



# The Opioid Epidemic: National 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 age, sex, race/ethnicity and urbanization.

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## COMPANION BRIEF

To read SHADAC's analysis of state-level data on opioid-related overdose deaths, visit: [www.shadac.org/2017OpioidBriefs](http://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.<sup>1,2</sup> Most of these deaths involved opioids, including heroin, prescription painkillers, and synthetic opioids such as fentanyl.<sup>3</sup> 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 population subgroups.

## 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).<sup>4</sup> 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.<sup>5</sup> 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.<sup>6</sup>

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.<sup>7,8</sup> For example, a national study found that 80 percent of people who reported using heroin also reported earlier misuse of prescription opioids.<sup>9</sup> 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.<sup>10</sup>

### 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.<sup>11,12,13,14</sup>

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.<sup>15</sup> 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.<sup>16,17</sup>

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.”<sup>18</sup> 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.<sup>19,20</sup> 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.<sup>21,22</sup> 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.<sup>23,24</sup>

### Opioids and Related Drugs

For nearly two decades, the U.S. has experienced statistically significant increases in overdose deaths related to opioids; 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.<sup>25</sup> However, data on overdose deaths show a nuanced story, with related but distinct trends in mortality for different types of opioids. Additionally, while opioid death rates have increased almost universally across different subpopulations in the U.S. (e.g., age, sex, race/ethnicity, and metropolitan/non-metropolitan communities), not all groups have been affected equally.

The following sections use vital statistics data from the CDC to examine national increases in overdose deaths from opioids and other selected drugs since 2000, as well as differences across groups by age, sex, race/ethnicity, and metro/non-metro communities (state-level analysis can be found in the companion brief, [The Opioid Epidemic: State Trends in Opioid-Related Overdose Deaths from 2000 to 2017](#)). 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.<sup>26</sup>

**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 at times 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.<sup>27</sup>

**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.<sup>28</sup> 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.<sup>29,30,31</sup> 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.<sup>32</sup>

**Cocaine:** Cocaine is a stimulant drug that is derived from the coca plant.<sup>33</sup> 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.<sup>34,35</sup> 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.<sup>36</sup> 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.<sup>37</sup>

### 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.

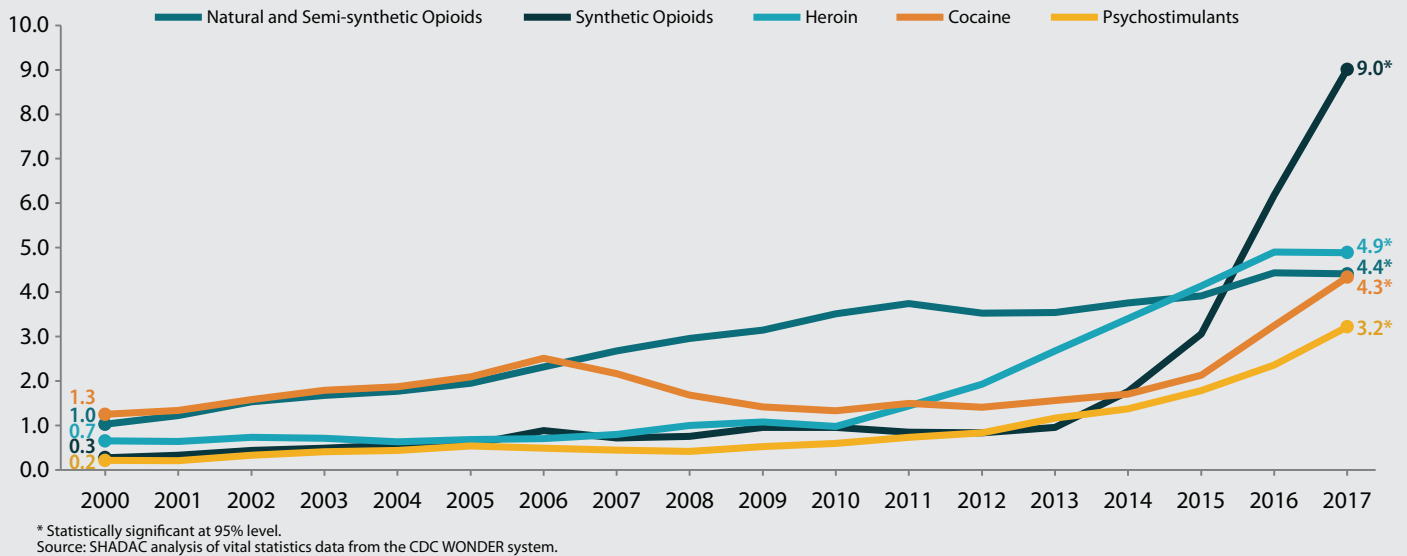
#### Opioid death trends

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.<sup>38</sup> 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 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



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.<sup>39,40,41</sup> 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.<sup>42,43</sup> 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.<sup>44,45,46</sup>

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.

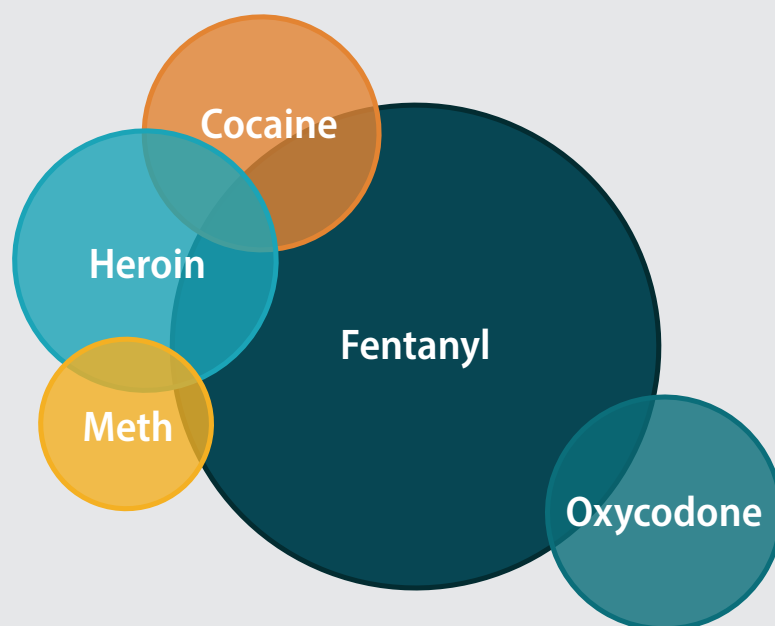
The overlapping trends between illicit opioids, cocaine, and psychostimulants—when viewed in combination with other evidence—suggest that increased deaths from these non-opioid illicit drugs are likely related to the evolving opioid crisis. A recent study by the CDC found that cocaine deaths between 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).<sup>47</sup> 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.<sup>48</sup> 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 opioids, with approximately 11 percent also involving fentanyl.<sup>49</sup> 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.<sup>50,51</sup> The likely explanations again include both deliberate combination drug use and use of methamphetamine that is contaminated with synthetic opioids.<sup>52</sup>

#### Overlapping Opioid, Cocaine and Psychostimulant Overdose Deaths

A 2018 study by the CDC found that opioid overdose deaths commonly involve more than one substance.<sup>63</sup> 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.<sup>64</sup> 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.<sup>65</sup>

Figure 2: Common Patterns in Overlapping Drug Overdose Deaths





### Opioid and related deaths by age

Since 2000, U.S. deaths from opioids have increased measurably across nearly all ages of adolescents and adults, but we focus on non-elderly adults for our analysis by age sub-group because they have the highest rates of overdose deaths.<sup>53</sup> However, the death rate totals presented here include people of all ages (i.e., children, non-elderly adults, and elderly adults). These increases across age groups largely mirror the overall trends in drug overdose deaths among the U.S. population as a whole—steep increases in heroin deaths since 2010 and synthetic opioids, cocaine, and psychostimulants since 2013, and more gradual but consistent increases in deaths from natural and semi-synthetic opioids since 2000.

Even though opioid death rates moved in similar directions over time, actual opioid death rates differed between age groups. In 2017, three age groups had synthetic opioid death rates that were significantly higher than the overall rate for all ages (8.7 per 100,000):<sup>54</sup> Adults age 25-34 had the highest rate for synthetic opioid deaths (19.5 per 100,000), followed by age 35-44 (17.3 per 100,000) and age 45-54 (13.6 per 100,000) (Figure 3).<sup>55</sup> Adults age 55-64 had rates that were significantly lower than the overall rate (8.3 per 100,000), and young adults age 18-24 had a rate that was not significantly different from the overall rate (8.5 per 100,000).

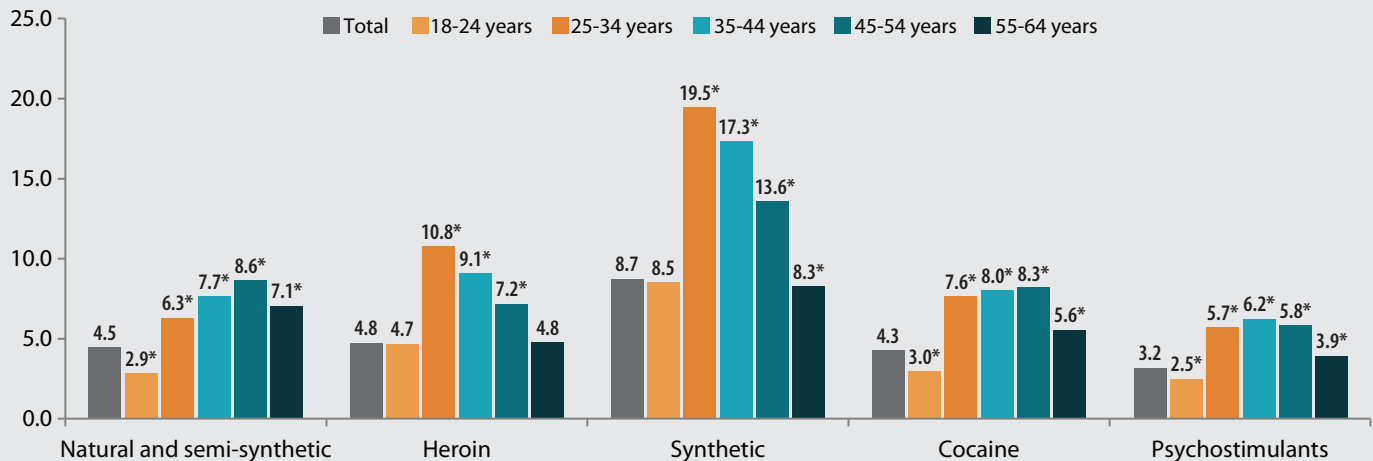
The pattern for heroin deaths was similar to synthetic opioids. Three age groups experienced heroin overdose death rates higher than the overall rate for all ages (4.8 per 100,000): Adults age 25-34 had the highest rate for heroin deaths (10.8 per 100,000), followed by age 35-44 (9.1 per 100,000), age 45-54 (7.2 per 100,000). Young adults age 18-24 (4.7 per 100,000) and adults age 55-64 (4.8 per 100,000) had rates that were not significantly different than the overall rate.

The pattern for natural and semi-synthetic opioids differed from heroin and synthetic opioids, skewing toward older adults. In this case, four age groups had death rates higher than the overall rate (4.5 per 100,000): Adults age 45-54 had the highest rate (8.6 per 100,000), followed by age 35-44 (7.7 per 100,000), age 55-64 (7.1 per 100,000), and age 25-34 (6.3 per 100,000). Young adults age 18-24 had rates that were significantly lower than the overall rate (2.9 per 100,000).

The pattern for cocaine deaths most resembled natural and semi-synthetic opioids, skewing toward older adults. In this case, four age groups had death rates higher than the overall rate (4.3 per 100,000): Adults age 45-54 had the highest rate (8.3 per 100,000), followed by age 35-44 (8.0 per 100,000), age 25-34 (7.6 per 100,000), and age 55-64 (5.6 per 100,000). Young adults age 18-24 had rates that were significantly lower than the overall rate (3.0 per 100,000).

The pattern for psychostimulant deaths was unique, without as strong a skew toward older or younger adults. In this case, four age groups had death rates higher than the overall rate (3.2 per 100,000): Adults age 35-44 had the highest rate (6.2 per 100,000), followed by age 45-54 (5.8 per 100,000), age 25-34 (5.7 per 100,000), and age 55-64 (3.9 per 100,000). Young adults age 18-24 had rates that were significantly lower than the overall rate (2.5 per 100,000).

**Figure 3: U.S. Overdose Death Rates Per 100,000 People by Age, 2017**



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

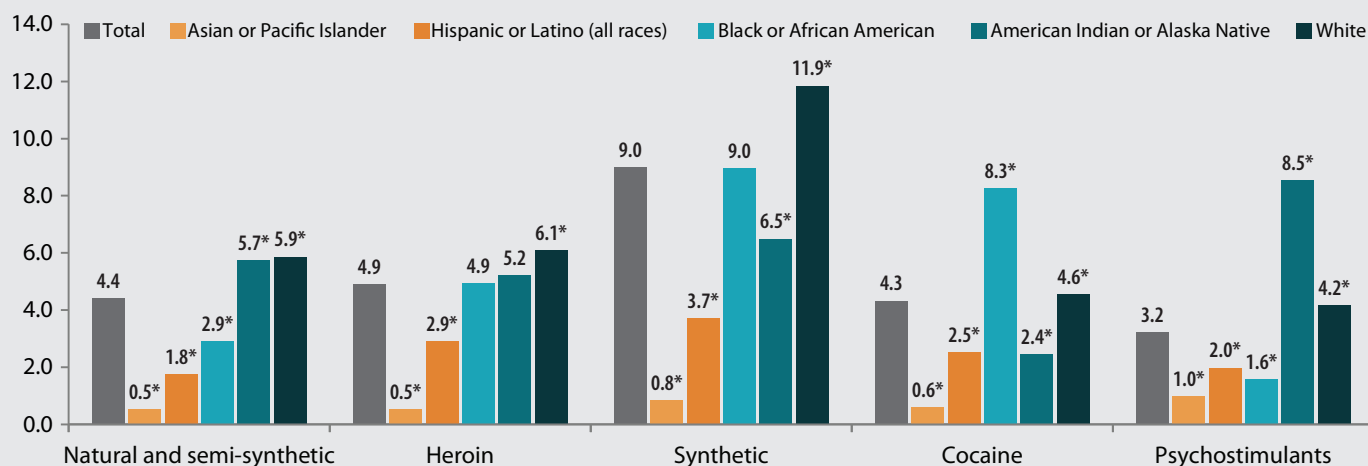
### Opioid and related deaths by race and ethnicity

Although the scale of the opioid crisis varies across racial and ethnic groups in the U.S., with some groups being hit especially hard, the crisis has not excluded any group entirely. Death rates from each type of opioids—natural and semi-synthetic, heroin, and synthetic—have increased significantly since 2000 across groups: American Indians and Alaska Natives, Asians and Pacific Islanders, blacks, whites, and Hispanics/Latinos.<sup>56</sup> Death rates from cocaine and psychostimulants have similarly increased significantly across racial/ethnic groups since 2000.

In 2017, whites had the highest rates of death for all three types of opioids. The death rate for whites was significantly higher than the overall rate for synthetic opioids (11.9 versus 9.0 per 100,000), heroin (6.1 versus 4.9 per 100,000), and natural and semi-synthetic opioids (5.9 versus 4.4 per 100,000) (Figure 4). Aside from American Indians and Alaska Natives, whose death rate from natural and semi-synthetic opioids was significantly higher than the overall rate (5.7 versus 4.4 per 100,000), no other group had opioid death rates that were significantly higher than the overall rate for opioids.

Although whites also had death rates that were significantly higher than the overall rates for cocaine (4.6 versus 4.3 per 100,000) and psychostimulants (4.2 versus 3.2 per 100,000), they did not have the highest death rates for these drugs. For cocaine, blacks had the highest death rate (8.3 versus 4.3 per 100,000), which was a statistically significant difference from the overall rate. For psychostimulants, American Indians and Alaska Natives had the highest death rate (8.5 versus 3.2 per 100,000), which was a statistically significant difference from the overall rate. These findings are consistent with other studies showing relatively high prevalence in use of and complications from cocaine among blacks and methamphetamine among American Indians and Alaska Natives.<sup>57,58,59,60,61</sup>

Figure 4: U.S. Overdose Death Rates Per 100,000 People by Race/Ethnicity, 2017



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

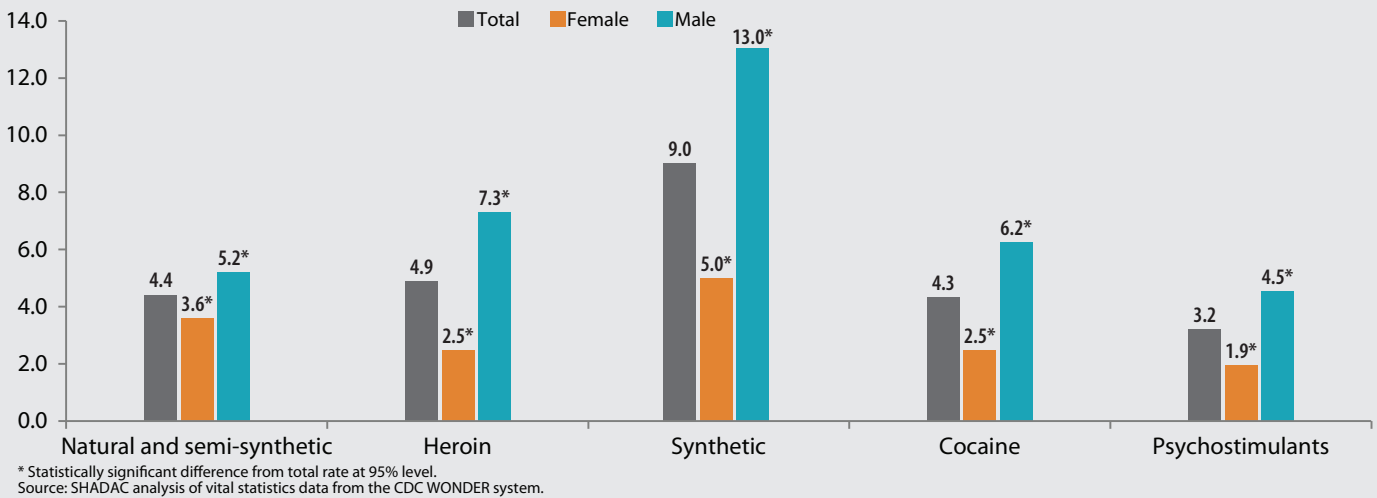
### Opioid and related deaths by sex

Death rates from each type of opioid, cocaine, and psychostimulants have increased significantly among both males and females since 2000, but males have consistently had higher rates of overdose deaths. However, the gap in overdose death rates between males and females varies by type of drug.

For heroin-related overdoses, females’ death rate in 2017 was approximately one-third the rate of males (2.5 versus 7.3 per 100,000), and for synthetic opioids, females’ death rate was slightly more than one-third the rate of males (5.0 versus 13.0 per 100,000) (Figure 5). But for natural and semi-synthetic opioids, the gap between male and female overdose death rates was smaller, with females experiencing a death rate that was approximately two-thirds the rate of males (3.6 versus 5.2 per 100,000).

The patterns for cocaine and psychostimulants were similar to those found in illicit opioids. Females’ death rates were slightly more than one-third the rates of males for both cocaine (2.5 versus 6.2 per 100,000) and psychostimulants (1.9 versus 4.5 per 100,000).

Figure 5: U.S. Overdose Death Rates Per 100,000 People by Sex, 2017

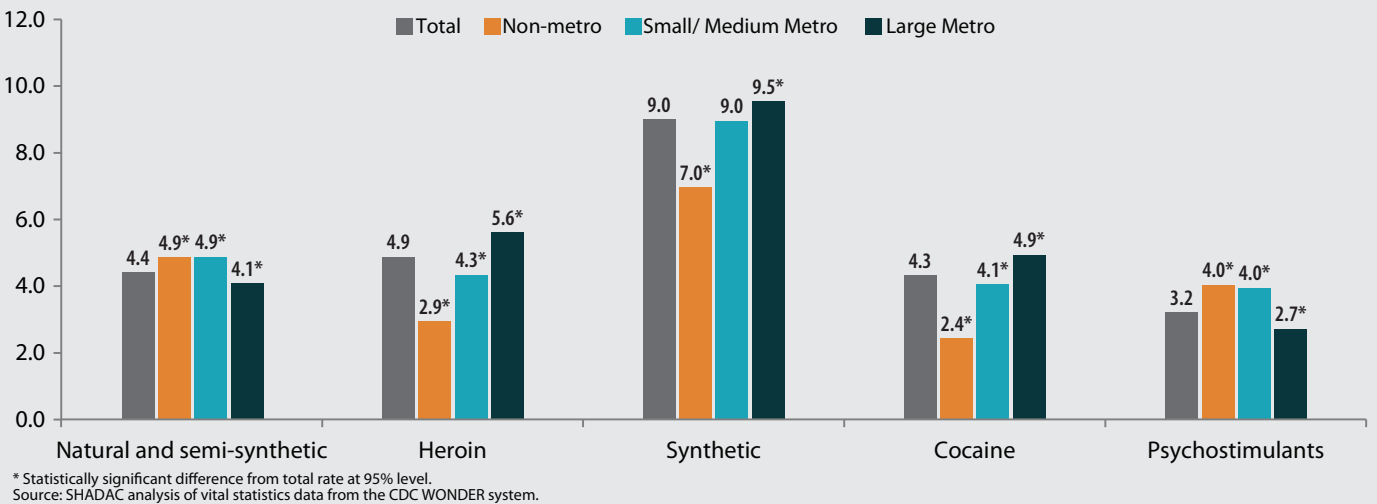


### Opioid and related deaths by urbanization

Death rates from each type of opioid, cocaine, and psychostimulants have increased significantly since 2000 in all categories of urbanization: large metro, small/medium metro, and non-metro (i.e., rural) areas of the U.S. However, different levels of urbanization are associated with different patterns in drug overdose death rates.

Overdose death rates show similar patterns among heroin, synthetic opioids, and cocaine across urbanization categories; large urban metropolitan areas have the highest rates of overdose deaths, with lower rates in small/medium metros and again lower rates in non-metro areas. With synthetic opioids, large metros have a death rate significantly higher than the overall rate in 2017 (9.5 versus 9.0 per 100,000), while the rate for non-metro areas is significantly lower than the overall rate (7.0 per 100,000) (Figure 6). Large metros also have a significantly higher death rate for heroin (5.6 versus 4.9 per 100,000), while small/medium metros and non-metro areas have significantly lower rates than the overall rate (4.3 and 2.9 per 100,000, respectively). Cocaine death rates again are significantly higher than the overall rate for large metros (4.9 versus 4.3 per 100,000) and significantly lower than the overall rate for small/medium metros and non-metro areas (4.1 and 2.4 per 100,000, respectively).

Figure 6: U.S. Overdose Death Rates Per 100,000 People by Metro Size, 2017





Death rates from natural and semi-synthetic opioids and from psychostimulants followed a different pattern, with significantly higher rates in non-metro and small/medium metro areas and significantly lower rates in large metro areas. For natural and semi-synthetic opioids, non-metro and small/medium metro areas had rates that were significantly higher (both at 4.9 per 100,000) compared to the overall rate of 4.4 per 100,000, while the rate for large metro areas was significantly lower (4.1 per 100,000) than the overall rate. For psychostimulants, non-metro and small/medium metro areas again had rates that were significantly higher (4.0 per 100,000) compared to the overall rate of 3.2 per 100,000, while the rate for large metro areas was significantly lower than the overall rate (2.7 per 100,000).

### Conclusions and Discussion

Since 2000, the U.S. has experienced statistically significant increases in opioid-related overdose deaths across broad segments of the population, including people of different ages, races and ethnicities, genders, and community urbanizations (i.e., rural to urban). 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.

As policymakers consider and implement efforts to mitigate and reverse the opioid crisis, data on overall trends and subpopulation differences can provide important insights that may help to inform interventions. When examining overdose death rates by age, the data show death rates from natural and semi-synthetic opioids (i.e., prescription opioid painkillers) are higher among older working-age adults (e.g., 45-54 years old) but death rates from heroin and synthetic opioids are higher among younger adults (e.g., 25-34 years old). By gender, data show that females generally have lower overdose death rates than males, but the gap is notably smaller for prescription opioid painkillers. Data on overdose deaths by urbanization show differing trends by community type, with large urban metros experiencing the highest death rates from heroin, synthetic opioids, and cocaine, while rural and small/medium metros experience the highest death rates from natural and semi-synthetic opioids, as well as psychostimulants such as methamphetamine.

By race and ethnicity, data show that whites consistently have the highest death rates from all types of opioids—natural and semi-synthetic, heroin, and synthetic—but other groups also demonstrate concerning patterns consistent with evidence that the opioid crisis increasingly also involves non-opioid drugs. For example, blacks have relatively high death rates from synthetic opioids, heroin, and the non-opioid cocaine; and American Indians and Alaska Natives have relatively high death rates from natural and semi-synthetic opioids, heroin, and non-opioid psychostimulants. Additionally, while our analysis did not examine differential rates of growth in overdose deaths by subpopulations, other research has found that the opioid crisis is increasingly affecting people of color, with blacks and Hispanics/Latinos experiencing the largest increases in deaths from the synthetic opioid fentanyl.<sup>62</sup>

History has shown that the opioid crisis has a capacity to grow and expand in new ways over time, so it will continue to be important for state and other policymakers to conduct careful surveillance of the evolving problem and monitor the impacts of efforts to save lives. Strong efforts to measure the opioid crisis provide policymakers with information to recognize and respond to emerging trends as the opioid crisis continues to develop in new ways. As federal, state, and local governments undertake innovative steps to address the opioid crisis, data are vital to evaluate which interventions are most effective in combatting the problem so that those solutions can be expanded and replicated.

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<sup>55</sup> Our analysis does not correct for overlap between specific sub-groups (e.g., age, gender) and the total overdose death rates. This results in a more conservative estimate of statistical significance (i.e., less likely to find a statistically significant difference).

<sup>56</sup> Statistical testing from 2000-2017 wasn't possible for some sub-groups because rates in 2000 and other early years in that decade were suppressed by the CDC because of especially small numbers of deaths. In those cases, we substituted the earliest year of unsuppressed data for 2000 rates. The following are the substitutions used in this brief:

- Natural and semi-synthetic opioids: Asians/Pacific Islanders, 2002
- Heroin: American Indians/Alaska Natives, 2007; Asians/Pacific Islanders, 2011
- Synthetic opioids: American Indians/Alaska Natives, 2004; Asians/Pacific Islanders, 2011

- Cocaine: Asians/Pacific Islanders, 2001
- Psychostimulants: American Indians/Alaska Natives, 2004; Asians/Pacific Islanders, 2001; blacks, 2002

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<sup>64</sup> 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.

<sup>65</sup> 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.