



# The Opioid Epidemic: State Trends in Opioid-Related Overdose Deaths from 2000 to 2015

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## SUMMARY

This brief examines the United States opioid epidemic at the state-level, analyzing trends in overdose deaths from heroin and other opioids, such as prescription painkillers. Using vital statistics data, it looks at which states have the highest rates of opioid-related deaths and which have experienced the largest increases in death rates.

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## INTRODUCTION

The number of annual deaths from drug overdoses in the United States has tripled during the past 15 years, from 17,500 in 2000 to 52,500 in 2015.<sup>1</sup> Most of these deaths involved opioids, including heroin and prescription painkillers.<sup>2</sup> Although the incidence of opioid-related deaths has grown for more than a decade, the problem began drawing substantially more attention from policy-makers, the news media, and the public since 2011, when the U.S. Centers for Disease Control and Prevention (CDC) declared overdoses from prescription painkillers an “epidemic.” More recently, heroin use has received increasing attention as deaths related to the illegal cousin of prescription painkillers more than tripled between 2010 and 2015.<sup>3</sup> This brief provides high-level information about opioids and opioid addiction, presents the historical context for the epidemic of opioid-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. Chemically, illicit opioids, such as heroin, are similar to legal opioid painkillers, such as oxycodone and hydrocodone.<sup>4</sup> All of these opioids stimulate the same opioid receptors in the reward centers in the brain, 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 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 a 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>

## COMPANION BRIEF

To read SHADAC’s analysis of opioid-related overdose deaths by age, race/ethnicity and urban/rural communities, visit: [www.shadac.org/OpioidBriefs](http://www.shadac.org/OpioidBriefs).

## 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, in the 1980s, some 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 of 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>

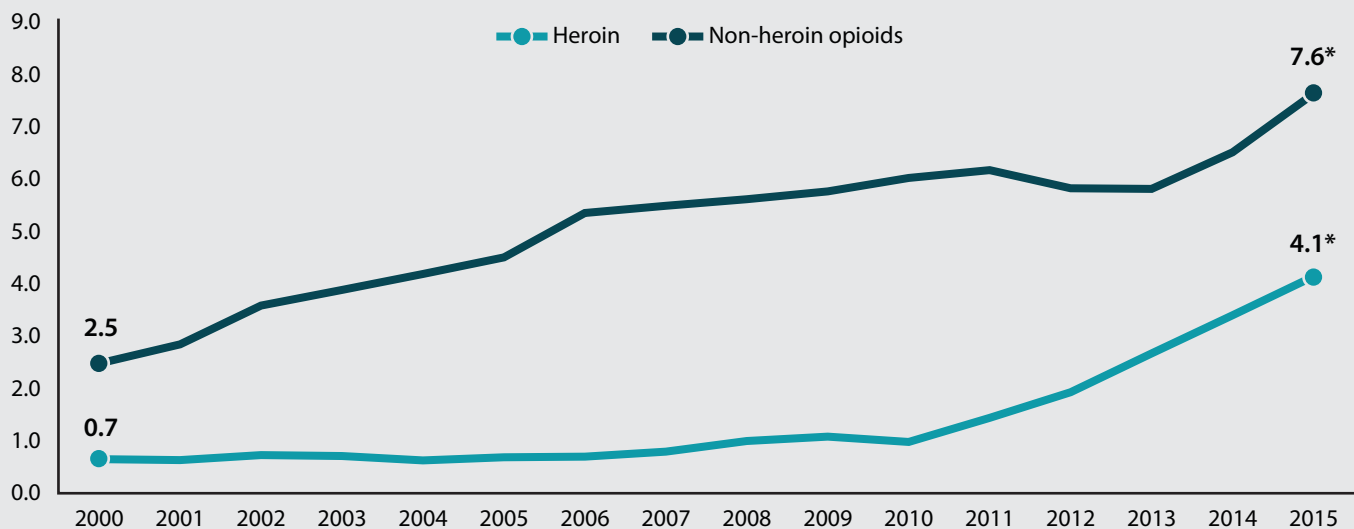
Second, in the 1990s and 2000s, there was an increased emphasis among health care professionals on the importance of recognizing and treating pain. In 1996, the president of the American Pain Society raised the idea of “pain as a vital sign,” stating that “quality care means that pain is measured and treated”— a concept that was adopted by many health professionals and throughout many health care organizations.<sup>15</sup> As examples, 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 the 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 approved the opioid painkiller Oxycontin, which has become among the most-common controlled substances in the U.S., and which 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>

## Trends of Increasing Deaths From Heroin and Other Opioids

Over more than a decade, the U.S. has experienced statistically significant increases in overdose deaths related to opioids. Between 2000 and 2015, U.S. rates of drug poisoning deaths related to opioids other than heroin—such as prescription painkillers—more than tripled, from 2.5 to 7.6 per 100,000 people (see Figure 1). During the same time, deaths from heroin also grew nearly six times, from 0.7 to 4.1 deaths per 100,000 people. These trends were largely consistent across different sub-groups of the U.S. population, such as age and race/ethnicity.<sup>23</sup>

Figure 1: U.S. Heroin and Non-heroin Opioid Death Rates Per 100,000 People, 2000-2015



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

Although deaths from both heroin and non-heroin opioids have increased since 2000, there are notable differences in their paths. While death rates from non-heroin opioids steadily increased from 2000 to 2010, more than doubling from 2.5 to 6.0 deaths per 100,000 people, the increase in death rates during that time from heroin was comparatively modest, increasing by less than half, from 0.7 to 1.0 deaths per 100,000 people. Since 2010, however, death rates from heroin have increased more rapidly—more than quadrupling to 4.1 per 100,000. During that same time period, deaths from non-heroin opioids dipped slightly to 5.8 deaths per 100,000 in 2012 and 2013, then resumed their climb to a high of 7.6 by 2015.

Some research suggests the increase in heroin death rates since 2010 may be due, at least in part, to people switching from prescription painkillers to heroin.<sup>24,25</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>26,27</sup> Other studies also have found evidence that a reformulation of the popular prescription opioid Oxycontin, designed to make the medication abuse-resistant, may have caused some people to adopt heroin as a substitute.<sup>28,29,30</sup>

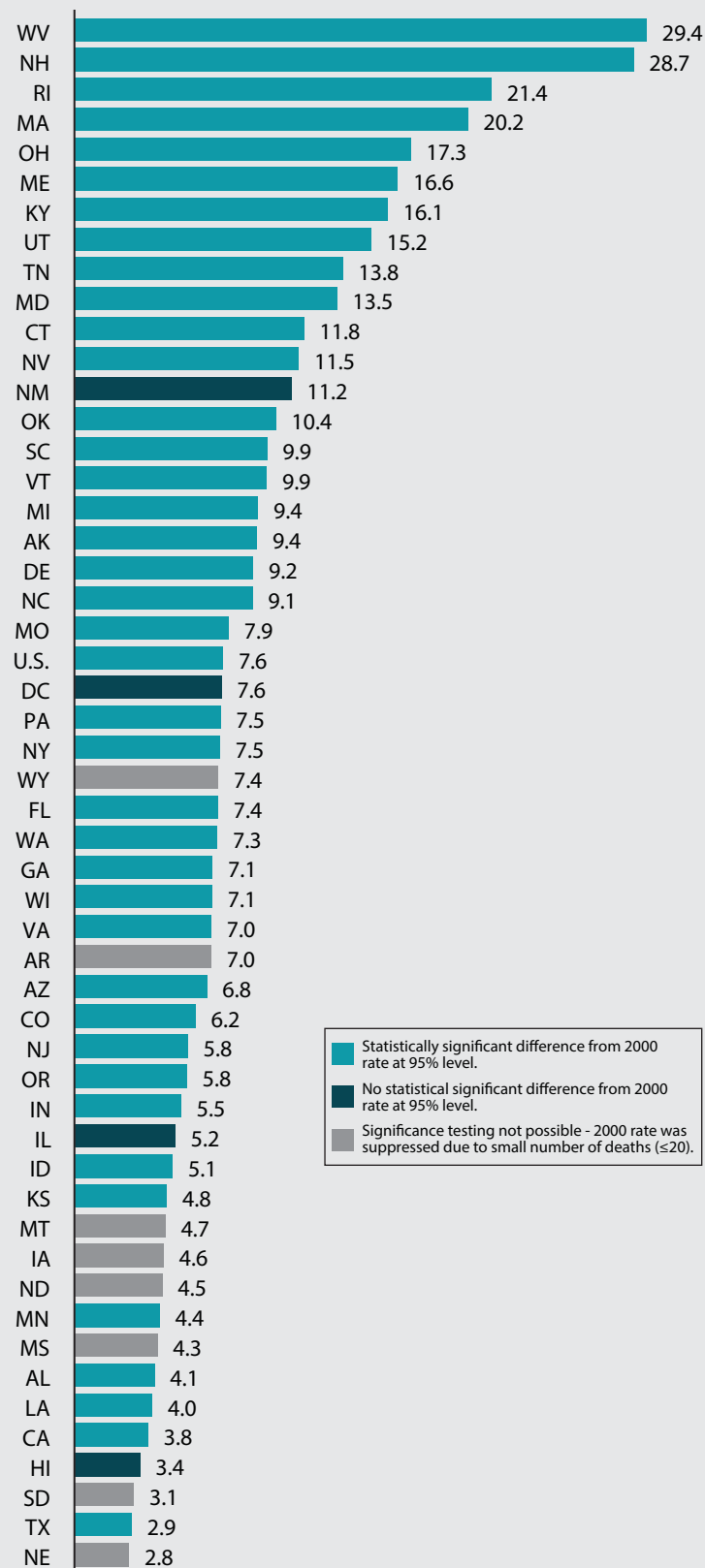
### Opioid Overdose Deaths at the State-level

Similar to the U.S., most states have experienced increases in opioid-related deaths. The following section of our brief examines differences in opioid-related death rates across states.

#### Non-heroin opioid-related deaths

Between 2000 and 2015, 39 states saw statistically significant increases in deaths from non-heroin opioids (Figure 2). Non-heroin opioid deaths were statistically stable in just three states (HI, IL, NM) and the District of Columbia,<sup>31,32</sup> and no states experienced significant declines.

Figure 2: Non-heroin Opioid Death Rates Per 100,000 People, 2015



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

Despite widespread increases in non-heroin opioid death rates, individual states' death rates and the magnitude of their increases varied widely. In 2015, Nebraska's rate of 2.8 non-heroin opioid deaths per 100,000 people was the lowest in the U.S., while West Virginia's rate (the highest) was more than 10 times larger, at 29.4 deaths. Additionally, statistically significant increases ranged from an increase of 1.1 deaths per 100,000 people in California (from 2.7 in 2000 to 3.8 in 2015) to an increase of 26.7 deaths in West Virginia (from 2.7 in 2000 to 29.4 in 2015) (Figure 3).

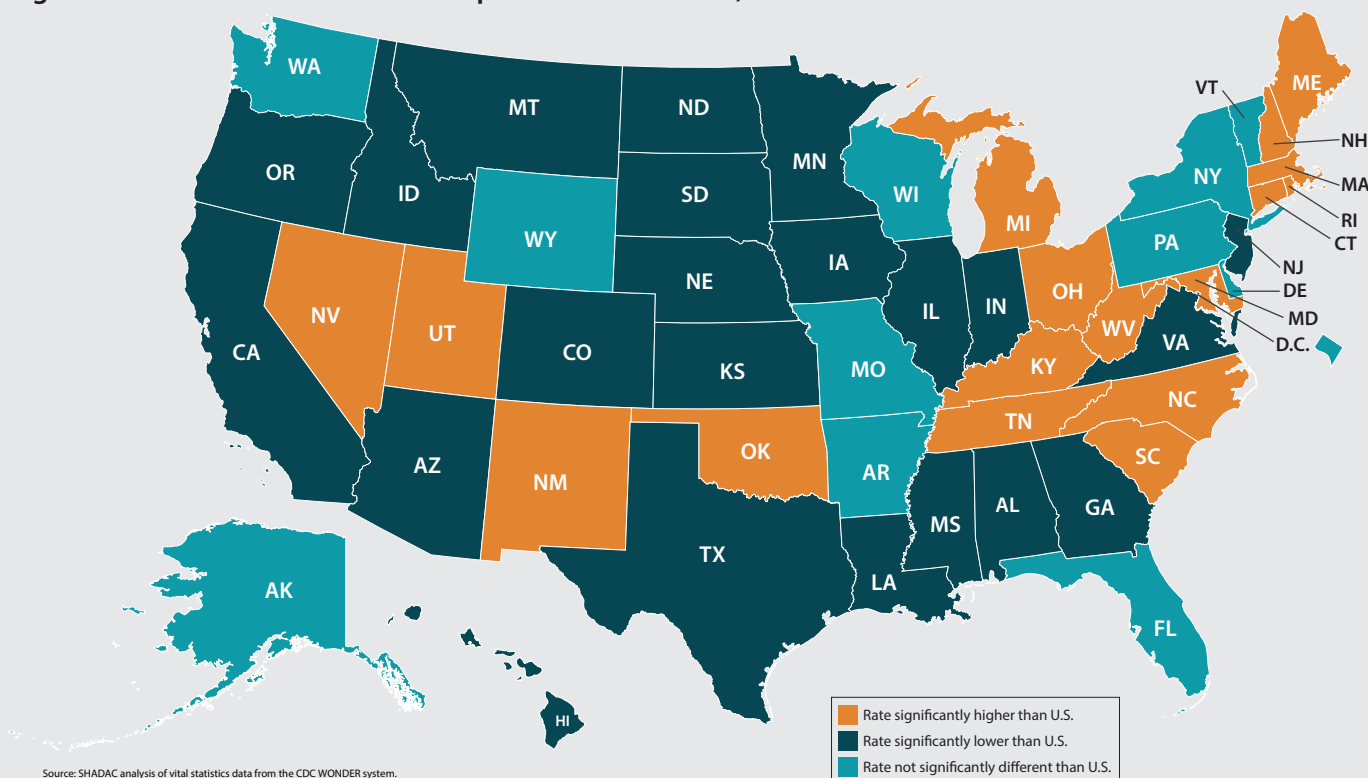
**Figure 3: States with the Largest Significant Increases in Non-heroin Opioid Death Rates, 2000-2015**

State	Deaths per 100,000 people		
	2000	2015	Change
West Virginia	2.7	29.4	+26.7
New Hampshire	2.2	28.7	+26.5
Rhode Island	5.2	21.4	+16.3
Ohio	1.6	17.3	+15.6
Massachusetts	4.7	20.2	+15.5

Note: Changes in the above table were statistically significant at 95% level.  
Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Although nearly all states have experienced significant increases in death rates from non-heroin opioids, certain regions of the U.S. have been more severely affected than others. Of the 17 states with death rates significantly higher than the U.S. rate, five are clustered in New England (CT, MA, ME, NH, RI), and eight are clustered in a region of Midwestern and Southern states (KY, OH, MD, MI, NC, SC, TN, WV) (Figure 4).

**Figure 4: State Rates of Non-heroin Opioid-related Deaths, 2015**



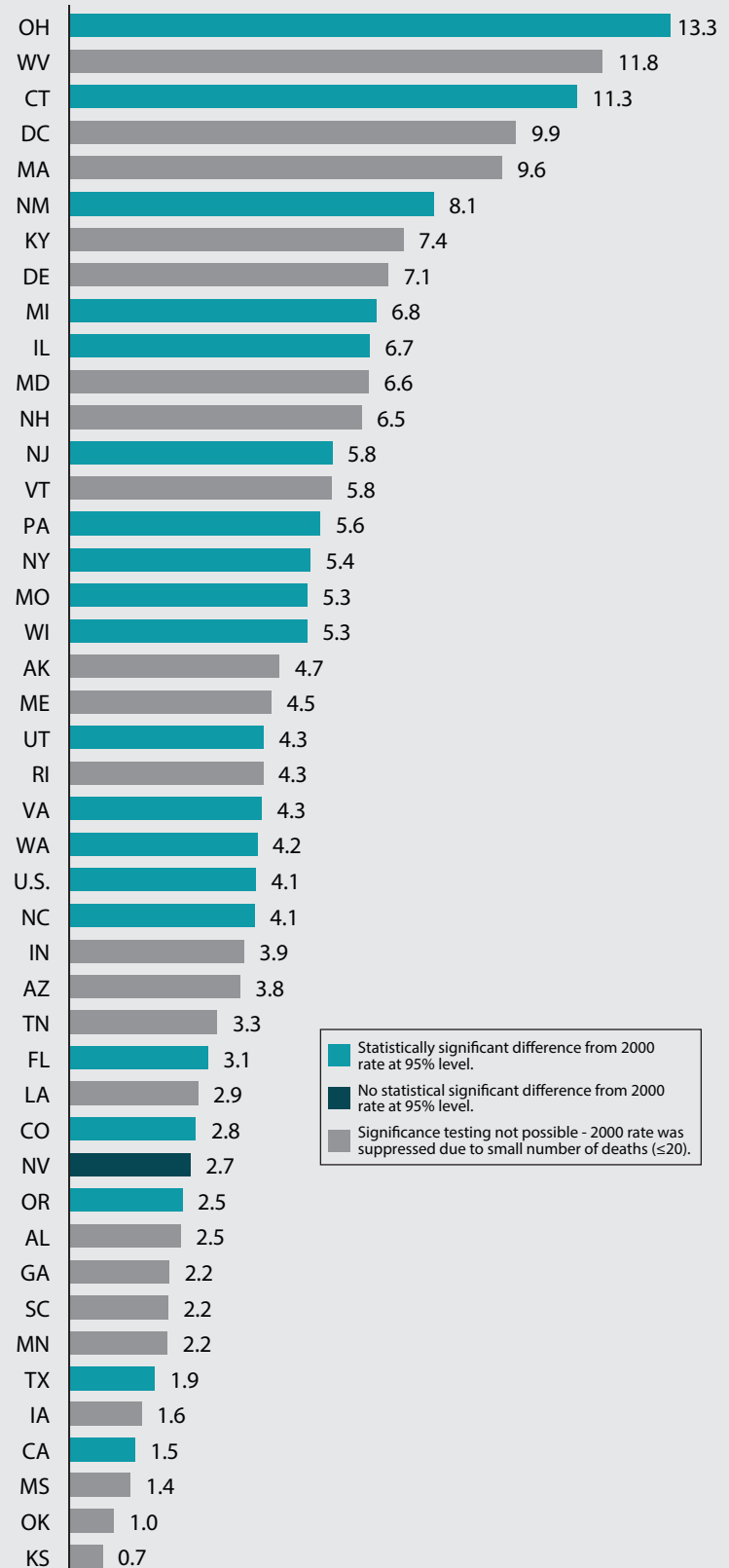
### Heroin-related deaths

Because heroin deaths are less common than non-heroin opioid deaths, heroin death rates were only available for 20 states for 2000.<sup>33</sup> However, since heroin deaths have increased, death rates were available for 42 states and D.C. by 2015. Among the 20 states for which testing was possible, 19 saw statistically significant increases, and one saw no significant change (NV). None saw significant declines (Figure 5).

For states with significant changes between 2000 and 2015, the magnitude of the increases in heroin deaths ranged from a low of 0.5 more deaths per 100,000 in California (from 1.0 to 1.5) to 12.7 more deaths per 100,000 in Ohio (from 0.7 to 13.3) (Figure 6). The levels of heroin death rates themselves also varied between states. In 2015, Ohio’s death rate of 13.3 per 100,000 people was nearly 20 times higher than Kansas’s rate of 0.7 deaths per 100,000.

As with non-heroin opioid death rates, the highest state-level heroin death rates are regionally concentrated. Of the 17 states with heroin death rates that were significantly higher than the U.S. rate in 2015, all but one (NM) were found in a contiguous block (Figure 7). More than half of those states (CT, KY, MA, MD, MI, NH, NM, OH, WV) also have high death rates from non-heroin opioids, which is not a surprise considering research on the relationship between heroin use and abuse of other opioids.

Figure 5: Heroin Death Rates Per 100,000 People, 2015



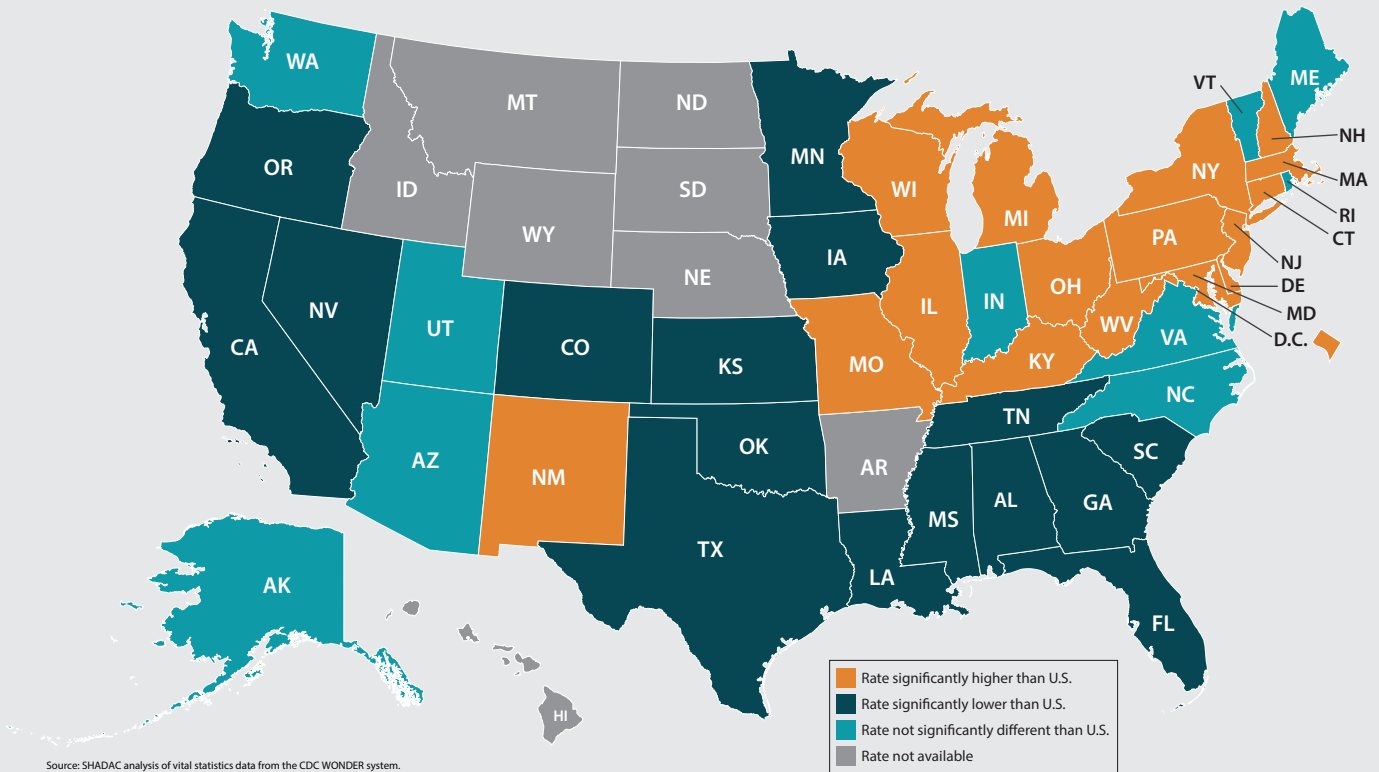
Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Figure 6: States with the Largest Significant Largest Increases in Heroin Death Rates, 2000-2015

State	2000	2015	Change
Ohio	0.7	13.3	+12.7
Connecticut	3.2	11.3	+8.1
Illinois	0.3	6.7	+6.4
Michigan	0.9	6.8	+5.9
New Mexico	2.2	8.1	+5.9

Note: Changes in the above table were statistically significant at 95% level.  
 Source: SHADAC analysis of vital statistics data from the CDC WONDER system.

Figure 7: State Rates of Heroin-related Deaths, 2015



## Discussion

Since 2000, the U.S. has experienced statistically significant increases in overdose deaths from both heroin and non-heroin opioids, such as prescription painkillers. Although data are more limited at the state level than at the national level, they illustrate a similar story to the U.S. epidemic: Some states have been hit especially hard, but almost every state has seen significant increases in opioid deaths.

Of the 42 states with data on non-heroin opioid death rates from 2000 to 2015, 39 experienced statistically significant increases and none saw declines. Of the 20 states with available data on heroin-related death rates, 19 saw statistically significant increases between 2000 and 2015, and none saw declines. Considered in combination with related research, the trends in state-level death rates from heroin and non-heroin opioids suggest these problems are related. For example, most of the states with the highest rates of heroin-related deaths also have among the highest rates of deaths from other opioids.

As 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, which may allow health care professionals to identify patients who may be “doctor shopping” to obtain multiple opioid prescriptions from different providers and which allow regulators and law enforcement to identify physicians or clinics that inappropriately prescribe large quantities of opioids, commonly known as “pill mills.” Many states also have adopted policies aimed specifically at preventing opioid overdoses, such as expanding access to the medication naloxone, which can reverse the toxic effects of an opioid overdose.

In addition to policies such as those, the CDC recommends improving access to substance abuse treatment services.<sup>34</sup> Some policy changes at the U.S. level are aimed at increasing access to substance abuse treatment services. For example, the U.S. Department of Health and Human Services estimated that 62 million Americans would be affected by provisions in the Affordable Care Act (ACA) requiring expanded coverage of mental health and substance use disorders.<sup>35</sup> In addition to expanding health insurance coverage, the ACA required that plans sold in the individual and small-group markets covered substance abuse treatment in parity with other health conditions, and it also required that states expanding their Medicaid programs under the ACA cover substance abuse treatment for newly eligible beneficiaries.<sup>36</sup> Additionally, the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) recently revised regulations allowing some physicians to treat more patients with buprenorphine, a medication similar to methadone that can be used to treat opioid addiction.<sup>37</sup> However, SAMHSA also has acknowledged other limitations in the availability of treatment, such as shortages of substance abuse treatment professionals, especially in rural areas.<sup>38</sup>

Although the opioid overdose epidemic has affected nearly all states, our findings show substantial differences across states. As policymakers consider options to curb the crisis, it will be important to consider those differences. For example, different solutions may be successful in a state like Massachusetts—with high death rates from heroin and non-heroin opioids—than in a state like Oklahoma—with a low death rate from heroin but a high rate from non-heroin opioids.

## References

- <sup>1</sup> U.S. Centers for Disease Control and Prevention, National Center for Health Statistics. “Drug Poisoning Mortality: United States, 1999–2015.” 2017. Available at: <https://www.cdc.gov/nchs/data-visualization/drug-poisoning-mortality>
- <sup>2</sup> U.S. Centers for Disease Control and Prevention. “Increases in Drug and Opioid-Involved Overdose Deaths — United States, 2010–2015.” *Morbidity and Mortality Weekly Report*. 2016. Available at: <https://www.cdc.gov/mmwr/volumes/65/wr/mm655051e1.htm>
- <sup>3</sup> U.S. Centers for Disease Control and Prevention. “Understanding the Epidemic.” 2016. Available at: <https://www.cdc.gov/drugoverdose/epidemic/>
- <sup>4</sup> The issue of legal status of opioid drugs is complex. Heroin, as a Schedule 1 controlled substance, is treated as an “illegal” drug with a high risk for abuse and no medicinal value. Most other opioids, such as oxycodone and hydrocodone, are considered Schedule 2 controlled substances, meaning they have substantial potential for abuse but also have medicinal value. The legality of Schedule 2 opioids depends on how they are manufactured and distributed. If a person takes an opioid painkiller that was properly prescribed and dispensed by licensed health care provider, then that would generally be legal. However, opioid painkillers are sometimes fraudulently prescribed or diverted from their intended patients, which is illegal. Additionally, criminal drug traffickers also manufacture counterfeit opioids that are chemically similar to prescription painkillers (e.g., fentanyl) and sell them illegally on the black market.
- <sup>5</sup> Merrer, J., Becker, J., Befort, K., Kieffer, B. “Reward Processing by the Opioid System in the Brain.” *Physiological Reviews*. 2009; 89(4): 1,379–1,412. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4482114/>
- <sup>6</sup> American Academy of Addiction Medicine. “Public Policy Statement: Definition of Addiction.” 2011. Available at: [https://www.asam.org/docs/default-source/public-policy-statements/1definition\\_of\\_addiction\\_long\\_4-11.pdf?sfvrsn=2](https://www.asam.org/docs/default-source/public-policy-statements/1definition_of_addiction_long_4-11.pdf?sfvrsn=2)
- <sup>7</sup> Keyes, K., Cerda, M., Brady, J., Havens, J., & Galea, S. “Understanding the Rural-Urban Differences in Nonmedical Prescription Opioid Use and Abuse in the United States.” *The American Journal of Public Health*. 2014; 104(2): e52–e59. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3935688/#bib68>
- <sup>8</sup> Canfield, M., Keller, C., Frydrych, L., Ashrafoun, L., Purdy, C., & Blondell, R. “Prescription opioid use among patients seeking treatment for opioid dependence.” *Journal of Addiction Medicine*. 2010; 5(1):86. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/20543897>

- <sup>9</sup> Muhuri, P., Gfroerer, J. & Davies, C. "Associations of Nonmedical Pain Reliever Use and Initiation of Heroin Use in the United States." SAMHSA Center for Behavioral Health Statistics and Quality Data Review. 2013. Available at: <http://www.samhsa.gov/data/sites/default/files/DR006/DR006/nonmedical-pain-reliever-use-2013.htm#endnote2>
- <sup>10</sup> Canfield, M., Keller, C., Frydrych, L., Ashrafioun, L., Purdy, C., & Blondell, R. "Prescription opioid use among patients seeking treatment for opioid dependence." *Journal of Addiction Medicine*. 2010; 5(1):86. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/20543897>
- <sup>11</sup> Frakt, A. "Painkiller Abuse, a Cyclical Challenge." *The New York Times*. 2014. Available at: <https://www.nytimes.com/2014/12/23/upshot/painkiller-abuse-a-cyclical-challenge.html>
- <sup>12</sup> DuPont, S., Bezaitis, A., Ross, M. "Stemming The Tide Of Prescription Opioid Overuse, Misuse, And Abuse." *Health Affairs Blog*. 2015. Available at: <http://healthaffairs.org/blog/2015/09/22/stemming-the-tide-of-prescription-opioid-overuse-misuse-and-abuse/>
- <sup>13</sup> Portenoy, R., Foley, K. "Chronic use of opioid analgesics in non-malignant pain: report of 38 cases." *Pain*. 1986; 25(2): 171-186.
- <sup>14</sup> Porter, J., Jick, H. "Addiction Rare in Patient Treated With Narcotics." *New England Journal of Medicine*. 1980; 302(2): 123.
- <sup>15</sup> U.S. Department of Veterans Affairs. "Pain as the 5th Vital Sign Toolkit." 2000. Available at: [https://www.va.gov/PAINMANAGEMENT/docs/Pain\\_As\\_the\\_5th\\_Vital\\_Sign\\_Toolkit.pdf](https://www.va.gov/PAINMANAGEMENT/docs/Pain_As_the_5th_Vital_Sign_Toolkit.pdf)
- <sup>16</sup> Mularski, R., White-Chu, F., Overbay, D., Miller, L., Asch, S., Ganzini, L. "Measuring Pain as the 5th Vital Sign Does Not Improve Quality of Pain Management." *Journal of General Internal Medicine*. 2006; 21(6): 607-612. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1924634/>
- <sup>17</sup> Garcia, A. "State Laws Regulating Prescribing of Controlled Substances: Balancing the Public Health Problems of Chronic Pain and Prescription Painkiller Abuse and Overdose." *Journal of Law, Medicine and Ethics*. 2013. Available at: [https://www.aslme.org/media/downloadable/files/links/j/l/jlme-41\\_1-garcia\\_supp2.pdf](https://www.aslme.org/media/downloadable/files/links/j/l/jlme-41_1-garcia_supp2.pdf)
- <sup>18</sup> U.S. Food and Drug Administration. "Timeline of Selected FDA Activities and Significant Events Addressing Opioid Misuse and Abuse." 2017. Available at: <https://www.fda.gov/Drugs/DrugSafety/InformationbyDrugClass/ucm338566.htm>
- <sup>19</sup> U.S. Department of Justice. "Justice Department Recovers \$2 Billion for Fraud Against the Government in Fy 2007; More Than \$20 Billion Since 1986." 2007. Available at: [https://www.justice.gov/archive/opa/pr/2007/November/07\\_civ\\_873.html](https://www.justice.gov/archive/opa/pr/2007/November/07_civ_873.html)
- <sup>20</sup> Meier, B. "U.S. maker of OxyContin painkiller to pay \$600 million in guilty plea." *The New York Times*. 2007. Available at: <http://www.nytimes.com/2007/05/11/business/worldbusiness/11iht-oxy.1.5665287.html>
- <sup>21</sup> Stempel, J. "Endo to flag Opana ER painkiller's risks, under NY settlement." *Reuters*. 2016. Available at: <http://www.reuters.com/article/us-endo-new-york-settlement-idUSKCN0W51YI>
- <sup>22</sup> New York State Office of the Attorney General. "A.G. Schneiderman Announces Settlement With Endo Health Solutions Inc. & Endo Pharmaceuticals Inc. Over Marketing Of Prescription Opioid Drugs." 2016. Available at: <https://ag.ny.gov/press-release/ag-schneiderman-announces-settlement-endo-health-solutions-inc-endo-pharmaceuticals>
- <sup>23</sup> State Health Access Data Assistance Center (SHADAC). "The Opioid Epidemic: National Trends in Opioid-Related Overdose Deaths from 2000 to 2015." 2017. Accessible at: [www.shadac.org/OpioidBriefs](http://www.shadac.org/OpioidBriefs)
- <sup>24</sup> Cicero, T., Ellis, M., & Harney, J. "Shifting Patterns of Prescription Opioid and Heroin Abuse in the United States." *The New England Journal of Medicine*. 2015; 373(18): 1789-1790. Available at: <http://www.nejm.org/doi/pdf/10.1056/NEJMc1505541>
- <sup>25</sup> Unick, G., Rosenblum, D., Mars, S., Ciccarone, D. "Intertwined Epidemics: National Demographic Trends in Hospitalizations for Heroin- and Opioid-Related Overdoses, 1993–2009." *PLOS One*. 2013; 8 (2): e54496. Available at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0054496>
- <sup>26</sup> Muhuri, P., Gfroerer, J., Davies, C. "Associations of Nonmedical Pain Reliever Use and Initiation of Heroin Use in the United States." U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Behavioral Health Statistics and Quality Data Review. 2013. Available at: <http://archive.samhsa.gov/data/2k13/DataReview/DR006/nonmedical-pain-reliever-use-2013.pdf>
- <sup>27</sup> Jones, C. "Heroin use and heroin use risk behaviors among nonmedical users of prescription opioid pain relievers – United States, 2002–2004 and 2008–2010." *Drug and Alcohol Dependence*. 2013; 132(1-2): 95-100. Available at: <http://www.sciencedirect.com/science/article/pii/S0376871613000197>



- <sup>28</sup> Alpert, A., Powell, D., Liccardo Pacula, R. "Supply-Side Drug Policy in the Presence of Substitutes: Evidence from the Introduction of Abuse-Deterrent Opioids." National Bureau of Economic Research. 2017. Available at: <http://www.nber.org/papers/w23031>
- <sup>29</sup> Cicero, T., & Ellis, M. "Abuse-Deterrent Formulations and the Prescription Opioid Abuse Epidemic in the United States: Lessons Learned from OxyContin." *Journal of the American Medical Association Psychiatry*. 2015;72(5): 424-30. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25760692>
- <sup>30</sup> Dart, R., Surratt, H., Cicero, T., Parrino, M., Severtson, S., Bucher-Bartelson, B., Green, J. "Trends in Opioid Analgesic Abuse and Mortality in the United States." *New England Journal of Medicine*. 2015; 372: 241-248. Available at: <http://www.nejm.org/doi/full/10.1056/NEJMsa1406143#t=article>
- <sup>31</sup> The CDC suppresses rates based on 20 or fewer deaths. Only three states (HI, IL, NM) and the District of Columbia did not experience significant increases in non-heroin opioid, while testing was not possible for eight states because their rates were suppressed due to a small number of deaths in 2000.
- <sup>32</sup> Statistical testing was not possible for eight states due to a small number of deaths.
- <sup>33</sup> The CDC suppresses rates based on 20 or fewer deaths.
- <sup>34</sup> U.S. Centers for Disease Control and Prevention. "Promising State Strategies." 2016. Available at: <https://www.cdc.gov/drugoverdose/policy/index.html>
- <sup>35</sup> Beronio, K., Po, K., Skopec, L., Glied, S. "Affordable Care Act Will Expand Mental Health and Substance Use Disorder Benefits and Parity Protections for 62 Million Americans." ASPE Research Brief. 2013. Available at: [https://aspe.hhs.gov/system/files/pdf/76591/rb\\_mental.pdf](https://aspe.hhs.gov/system/files/pdf/76591/rb_mental.pdf)
- <sup>36</sup> State Health Access Data Assistance Center (SHADAC). "Substance use and the ACA in Kentucky." 2016. Accessible at: <http://www.shadac.org/publications/substance-use-and-aca-kentucky-study-impact-aca-implementation-ky>
- <sup>37</sup> Johnson, K. Untitled SAMHSA Dear Colleague letter. 2016. Available at: [https://www.samhsa.gov/sites/default/files/programs\\_campaigns/medication\\_assisted/dear\\_colleague\\_letters/2016-colleague-letter-275-limit.pdf](https://www.samhsa.gov/sites/default/files/programs_campaigns/medication_assisted/dear_colleague_letters/2016-colleague-letter-275-limit.pdf)
- <sup>38</sup> U.S. Substance Abuse and Mental Health Services Administration. "Report to Congress on the Nation's Substance Abuse and Mental Health Workforce Issues." 2013. Available at: <https://store.samhsa.gov/shin/content/PEP13-RTC-BHWORK/PEP13-RTC-BHWORK.pdf>

**Appendix Table 1: Non-heroin opioid overdose deaths per 100,000 people**

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Alabama	1.0	1.3	1.6	1.1	1.8	1.7	2.7	3.5	4.0	4.3	3.9	3.5	2.9	2.8	3.5	4.1
Alaska	3.9	N/A	N/A	N/A	N/A	N/A	4.1	N/A	11.7	11.8	8.4	7.2	8.3	7.7	8.9	9.4
Arizona	4.6	4.8	5.7	5.3	5.6	6.1	7.0	7.0	7.2	8.6	8.7	7.1	6.8	6.0	6.0	6.8
Arkansas	N/A	1.1	3.5	3.4	4.8	4.6	5.1	5.3	7.2	7.2	6.6	6.0	5.8	5.6	6.0	7.0
California	2.7	1.4	3.8	3.5	3.5	3.5	3.7	4.0	4.3	4.7	4.5	4.4	3.7	4.0	3.9	3.8
Colorado	3.4	4.0	3.8	4.2	4.5	5.4	5.9	6.3	6.2	6.4	5.1	6.6	6.1	6.0	7.0	6.2
Connecticut	1.7	1.7	2.5	1.9	3.0	2.7	4.0	3.8	3.4	3.4	4.2	3.4	3.1	6.6	8.0	11.8
Delaware	3.1	3.6	4.6	3.8	3.5	3.0	3.8	4.2	6.5	8.5	10.3	11.1	6.7	8.9	9.4	9.2
DC	6.4	8.1	4.6	10.2	8.0	7.2	9.3	4.6	4.2	N/A	3.4	5.2	3.9	3.9	5.4	7.6
Florida	2.6	4.3	4.7	5.2	6.4	5.8	6.5	7.8	7.7	8.3	8.9	8.2	6.4	5.8	5.9	7.4
Georgia	1.4	2.1	2.4	2.6	2.9	3.3	3.5	4.0	4.0	4.8	5.3	5.2	5.0	4.7	6.0	7.1
Hawaii	2.2	2.8	3.5	3.0	4.0	4.6	3.8	5.3	3.6	4.0	5.1	5.0	4.2	4.2	3.3	3.4
Idaho	2.1	3.7	3.2	4.0	3.2	3.6	4.7	4.1	4.7	4.1	5.2	5.0	3.8	4.5	4.4	5.1
Illinois	4.3	4.0	4.4	3.6	4.1	4.4	6.5	5.0	5.9	6.2	6.0	6.0	7.2	4.3	4.3	5.2
Indiana	0.6	1.0	1.0	2.0	2.1	2.4	2.8	3.6	4.2	4.2	3.9	4.7	4.2	3.3	4.9	5.5
Iowa	N/A	0.8	1.2	1.3	2.0	2.3	3.2	3.5	4.1	4.7	5.0	5.4	5.5	5.3	4.3	4.6
Kansas	0.9	1.8	3.0	2.8	4.4	4.0	4.4	4.3	3.2	5.2	3.5	4.1	5.7	5.4	5.4	4.8
Kentucky	2.3	3.5	4.3	5.7	5.4	6.8	7.9	8.1	8.4	9.7	13.2	14.8	13.0	11.8	13.0	16.1
Louisiana	1.2	1.8	2.1	2.6	3.2	3.7	4.3	4.8	2.7	2.6	2.5	2.2	2.8	3.6	3.7	4.0
Maine	3.1	4.3	7.1	6.6	7.7	8.9	7.1	7.9	7.8	8.6	7.1	6.7	7.2	8.6	12.1	16.6
Maryland	8.6	8.7	9.2	9.4	7.6	7.5	8.4	8.5	7.2	7.8	7.4	7.8	8.8	9.6	11.3	13.5
Massachusetts	4.7	7.4	7.1	8.7	6.8	8.3	9.6	8.9	8.3	8.9	7.5	8.3	7.7	10.6	14.2	20.2
Michigan	0.9	1.1	1.7	1.8	2.6	3.5	5.0	4.0	4.4	5.1	5.1	4.9	4.7	5.3	6.3	9.4
Minnesota	1.1	1.8	1.8	2.1	2.6	2.8	3.0	3.4	4.2	4.9	4.1	4.5	4.6	4.1	4.3	4.4
Mississippi	N/A	0.9	0.9	1.1	0.9	1.3	2.3	3.2	3.6	3.2	3.3	2.9	3.6	3.2	3.3	4.3
Missouri	1.6	2.0	2.5	4.3	4.0	4.6	6.4	5.7	6.4	6.4	7.4	6.6	5.9	6.7	7.1	7.9
Montana	N/A	N/A	2.2	4.5	4.7	4.7	5.2	6.2	7.3	9.4	6.1	6.7	5.0	6.8	5.3	4.7
Nebraska	N/A	1.7	1.4	N/A	1.5	2.5	1.8	2.4	1.7	3.6	3.4	2.8	2.9	2.1	3.0	2.8
Nevada	7.1	7.8	8.7	9.7	10.8	11.9	12.3	12.9	13.7	15.4	15.3	15.3	14.4	12.1	10.9	11.5
New Hampshire	2.2	4.0	6.2	7.0	6.5	8.0	7.8	10.1	6.1	7.8	8.0	8.8	7.4	7.2	18.9	28.7
New Jersey	1.9	2.6	3.1	3.0	2.4	3.3	3.3	2.9	2.6	0.4	3.2	3.9	3.8	4.0	4.4	5.8
New Mexico	8.0	7.2	9.8	10.8	8.3	9.2	11.5	12.3	14.1	8.3	8.8	9.2	11.8	12.5	15.1	11.2
New York	2.4	2.9	2.6	2.7	2.3	2.7	4.7	4.4	4.9	4.3	4.7	5.5	5.7	5.6	5.5	7.5
North Carolina	3.1	3.6	4.4	5.3	6.0	6.9	7.2	7.7	8.4	8.4	7.7	7.8	7.1	6.8	7.9	9.1
North Dakota	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.1	N/A	N/A	N/A	N/A	N/A	4.5	4.5
Ohio	1.6	2.3	2.9	2.5	3.5	4.0	4.8	5.0	5.5	4.3	7.2	7.9	6.8	7.0	11.2	17.3
Oklahoma	3.6	4.4	4.1	7.4	8.9	9.0	10.9	13.8	11.3	15.2	13.8	12.7	13.6	12.9	12.5	10.4
Oregon	2.3	3.4	4.5	5.0	5.1	6.3	8.2	6.7	6.8	6.6	6.6	6.9	6.1	5.0	5.5	5.8
Pennsylvania	1.7	1.2	1.8	2.7	3.0	3.2	3.0	3.5	4.0	4.2	4.4	4.4	4.5	5.0	5.6	7.5
Rhode Island	5.2	7.4	6.5	9.3	7.0	10.2	11.8	8.0	12.1	10.5	10.2	12.4	11.5	14.3	16.2	21.4
South Carolina	2.0	1.9	1.9	2.1	3.1	3.4	4.9	4.3	4.6	4.8	5.5	5.1	4.7	4.8	9.5	9.9
South Dakota	N/A	N/A	N/A	N/A	2.7	3.1	3.3	2.5	4.2	4.4	4.5	4.4	3.0	4.4	4.0	3.1
Tennessee	1.7	2.3	2.8	5.0	6.3	7.3	7.6	7.7	7.6	8.2	9.8	9.8	10.7	11.0	11.8	13.8
Texas	1.3	1.9	2.7	2.8	2.9	3.1	3.8	3.5	3.0	3.6	3.6	3.3	3.1	2.7	2.8	2.9
Utah	6.8	7.3	9.0	11.4	11.6	13.4	13.7	14.3	13.6	14.6	12.5	14.2	15.8	15.3	16.1	15.2
Vermont	3.2	4.7	5.8	7.0	6.1	6.0	9.4	8.8	8.0	5.6	6.6	7.8	7.2	9.1	7.0	9.9
Virginia	2.8	3.4	3.7	3.9	4.5	4.0	4.5	5.4	5.2	4.8	4.3	6.0	5.3	5.6	6.7	7.0
Washington	5.4	4.7	6.5	6.7	8.4	8.9	9.6	9.3	9.4	9.5	8.1	8.9	8.2	7.8	7.7	7.3
West Virginia	2.7	7.6	9.8	11.1	13.8	8.1	16.0	18.4	19.5	9.3	24.7	30.1	25.1	23.5	25.4	29.4
Wisconsin	1.6	2.2	2.8	3.3	3.6	4.4	5.6	6.2	5.6	5.7	6.0	6.2	5.6	7.1	7.2	7.1
Wyoming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.4	7.4	5.6	8.5	7.3	7.2	8.0	7.8	7.4
<b>United States</b>	<b>2.5</b>	<b>2.8</b>	<b>3.6</b>	<b>3.9</b>	<b>4.2</b>	<b>4.5</b>	<b>5.4</b>	<b>5.5</b>	<b>5.6</b>	<b>5.8</b>	<b>6.0</b>	<b>6.2</b>	<b>5.8</b>	<b>5.8</b>	<b>6.5</b>	<b>7.6</b>

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

**Appendix Table 2: Heroin overdose deaths per 100,000 people**

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
<b>United States</b>	<b>0.7</b>	<b>0.6</b>	<b>0.7</b>	<b>0.7</b>	<b>0.6</b>	<b>0.7</b>	<b>0.7</b>	<b>0.8</b>	<b>1.0</b>	<b>1.1</b>	<b>1.0</b>	<b>1.4</b>	<b>1.9</b>	<b>2.7</b>	<b>3.4</b>	<b>4.1</b>

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