	3.8	3.5	3.4	1.6	3.5	4.3	3.4	4.4	3.1	5.6	8.5	11.6	--	*
Wisconsin	1.0	1.1	1.4	2.0	2.0	2.2	2.8	2.8	1.5	1.4	1.4	1.6	1.1	1.6	1.8	2.0	2.6	4.8	*	*
Wyoming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
United States	**1.3**	**1.3**	**1.6**	**1.8**	**1.9**	**2.1**	**2.5**	**2.2**	**1.7**	**1.4**	**1.3**	**1.5**	**1.4**	**1.6**	**1.7**	**2.1**	**3.2**	**4.3**	*	*

N/A: Death rate is suppressed because it is based on 20 or fewer deaths.
-- Significance testing not possible because rate from 2000 was suppressed.
* Difference between 2000/2013 and 2017 rates is statistically significant at the 95% level.

APPENDIX TABLE 5: PSYCHOSTIMULANT OVERDOSE DEATHS PER 100,000 PEOPLE

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2000 2017 test	2013 2017 test
Alabama	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	N/A	N/A	0.5	0.6	0.9	1.2	2.6	--	*
Alaska	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.0	3.4	3.9	3.5	6.3	9.1	--	*
Arizona	0.5	1.0	0.9	1.3	1.5	1.8	1.9	1.8	1.3	1.6	1.8	2.0	2.0	2.9	3.6	5.1	6.7	8.5	*	*
Arkansas	N/A	N/A	N/A	0.8	N/A	1.0	1.0	0.9	0.9	1.3	1.2	1.4	1.5	1.6	2.2	2.1	2.6	3.1	--	*
California	0.6	0.3	1.1	1.3	1.3	1.5	1.4	1.3	1.2	1.4	1.5	1.7	2.0	2.6	2.8	3.6	3.8	4.6	*	*
Colorado	N/A	0.5	N/A	0.7	0.6	1.1	0.7	0.9	0.8	0.8	0.8	1.2	1.1	1.9	2.2	2.6	3.6	5.2	--	*
Connecticut	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6	0.7	1.2	--	--
Delaware	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
DC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Florida	0.2	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.8	1.5	2.2	*	*
Georgia	N/A	N/A	0.2	N/A	0.5	0.5	0.5	0.3	0.3	0.5	0.7	0.6	0.8	1.1	1.4	2.2	2.4	3.6	--	*
Hawaii	N/A	N/A	N/A	1.8	2.2	2.7	1.6	2.3	2.2	2.7	3.3	3.5	3.0	4.0	4.0	5.9	6.8	7.4	--	*
Idaho	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.7	1.9	2.6	2.9	2.7	--	
Illinois	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	0.2	0.4	0.5	0.9	1.4	--	*
Indiana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.6	0.8	2.0	4.7	--	*
Iowa	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.9	N/A	1.0	1.7	1.4	2.2	2.7	3.3	--	*
Kansas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	1.1	1.3	1.3	2.3	3.0	2.9	--	*
Kentucky	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.7	0.6	1.0	1.5	2.2	4.7	8.0	--	*
Louisiana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	0.8	1.0	1.8	2.3	--	*
Maine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.7	2.3	3.8	--	--
Maryland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.4	0.8	1.2	--	--
Massachusetts	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.4	0.7	0.6	0.7	1.0	--	*
Michigan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3	N/A	0.3	0.6	0.6	0.9	1.6	--	*
Minnesota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	0.9	0.7	1.3	1.5	2.6	2.9	--	*
Mississippi	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	1.9	2.0	2.3	--	--
Missouri	N/A	N/A	N/A	N/A	0.4	0.5	0.5	0.4	0.4	0.5	0.8	0.8	1.0	1.3	1.8	2.4	3.3	4.3	--	*
Montana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.6	2.6	2.5	--	--
Nebraska	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.5	N/A	2.1	--	--
Nevada	1.2	N/A	2.1	1.9	3.0	2.7	2.8	1.9	1.9	2.6	2.9	4.0	3.7	4.9	4.5	5.7	7.5	8.3	*	*
New Hampshire	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.3	--	--
New Jersey	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	0.6	0.9	--	--
New Mexico	N/A	N/A	N/A	1.3	1.6	2.1	2.0	1.9	1.5	1.4	1.4	1.7	3.4	4.2	6.3	6.1	7.1	8.2	--	*
New York	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.4	0.8	1.0	--	*
North Carolina	N/A	N/A	N/A	N/A	N/A	0.2	N/A	N/A	N/A	N/A	N/A	0.2	0.3	0.3	0.3	0.7	1.2	1.8	--	*
North Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.0	--	--
Ohio	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.3	0.5	0.6	1.0	2.3	5.3	--	*
Oklahoma	0.7	0.7	0.6	1.3	1.5	1.9	1.2	1.2	0.7	1.9	2.5	2.4	3.0	3.9	3.8	5.3	7.1	7.2	*	*
Oregon	N/A	N/A	0.7	0.6	0.8	0.9	N/A	N/A	0.6	0.9	0.9	1.6	1.4	2.1	2.9	3.1	3.6	4.0	--	*
Pennsylvania	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2	0.2	0.3	0.3	0.5	0.9	1.6	--	*
Rhode Island	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
South Carolina	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6	1.4	1.9	2.7	4.0	--	*
South Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.1	--	--
Tennessee	N/A	N/A	N/A	N/A	N/A	0.4	N/A	0.4	N/A	0.3	0.6	0.8	0.8	1.3	1.2	1.8	2.9	5.0	--	*
Texas	0.2	0.2	0.3	0.4	0.4	0.6	0.5	0.4	0.4	0.5	0.6	0.7	0.8	1.2	1.4	1.7	2.1	2.3	*	*
Utah	N/A	N/A	1.2	1.8	1.8	1.8	2.2	1.7	1.8	1.8	1.4	2.2	3.1	3.8	3.9	5.2	5.1	6.8	--	*
Vermont	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
Virginia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.6	0.7	0.9	1.4	--	*
Washington	0.9	0.7	1.1	1.5	1.5	1.5	1.3	1.4	1.1	1.6	1.4	1.8	2.1	2.7	3.1	4.2	4.4	5.2	*	*
West Virginia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.3	2.2	3.9	7.0	13.6	--	*
Wisconsin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.4	N/A	0.5	0.9	0.7	1.4	2.3	--	*
Wyoming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	--	--
United States	**0.2**	**0.2**	**0.3**	**0.4**	**0.4**	**0.5**	**0.5**	**0.4**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**1.2**	**1.4**	**1.8**	**2.4**	**3.2**	*	*

N/A: Death rate is suppressed because it is based on 20 or fewer deaths.
-- Significance testing not possible because rate from 2000 was suppressed.
* Difference between 2000/2013 and 2017 rates is statistically significant at the 95% level.