



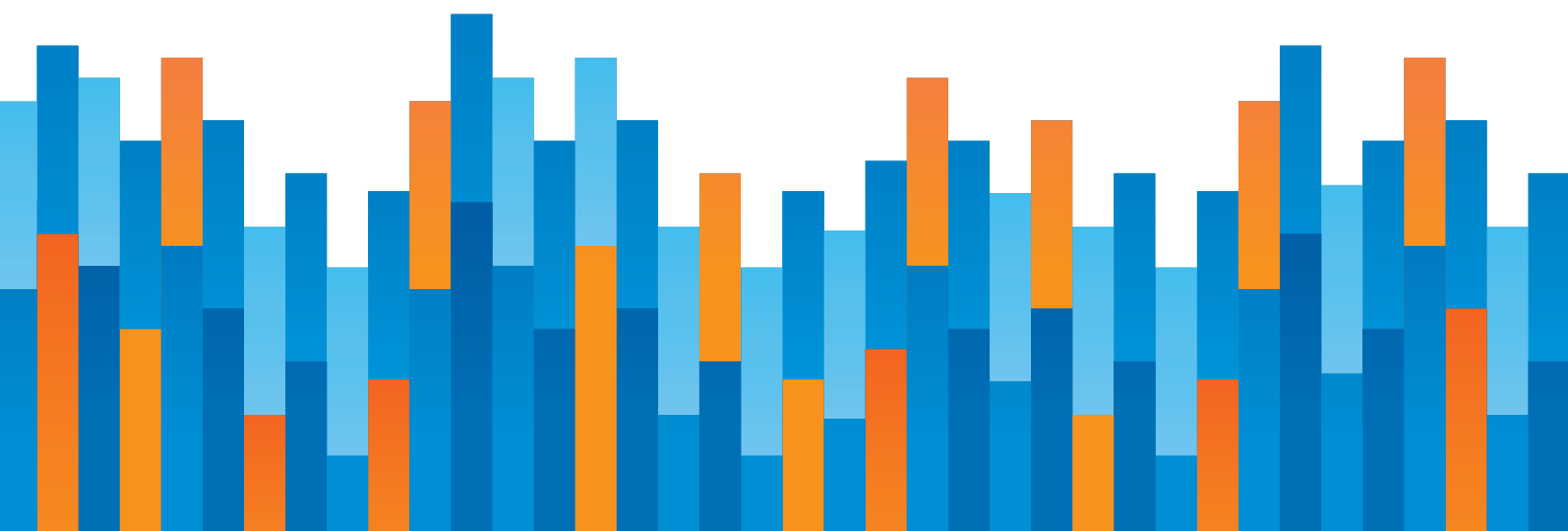
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# PRESCRIPTION DRUG MONITORING PROGRAMS: PDMP EFFECTS ON OPIOID PRESCRIBING AND DRUG OVERDOSE MORTALITY

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by Jacob James Rich and Robert Capodilupo

July 2021





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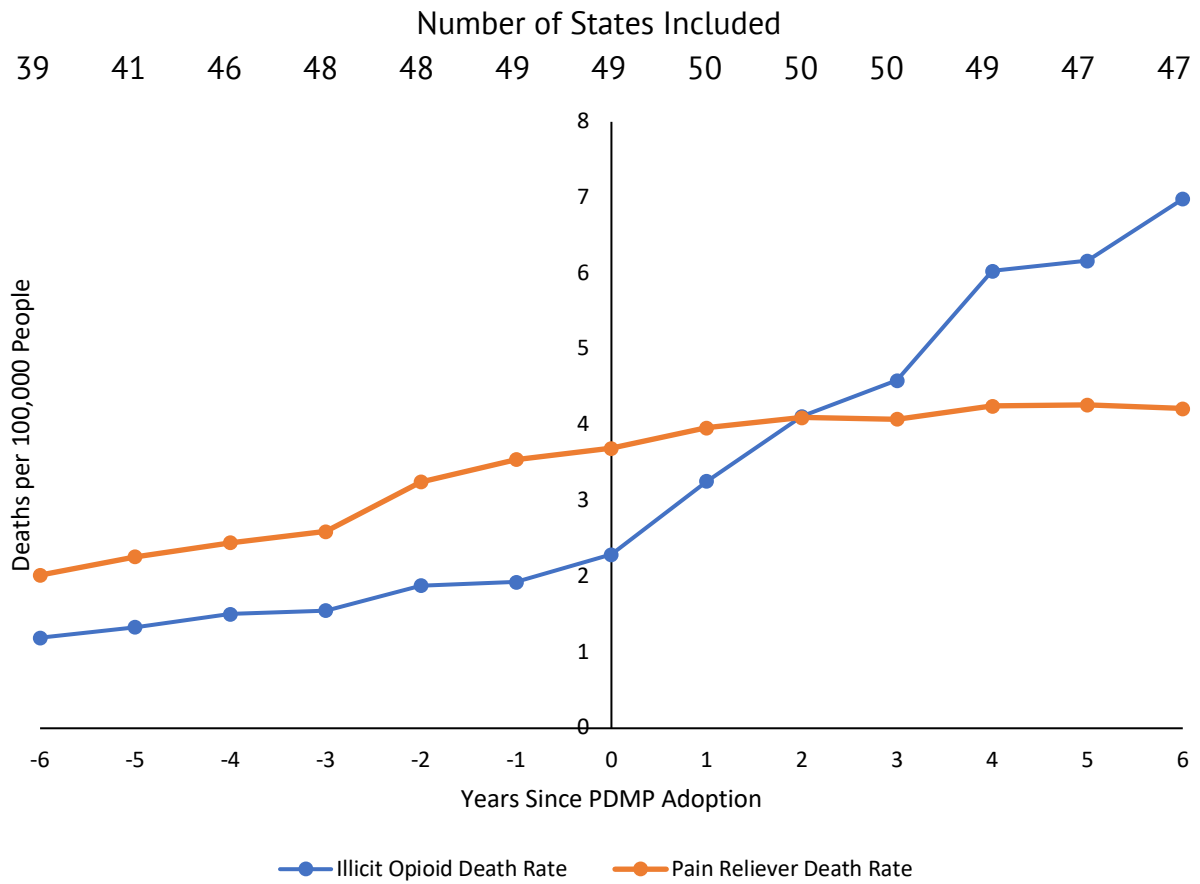
# EXECUTIVE SUMMARY

The Centers for Disease Control and Prevention reported 70 630 drug overdose deaths for 2019 in the United States, 70.5% of which were opioid-related. Amid unprecedented drug-related mortality across the entire United States, Prescription Drug Monitoring Programs (PDMPs) are the most popular interventions states enact to address opioid addiction and overdoses. Missouri may soon become the final state to implement a PDMP, which allows health officials and law enforcement to review the prescribing histories among doctors and patients in hopes of reducing inappropriate prescribing that might lead to addiction or death.

However, the inception of PDMPs has been followed by increasing rates of opioid overdose and stable rates of drug addiction. With 19 years of mortality data, this analysis assesses whether PDMPs have significant effects on either opioid prescribing or mortality.

This study finds that, although the PDMPs' intermediary purpose to reduce prescribing has been achieved by reducing opioid distribution by 7.7%, they have had inconsistent effects on prescription opioid overdoses, while increasing total opioid overdoses by 17.5% due to increasing mortality from the black market varieties by 19.8%.

**FIGURE ES1: STATE-LEVEL DEATH RATES FROM LICIT AND ILLICIT OPIOID OVERDOSES FOLLOWING PDMP IMPLEMENTATION BY STATE**



**NOTE:** On the x-axis, 0 represents when a PDMP was enacted for 49 states and Washington, D.C.  
**Source:** “Multiple Cause of Death Data,” CDC WONDER, www.cdc.gov, 2019, <https://wonder.cdc.gov>, Accessed 18 August 2020.

Since PDMPs fail to achieve their ultimate goal of reducing opioid overdoses, their funding should be re-appropriated to more-effective mechanisms to reduce addiction and overdose rates, such as providing access to prescription-quality opioids for medication-assisted treatment (MAT).

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## PART 1

# INTRODUCTION AND HISTORY

Prescription Drug Monitoring Programs (PDMPs) have been used in the United States since the early 20<sup>th</sup> century. Prior to 1914, natural opiates—the predecessors to modern synthetic or semi-synthetic “opioids”—were unregulated by the federal government and widely available for purchase without prescription in most of the United States.<sup>1</sup> Use among the American public was quite commonplace. According to one article published in *The New York Times*, one in every 400 United States citizens had some type of opiate addiction by 1911, reportedly due to “the sudden emergence of street heroin abuse as well as iatrogenic [induced by medical treatment] morphine dependence.”<sup>2</sup> In response to rising levels of Chinese immigration to the U.S., which was blamed for rising rates of opium use, states like California began outlawing the recreational consumption of various narcotics. San Francisco became the first U.S. municipality to enforce an anti-narcotics law in 1875, outlawing the operation of opium dens, which became state law in 1881. By 1907,

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<sup>1</sup> Mark R. Jones, Omar Viswanath, Jacquelin Peck, Alan D. Kaye, Jatinder S. Gill, and Thomas T. Simopoulos, “A Brief History of the Opioid Epidemic and Strategies for Pain Medicine,” *Pain and Therapy* 7, no. 1 (2018), Accessed 18 August 2020.

<sup>2</sup> Edward Marshall, “Uncle Sam Is the Worst Drug Fiend in the World,” *The New York Times*, [www.nytimes.com](https://www.nytimes.com/1911/03/12/archives/-uncle-sam-is-the-worst-drug-fiend-in-the-world-dr-hamilton-wright-.html), 12 March, 1911, <https://www.nytimes.com/1911/03/12/archives/-uncle-sam-is-the-worst-drug-fiend-in-the-world-dr-hamilton-wright-.html>, Accessed 18 August 2020; Jones et al., “A Brief History of the Opioid Epidemic and Strategies for Pain Medicine.”

California's State Board of Pharmacy quietly lobbied for an amendment to the state's poison laws, which prohibited the sale of opium, morphine, and cocaine except by a doctor's prescription.<sup>3</sup> Eventually, the U.S. Congress passed the Harrison Narcotics Tax Act in 1914, the first federal statute regulating the production and sale of opiates and cocaine, which was enforced as a ban on the recreational sale of both products. Under this law, physicians across the U.S. were also restricted from prescribing opiates to addiction patients, and all proprietors of opium products needed to be registered with the federal government, creating the ancestor to the modern PDMP databases.

In an effort to further combat overprescribing, states slowly began to develop their own monitoring programs, the first of which was created in New York in 1918. However, these early PDMPs were rather slow in their collection speeds and used inefficient paper reports to monitor the prescription history of patients.<sup>4</sup> These programs developed throughout the mid-20<sup>th</sup> century and were rather ineffective, as “[p]rescribers were required to report to databases within 30 days, too long a time to reasonably be useful in preventing real-time ‘doctor shopping’ or over-prescribing.”<sup>5</sup> Additionally, there were no electronic databases tracking which patients had recently filled opioid prescriptions for doctors to reference.

Given the weaknesses of these early PDMPs, few states adopted any type of monitoring program over the course of the first half of the 20<sup>th</sup> century. However, the proliferation of PDMPs was greatly enabled by the ruling of *Whalen v. Roe* in 1977, a case that upheld the constitutionality of New York's precursor of the PDMP under the broad police power given to the states by the Tenth Amendment. The plaintiffs of this case argued that the monitoring program constituted an invasion of patient privacy, due to its collection and storing of prescribing records. Writing for the majority, Justice John Paul Stevens held that, “[n]either the immediate nor the threatened impact of the patient identification requirement on either the reputation or the independence of patients...suffices to constitute an invasion of any right or liberty protected by the Fourteenth Amendment.”<sup>6</sup> With the constitutionality of patient prescription monitoring upheld, states were able to

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<sup>3</sup> Dale H. Gieringer, “The Forgotten Origins of Cannabis Prohibition in California,” *Contemporary Drug Problems*, 1 June 1999.

<sup>4</sup> *History of Prescription Drug Monitoring Programs*, Heller School for Social Policy and Management, Brandeis University, [www.pdmpassist.org](http://www.pdmpassist.org), 2018. [https://www.pdmpassist.org/pdf/PDMP\\_admin/TAG\\_History\\_PDMPs\\_final\\_20180314.pdf](https://www.pdmpassist.org/pdf/PDMP_admin/TAG_History_PDMPs_final_20180314.pdf), Accessed 18 August, 2020.

<sup>5</sup> Claire Stoltz, *The Effects of Prescription Drug Monitoring Programs on Opioid Use, Disability, and Mortality*, Department of Economics, Harvard University, 2016.

<sup>6</sup> *Whalen v. Roe*, 429 U.S. 589 (1977).

pursue data collection on prescribing history more thoroughly. Empowered by this ruling, many more states began to operate some form of a PDMP.



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By 1990, states such as Oklahoma and Nevada began to adopt electronic reporting systems, greatly expanding the capabilities of these programs. These improvements reduced operations costs and increased the accuracy of the databases, leading other states to consider them as a viable means to monitor opioid prescribing.<sup>7</sup> In 2003, the PDMP seemed to be an effective way to combat opioid overdose deaths. Given that the majority of opioid deaths in 2003 were due to prescription drugs, the program’s intended purpose of limiting opioid prescribing seemed logical. In that year, Congress further increased funding for state PDMPs through the Harold Rogers Prescription Drug Monitoring Programs Grant, a competitive federal program that allows states to receive funding to “enhance the capacity of regulatory and law enforcement agencies and public health officials to collect and analyze controlled substance prescription data...through a centralized database administered by an authorized state agency.”<sup>8</sup>

Although PDMPs are implemented at the state level, federal law enforcement such as the Drug Enforcement Administration (DEA) has unfettered access to the prescribing records states collect. States such as Oregon and Utah have challenged this power on Fourth Amendment grounds, but federal courts ruled in favor of the DEA saying state law provides a “positive conflict...so that the two cannot consistently stand together” against Oregon in

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<sup>7</sup> *History of Prescription Drug Monitoring Programs.*

<sup>8</sup> Department of Justice Bureau of Justice Assistance, *Harold Rogers Prescription Drug Monitoring Program*, www.bja.ojp.gov, 2016, <https://bj.a.ojp.gov/sites/g/files/xyckuh186/files/media/document/BJA-2016-9255.pdf>, Accessed 18 August 2020.



2014 and “physicians and patients have no reasonable expectation of privacy from the DEA” against Utah in 2017.<sup>9</sup>

Due to increased access to funding and resources under the Harold Rogers Program, by 2016, every state with the exception of Missouri had enacted some form of a PDMP (see Table 1). States vary on the extent to which types of participation in these databases are mandatory and on what types of drugs are monitored. All states with PDMPs monitor at least Schedule II-IV opioids, and the majority of states also monitor prescriptions for Schedule V opioid products, such as codeine cough syrup. PDMPs are administered by state government agencies and compile accessible information on prescribing histories, which is entered into the database by health care providers. These systems are updated on a daily or weekly basis, depending on the state.<sup>10</sup>

**TABLE 1: PDMP IMPLEMENTATION DATES, BY STATE**

State	Mandatory PDMP	Operational PDMP
Alabama		4-2006
Alaska	7-2017	1-2012
Arizona	3-2018	12-2008
Arkansas	8-2017	5-2013
California	10-2018	9-2009
Colorado		2-2008
Connecticut	10-2015	7-2008
Washington, D.C.		10-2016
Delaware	3-2012	8-2012
Florida	7-2018	10-2011
Georgia	7-2018	5-2013
Hawaii	6-2018	2-2012
Idaho		4-2008
Illinois	1-2018	12-2009
Indiana	1-2019	7-2007
Iowa	7-2018	3-2009
Kansas		4-2011
Kentucky	7-2012	7-2001
Louisiana	8-2014	1-2009

<sup>9</sup> Lisa N. Sacco, et al., “Prescription Drug Monitoring Programs,” *CRS Report*, [www.fas.org](http://www.fas.org), 24 May, 2018, <https://fas.org/sgp/crs/misc/R42593.pdf#page=26>, Accessed 8 August 2020.

<sup>10</sup> “State PDMP Profiles and Contacts,” Heller School for Social Policy and Management, Brandeis University, [www.pdmpassist.org](http://www.pdmpassist.org), 2020, <https://www.pdmpassist.org/State>, Accessed 18 August 2020.

State	Mandatory PDMP	Operational PDMP
Maine	1-2017	1-2005
Maryland	7-2018	12-2013
Massachusetts	10-2016	1-2011
Michigan	1-2018	1-2003
Minnesota		4-2010
Mississippi	3-2018	7-2008
Missouri		
Montana		10-2012
Nebraska		1-2017
Nevada	10-2015	2-2011
New Hampshire	1-2016	10-2014
New Jersey	11-2015	1-2012
New Mexico	1-2017	8-2005
New York	8-2013	6-2013
North Carolina		7-2007
North Dakota		10-2008
Ohio	4-2015	10-2006
Oklahoma	11-2015	7-2006
Oregon		9-2011
Pennsylvania	1-2017	8-2016
Rhode Island	3-2015	9-2012
South Carolina	5-2017	2-2008
South Dakota		3-2012
Tennessee	4-2013	1-2010
Texas	9-2019	8-2012
Utah	5-2017	1-2006
Vermont	11-2013	1-2009
Virginia	7-2015	6-2006
Washington		1-2012
West Virginia	5-2013	5-2013
Wisconsin	4-2017	6-2013
Wyoming		7-2013

Source: Byungkyu Lee, et al., *Systematic Evaluation of State Policy Interventions Targeting the US Opioid Epidemic, 2007-2018*, JAMA Network, 12 February 2021, Vol. 4, Issue 2, Accessed 12 February 2021; Justine Mallatt, “Unintended Consequences of Prescription Monitoring: Policy-Induced Substitution to Illicit Drugs,” 2019, Working paper provided by author, Revisions requested at *American Journal of Health Economics*.

The PDMP is now widely regarded as an effective policy mechanism that states can use to combat the opioid crisis. Given the crisis's wide-reaching effect across the United States, policies such as this aimed at curbing opioid overdoses are now considered a priority by politicians across the political spectrum. Legislators with ideologies as differing as Senators Bernie Sanders (D-VT) and Rob Portman (R-OH) have rallied in unison to support legislation aimed at lowering overdose deaths. In a time of unprecedented political divide and gridlock, it is exceptional for any policy to garner such universal support.



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For example, in October of 2018, the U.S. Senate passed the Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment (SUPPORT) for Patients and Communities Act—a bill that strengthened state PDMPs by encouraging interstate sharing of data through nationwide databases such as PMPi Hub and RxCheck Hub and mandated PDMP use for all Medicaid providers—by a margin of 98-1 in the Senate, indicating the unified nature of mainstream political thought surrounding this crisis. Though all PDMPs are administered by the states, this legislation enhanced funding for state PDMPs and created a mechanism by which a patient's prescription history could be accessed across state lines.<sup>11</sup>

The dire magnitude of the opioid crisis has created an imperative for legislators, forcing them to act quickly in order to stem the rising level of overdose deaths. As Senator Ted Cruz (R-TX) stated in 2018 while endorsing the SUPPORT for Patients and Communities Act “[t]oo many lives have been lost to the opioid crisis....I am proud of Congress’s actions today

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<sup>11</sup> Mary Beth Musumeci and Jennifer Tolbert, *Federal Legislation to Address the Opioid Crisis: Medicaid Provisions in the SUPPORT Act*, Henry J. Kaiser Family Foundation, www.kff.org, 2018, <https://www.kff.org/medicaid/issue-brief/federal-legislation-to-address-the-opioid-crisis-medicaid-provisions-in-the-support-act/>, Accessed 18 August 2020.

to take a stand in efforts to save millions from the ravages of drug addiction.”<sup>12</sup> It is this sense of urgency—legislating in response to tens of thousands of overdose deaths every year—that has created almost universal support for these interventions, with little, if any, public debate or criticism of them. The only abstention in the Senate to the SUPPORT Act was Sen. Mike Lee (R-UT), who originally publicly endorsed congressional intervention at the American Enterprise Institute, but later expressed worry that the bill would be ineffective despite its good intentions:<sup>13</sup>

*There are some very good elements in this opioid response bill, including strengthening U.S. Customs and Border Protection authority to discover and destroy packages containing illegal controlled substances. Unfortunately, the bill also includes dozens of new grant programs with little accountability for how the dollars will be spent and minimal measurement or analysis on their effectiveness. Good intentions are not enough. In the face of a crisis such as this, we cannot afford to waste precious funds on programs which likely won't work.*<sup>14</sup>

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<sup>12</sup> Ted Cruz, “Sen. Cruz: ‘Too Many Lives Have Been Lost to the Opioid Crisis, and Today We Take a Stand for All Americans,’” [www.cruz.senate.gov](http://www.cruz.senate.gov), October 3, 2018, [https://www.cruz.senate.gov/?p=press\\_release&id=4126](https://www.cruz.senate.gov/?p=press_release&id=4126), Accessed 18 August 2020.

<sup>13</sup> American Enterprise Institute, “Senator Mike Lee: Interpreting ‘The Numbers Behind the Opioid Crisis’ | LIVE STREAM,” The Social Capital Project of the Joint Economic Committee, YouTube, 13 March 2018.

<sup>14</sup> Mike Lee, “Press Releases: Sen. Lee Votes Against Unaccountable Opioid Spending,” [www.lee.senate.gov](http://www.lee.senate.gov), September 2018, <https://www.lee.senate.gov/public/index.cfm/2018/9/sen-lee-votes-against-unaccountable-opioid-spending>, Accessed 18 August 2020.

## PART 2

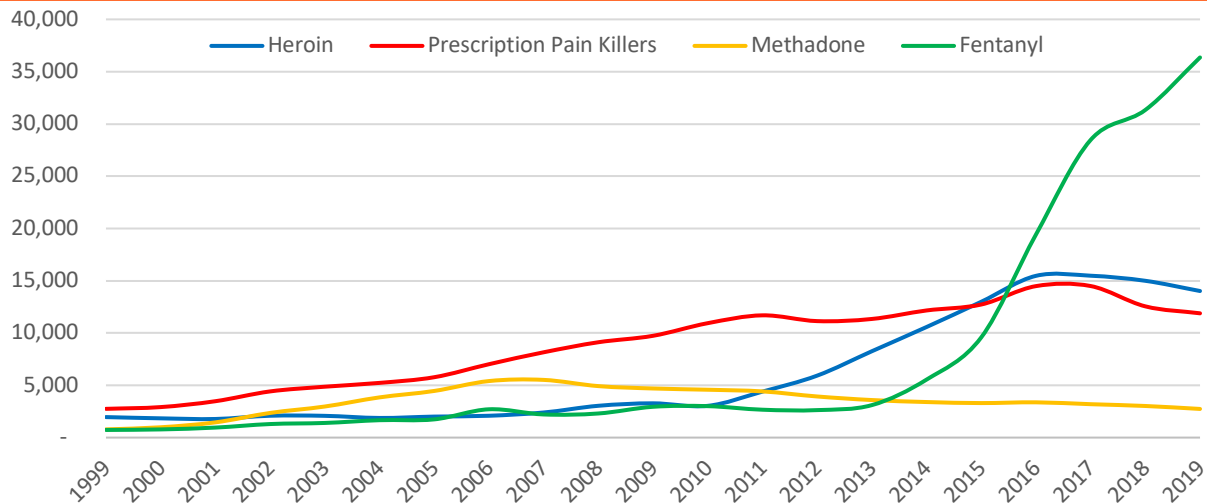
# PDMPs, Drug Abuse Rates, and Opioid Overdose Rates

The CDC divides the modern opioid crisis into three distinct waves, the first beginning “...in the 1990s, with overdose deaths involving prescription opioids (natural and semi-synthetic opioids and methadone) increasing since at least 1999.”<sup>15</sup> However, more-recent research shows that, as demonstrated by Figure 1, by 2010 the second wave of the opioid crisis came on “with rapid increases in overdose deaths involving heroin,” and not prescription opioids.<sup>16</sup> Finally, the third wave of the crisis took hold beginning in 2013, as synthetic opioids such as fentanyl drove the most recent spike in opioid overdose deaths. This followed significant increases in heroin seizures at the U.S. southwest border with Mexico, with the DEA reporting “[h]eroin seizures at the border more than doubled over five years, from 2009 (846 kilograms) to 2013 (2,196 kilograms).”<sup>17</sup>

<sup>15</sup> “Understanding the Epidemic,” Centers for Disease Control and Prevention, March 19, 2020, [www.cdc.gov, https://www.cdc.gov/drugoverdose/epidemic/index.html](https://www.cdc.gov/drugoverdose/epidemic/index.html), Accessed 18 August 2020.

<sup>16</sup> “Multiple Cause of Death Data,” CDC WONDER, [www.cdc.gov](https://wonder.cdc.gov), 2019, <https://wonder.cdc.gov>. Accessed 18 August 2020.

<sup>17</sup> “2019 National Drug Threat Assessment,” Drug Enforcement Administration, December 2019, [www.dea.gov](https://www.dea.gov), [https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020\\_Low\\_Web-DIR-007-20\\_2019.pdf](https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-DIR-007-20_2019.pdf), Accessed 18 August 2020.

**FIGURE 1: TOTAL OVERDOSE DEATHS BY OPIOID CATEGORY**

Source: “Multiple Cause of Death Data,” CDC WONDER, [www.cdc.gov](http://www.cdc.gov), 2019, <https://wonder.cdc.gov>. Accessed 18 August 2020.

Since 2014, the majority of opioid deaths in the United States have not been due to overdoses from prescription opioids—those monitored by PDMPs—but from illicit drugs like heroin and fentanyl. Concerned only with reducing opioid prescription numbers, the PDMP does not directly address ways by which policy can curb the types of overdoses that are most prevalent in the present day. The data suggest that as PDMPs cut users off from legal channels of prescribed, quality-controlled drugs, they may be driven toward black market heroin and fentanyl, whose ingredients and lethal dosages are unknown.

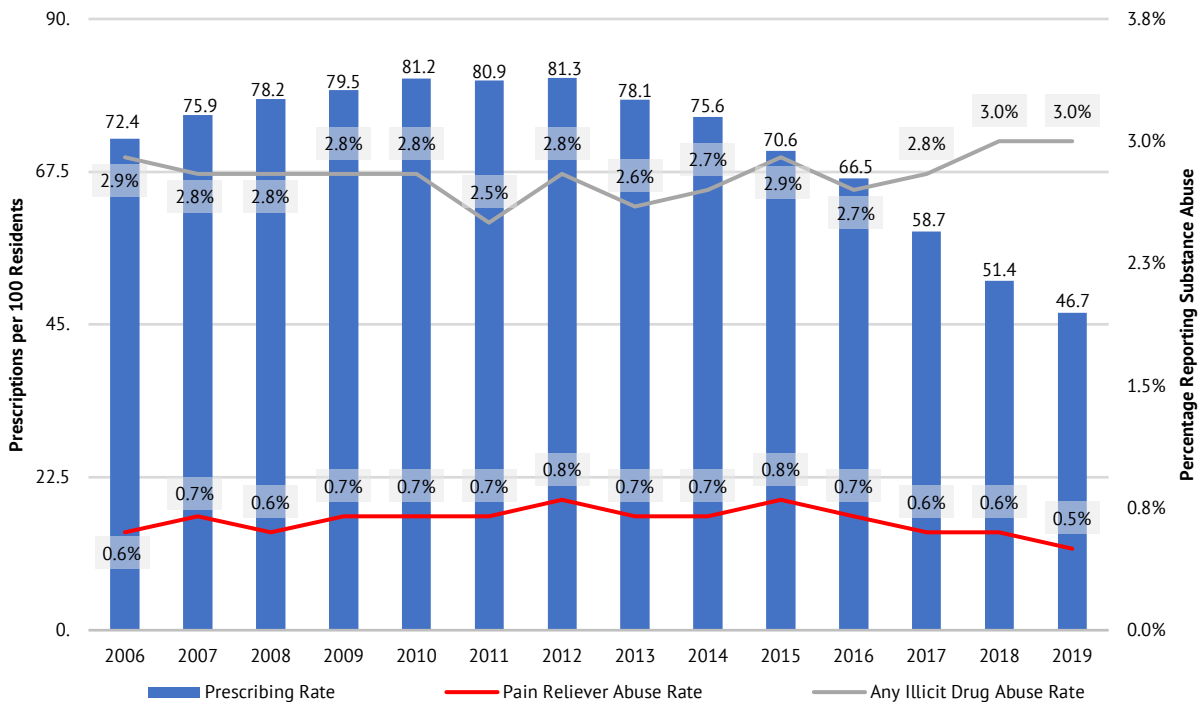
This analysis also compares overall drug abuse rates in a context of PDMP proliferation. Evidence from the Substance Abuse and Mental Health Services Administration (SAMHSA) suggests the supply of prescription opioids distributed by doctors has no influence on reports of substance abuse disorder.<sup>18</sup> Although drugs of abuse tend to follow availability, such as prescribing patterns, illicit drug abuse in general has remained stable since the data were standardized in 2002. During the height of prescribing in the U.S. around 2012, pain reliever abuse was reported by three in 400 people, triple the rough one in 400 people estimate reported by *The New York Times* in 1911 before federal regulations.<sup>19</sup> But these

<sup>18</sup> SAMHDA, Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, December 2020, <https://www.datafiles.samhsa.gov/info/data-portal-nid17200>, Accessed 1 January 2021

<sup>19</sup> *Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings*, Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, [www.samhsa.gov](http://www.samhsa.gov), September 2014,

increases in prescription pain killer abuse amid more prescribing did not affect overall rates of drug abuse, shown in Figure 2. This is because increases in prescribing were accompanied by reductions in abuse of illicit drugs, such as cocaine and heroin, which again reversed after prescription rates were reduced to previous levels. But with no effect on illicit drug abuse in general, increased prescribing does not appear to increase the overall rate of drug abuse. Indeed, looking at Figure 2’s gray line, which increases as prescriptions decrease, it’s likely that prescribing interventions may be motivating drug users to substitute more-available and lower-quality black market variants for restricted prescription-grade drugs.<sup>20</sup>

**FIGURE 2: RATES OF PRESCRIBING AND REPORTS OF ABUSE BY SUBSTANCE AMONG PEOPLE AGE 12 AND OLDER**



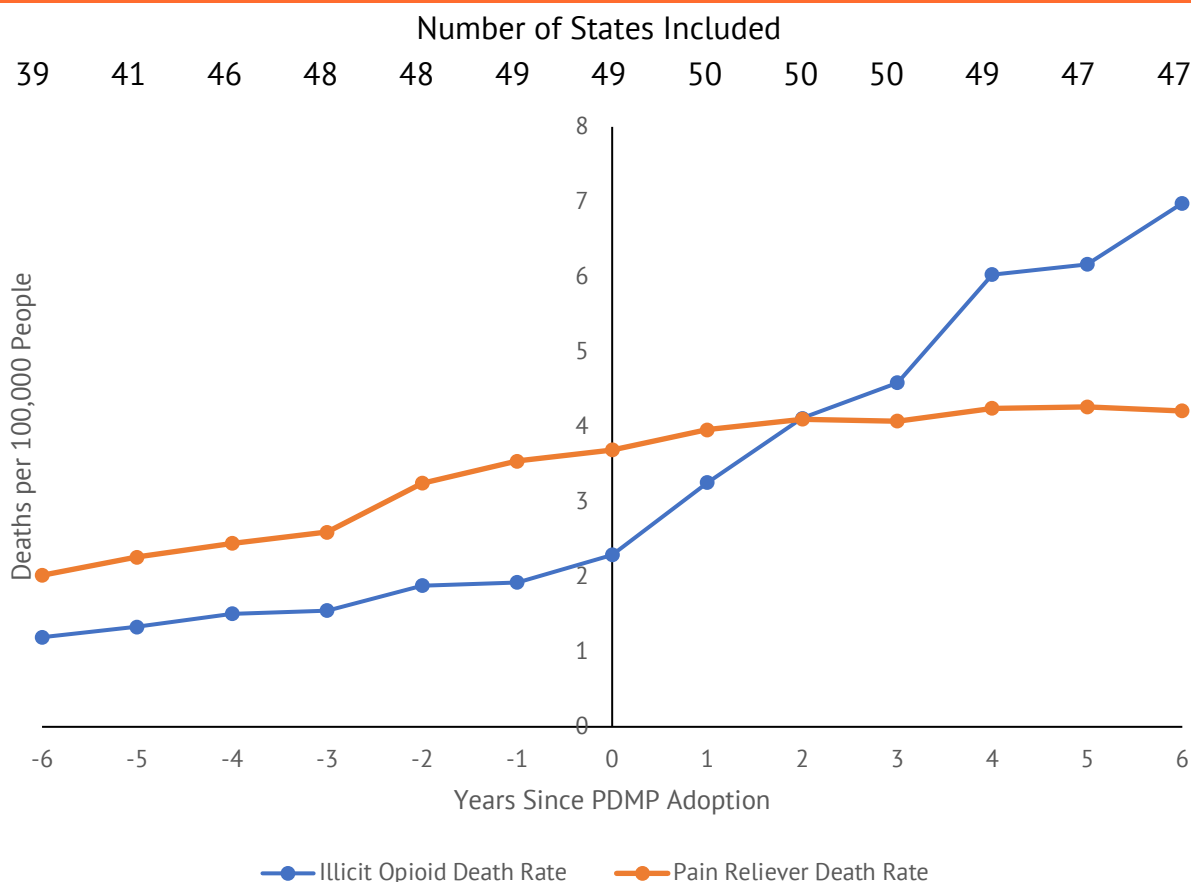
Source: SAMHDA, Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, December 2020, <https://www.datafiles.samhsa.gov/info/data-portal-nid17200>, Accessed 1 January 2021; “U.S. Opioid Prescribing Rate Maps,” Centers for Disease Control and Prevention, [www.cdc.gov](http://www.cdc.gov), 5 March 2020., <https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html>, Accessed 18 August 2020.

<https://www.samhsa.gov/data/sites/default/files/NSDUHresultsPDFWHHTML2013/Web/NSDUHresults2013.pdf>, Accessed 18 August 2020.

<sup>20</sup> 2018 NSDUH Annual National Report, Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, [www.samhsa.gov](http://www.samhsa.gov), August 2019, <https://www.samhsa.gov/data/report/2018-nsduh-annual-national-report>, Accessed 18 August 2020.

Regarding the stated intent of PDMPs—to reduce opioid deaths—this study’s analysis finds that the outcomes of PDMP implementation are far less beneficial than the popular support for this policy suggests. First, there is no apparent link between PDMP implementation and a reduction in opioid overdose deaths. Additionally, the majority of the increase in opioid overdoses has taken place after PDMPs are put into effect at the state level. Figure 3 shows that the effect on prescription opioid overdoses becomes stable after PDMP implementation. However, it also shows that black market overdoses from heroin and fentanyl dramatically increase following PDMP adoption. It appears that surges in illicit opioid overdose deaths follow PDMP implementation, with no clear reduction in deaths, which is the stated intent of the intervention.

**FIGURE 3: STATE-LEVEL DEATH RATES FROM LICIT AND ILLICIT OPIOID OVERDOSES FOLLOWING PDMP IMPLEMENTATION BY STATE**



**NOTE:** On the x-axis, 0 represents when a PDMP was enacted for 49 states and Washington, D.C.

**Source:** “Multiple Cause of Death Data,” CDC WONDER, www.cdc.gov, 2019, <https://wonder.cdc.gov>, Accessed 18 August 2020.



While useful in viewing average changes in opioid death rates before and after PDMP implementation, these observations deserve a closer investigation of why this correlation occurs. Using common methods from the economics and medical literatures, this analysis reviews a panel of state-level data to determine the effect of various types of PDMPs in consistently predicting opioid overdose mortality.<sup>21</sup>

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<sup>21</sup> Jeffrey A. Miron and Elina Tetelbaum, “Does The Minimum Legal Drinking Age Save Lives?” *Economic Inquiry* 47, no. 2 (2009).

## PART 3

# EXPLORING HOW AND WHY PDMPs CORRELATE TO INCREASED OPIOID DEATH RATES: FINDINGS OF DATA ANALYSIS

## 3.1 PDMPs AND OPIOID PRESCRIBING

PDMPs are enacted by governments in an effort to improve opioid prescribing.<sup>22</sup> By creating a database that allows prescribers to view a patient's opioid history before writing prescriptions, this policy is designed to better inform practitioners about the opioid treatments that a patient has already received and to combat "doctor shopping," the practice of an opioid-seeking patient visiting several providers to acquire multiple fills for a similar diagnosis. Supporters of PDMPs argue that, because the PDMP database tells prescribers the number of opioids that a patient has already received, the providers will be

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<sup>22</sup> "Prescription Drug Monitoring Programs (PDMPs)," Centers for Disease Control and Prevention, [www.cdc.gov](https://www.cdc.gov/drugoverdose/pdmp/states.html), June 10, 2020, <https://www.cdc.gov/drugoverdose/pdmp/states.html>, Accessed 18 August 2020.

better informed about a patient's legitimate treatment needs. Thus providers will be less likely to prescribe to patients who already received their prescription for a particular procedure or have a significant history of opioid consumption, who may be seeking out opioids for non-medical purposes.<sup>23</sup>

To examine the relationship between PDMPs and opioid prescribing, this study first examines state-level prescribing rates of the two different types of PDMPs—mandatory and non-mandatory—after implementation. The two types of PDMPs are distinguished by a broad requirement given to physicians before prescribing. Non-mandatory, a.k.a. “operational,” programs give physicians the discretion to check the PDMP database before prescribing opioids, if such a database is made available. Mandatory PDMPs *require* doctors to check their patients' prescribing histories before dispensing opioids. The idea is that people with opioid use disorder might seek opioids for their addiction by visiting multiple physicians within a short period of time to stock up on opioids. Advocates for mandatory PDMPs claim that requiring doctors to review their patients' prescribing histories will prevent them from inappropriately prescribing opioids. With both types of PDMPs, the state would still record the prescription, which could be audited by law enforcement at a later date.

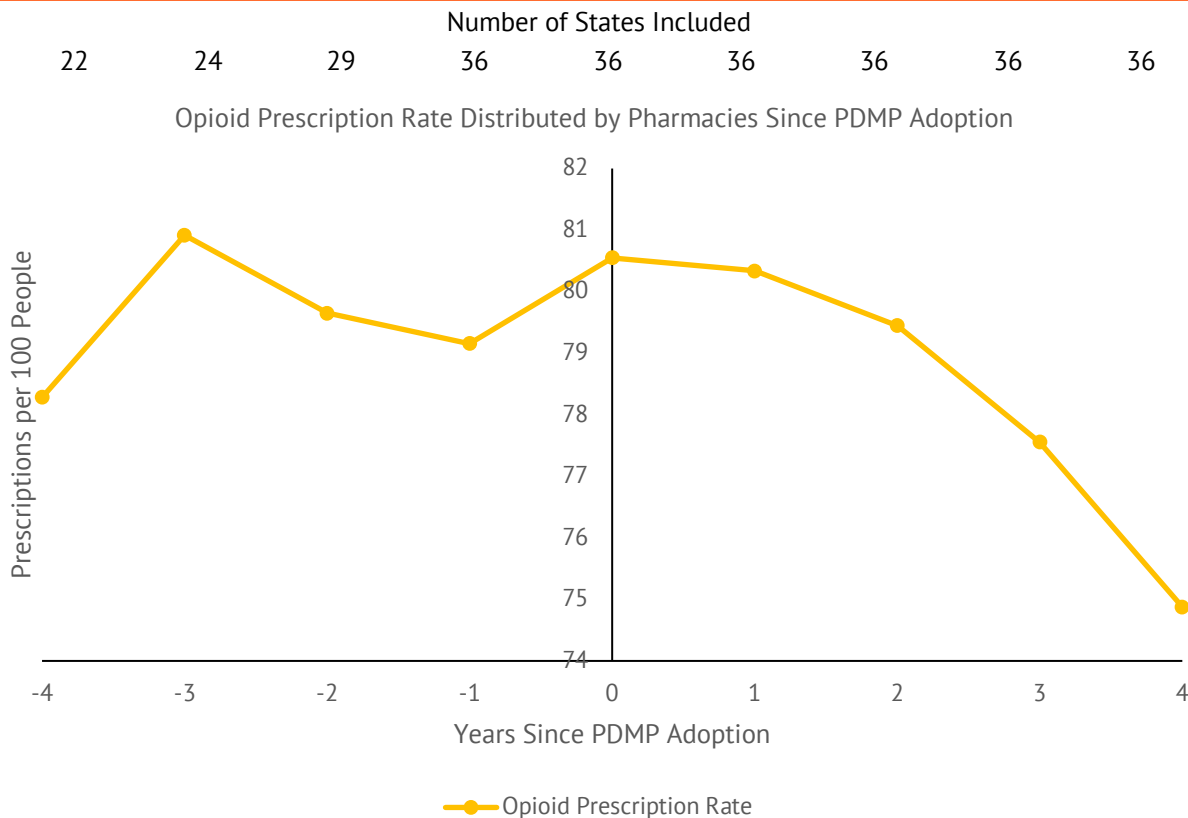
Figure 4 illustrates the average decrease in prescribing for the whole country after PDMPs go into effect. It shows that enacting a PDMP is associated with a decrease in opioid prescribing per capita. The results of our study conclude that states typically reduce their prescribing rates 7.7% after enacting operational PDMPs.<sup>24</sup> However, this study finds no evidence that making PDMPs mandatory is associated with *additional* decreases in prescribing. Why mandatory access PDMPs aren't linked to decreases in prescribing after operational programs are implemented is up for debate. Notably, both mandatory and non-mandatory PDMP laws allow law enforcement to audit doctors, regardless of whether physicians are forced to check their patients' prescribing histories. Additionally, law enforcement oversight often relies on formulas that target doctors based on sheer volume of prescribing, not who receives the drugs. This means that database consultation, whether forced or discretionary, has no effect on whether a doctor might draw negative attention from law enforcement.

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<sup>23</sup> Jeffrey Singer, et al., “Today's nonmedical opioid users are not yesterday's patients; implications of data indicating stable rates of nonmedical use and pain reliever use disorder,” *Journal of Pain Research* 2019 No. 12 (2018), 617-620.

<sup>24</sup> Jacob James Rich and Robert Capodilupo, “Opioid Prescribing Mediating State Policy Intervention Effects on Drug Overdose Mortality,” *medRxiv*, 16 May 2021, <https://doi.org/10.1101/2021.05.13.21257109>.

**FIGURE 4: AVERAGE OPIOID PRESCRIPTION RATE AFTER PDMPs TAKE EFFECT**



**NOTE:** On the x-axis, 0 represents when a PDMP was enacted for 36 states. Smaller numbers of states approach PDMP implementation in this series relative to Figure 3 because CDC prescribing data begin in 2006, after many states already implemented PDMPs.

Source: “U.S. Opioid Prescribing Rate Maps,” Centers for Disease Control and Prevention, [www.cdc.gov](http://www.cdc.gov), 5 March 2020., <https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html>, Accessed 18 August 2020.

## 3.2 PDMPs AND DRUG OVERDOSE DEATHS

Having established evidence that operational PDMPs are associated with significant reductions in prescribing, this section examines the relationship that this reduction in opioid prescribing may have on opioid overdose deaths. The logic behind PDMPs holds that, since they work to reduce opioid prescribing, they also lower overdose deaths because people will be prescribed fewer opioids, and thus, have less of a risk of becoming addicted and ultimately dying from opioid overdoses. Because the ultimate goal of PDMPs is to reduce opioid overdose deaths—with reductions in prescribing only being a means to this end—simply establishing that PDMPs reduce prescribing is insufficient evidence to determine their effectiveness.



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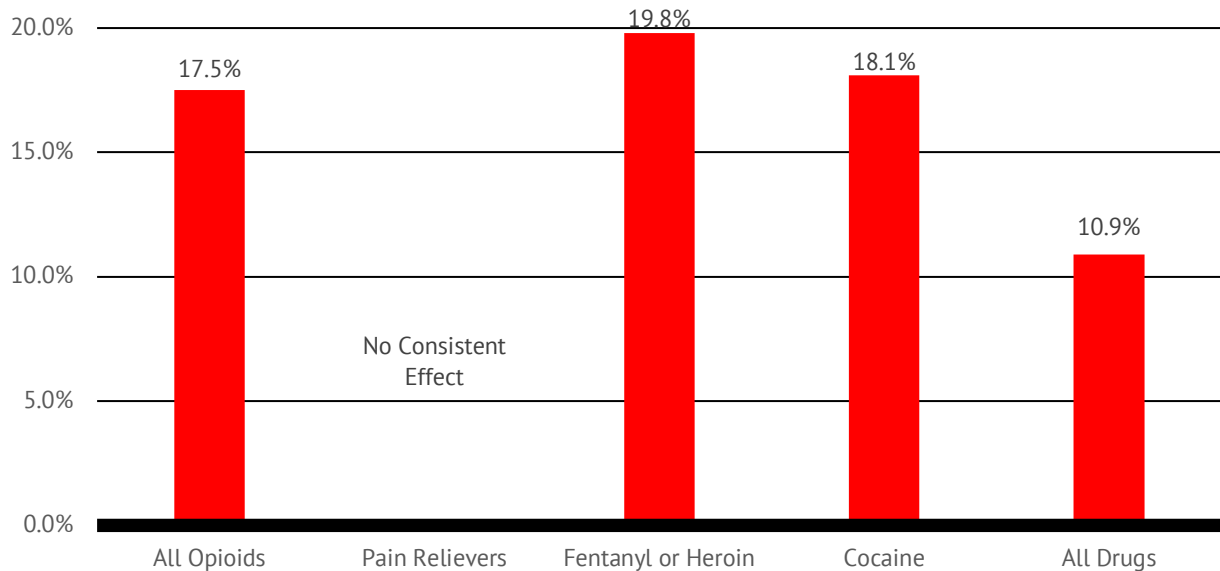


This analysis finds no evidence that decreases in prescribing are associated with a statistically significant decrease in total opioid deaths, instead finding strong evidence that PDMPs cause opioid death rates to increase by 17.4%, as depicted in Figure 5. This makes common sense. As PDMPs enable doctors to identify patients who may be doctor shopping to acquire opioids for non-medical use, doctors will likely stop prescribing opioids to them. Yet these are the very patients who are likely addicted and who will turn to illicit providers to fuel their habits. To further investigate the relationship between reduced opioid prescribing and overdose deaths, this analysis now turns to the results for overdoses from various subcategories of drugs.

The data in Figure 5 also reveal a significant 19.8% increase in deaths per capita from either heroin or fentanyl following the implementation of PDMPs. Although these findings suggest that PDMPs lead to increases in deaths from heroin and fentanyl separately, both drugs are often consumed intravenously (by injection), and it's not always clear whether the overdose victims knew which drug they were consuming. According to the CDC, "only a small percentage of fentanyl deaths had evidence consistent with prescription fentanyl," indicating that the majority of fentanyl deaths are caused by fentanyl acquired on the black market.<sup>25</sup> Thus, to examine the relationship between prescribing and black market deaths, this study combined all heroin and fentanyl deaths into one black market, illicit overdose deaths category.

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<sup>25</sup> Julie K. O'Donnell, et al., "Deaths Involving Fentanyl, Fentanyl Analogs, and U-47700 – 10 States, July–December 2016," *MMWR*, 3 Nov 2017, Vol. 66, Issue 43, 1197-1202.

**FIGURE 5: PERCENT INCREASE IN OVERDOSE DEATH RATE FOLLOWING PDMP ADOPTION**

Source: Jacob James Rich and Robert Capodilupo, “Opioid Prescribing Mediating State Policy Intervention Effects on Drug Overdose Mortality,” *medRxiv*, 16 May 2021, <https://doi.org/10.1101/2021.05.13.21257109>.

This substitution to black market drugs compounds the risk associated with opioid use. In particular, fentanyl’s heightened potency relative to that of most prescription opioids makes it especially dangerous, since “[d]rugs obtained in underground markets do not come with warning labels, and users cannot discuss safe use with their physicians, making them more likely to combine opioids with alcohol or other medications that suppress respiration.”<sup>26</sup> Because users lack guidance from a physician or the ability to “easily assess the purity of the products they consume,” they are at a higher risk of accidental overdose, and thus, overdose death.<sup>27</sup> In moving opioid use away from legal channels toward the black market, restrictions on prescribing, such as PDMPs, seem to increase the dangers of opioid use by forcing users to substitute more-potent and lower quality drugs.

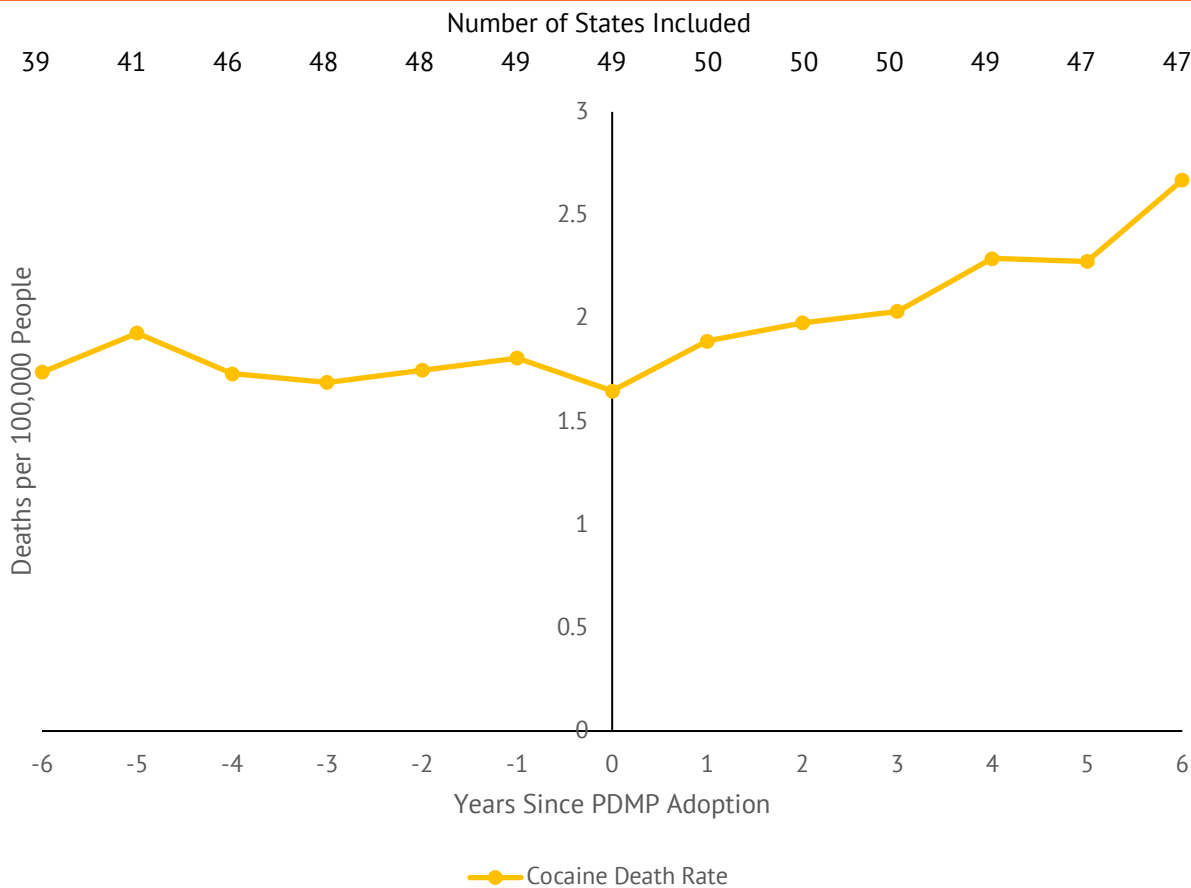
Moreover, fentanyl is vastly cheaper to produce than heroin, resulting in increased profits and proliferation on the black market, not only in opioids but also other illicit drugs. The

<sup>26</sup> Jeffrey Miron, Greg Sollenberger, and Laura Nicolae, *Overdosing on Regulation: How Government Caused the Opioid Epidemic*, *Cato Institute*, 14 February 2019.

<sup>27</sup> *Ibid.*

data in Figure 6 illustrate the relationship between PDMP implementation and cocaine-related deaths, which often involve the influence of black market opioids like fentanyl. Cocaine death rates were stable before states adopted PDMPs, but nearly doubled within six years of implementation. The percent increase in cocaine-related death rates following PDMP implementation relative to other drugs is also shown in Figure 5. Similar to illicit opioid overdose rates, PDMPs are followed by a 18.1% increase in the cocaine death rate.

**FIGURE 6: AVERAGE COCAINE-RELATED DEATH RATE AFTER PDMPs TAKE EFFECT**



**NOTE:** On the x-axis, 0 represents when a PDMP was enacted for 49 states and Washington, D.C.  
**Source:** “Multiple Cause of Death Data,” CDC WONDER, [www.cdc.gov](http://www.cdc.gov), 2019, <https://wonder.cdc.gov>, Accessed 18 August 2020.

Though reductions in prescribing seem to contribute to increases in black market deaths, we do find strong evidence that they are associated with reductions in prescription opioid deaths. According to our research, PDMPs have no consistent effect on deaths from prescription pain relievers, but a 1% reduction in prescribing is followed by a 0.56%

decrease in the pain reliever death rate.<sup>28</sup> In accordance with the argument that reductions in prescribing would reduce at least some opioid overdose deaths, this finding supports the claim that PDMPs, by reducing opioid prescribing, might work indirectly to lower prescription opioid overdose deaths—those most directly impacted by limits on prescribing. But these small reductions are dwarfed by the massive increase in illicit opioid deaths shown in Figure 5, resulting in an overall 10.9% increase in total drug overdose deaths correlated with subsequent reductions in opioid prescribing caused by PDMPs.

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*Evidently, reductions in prescribing may contribute to an increase in black market deaths from all illicit drugs as users are cut off from legal channels of higher quality, dosed prescription substances.*

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Evidently, reductions in prescribing may contribute to an increase in black market deaths from all illicit drugs as users are cut off from legal channels of higher quality, dosed prescription substances. Policies like PDMPs that aim to lower prescribing or increase enforcement are likely forcing opioid users to substitute heroin and fentanyl for the prescription opioids they can no longer access. Additionally, as cheap and potent illicit fentanyl increasingly replaces prescription opioids for non-medical purposes, it is also contaminating the cocaine supply and increasing cocaine-related overdoses, as suggested in Figures 5 and 6. In 2019, as shown in Figure 7, fentanyl likely caused 63.8% of cocaine-related deaths.<sup>29</sup> In contrast, as recently as 2013, fentanyl was implicated with less than 5% of cocaine-related deaths. These results suggest that fentanyl is likely why cocaine-related deaths have more than tripled since 2013. Similarly, the proportion of opioid deaths caused by fentanyl increased from 12.4% in 2013 to 72.9% in 2019, with opioid overdoses doubling during the same period.

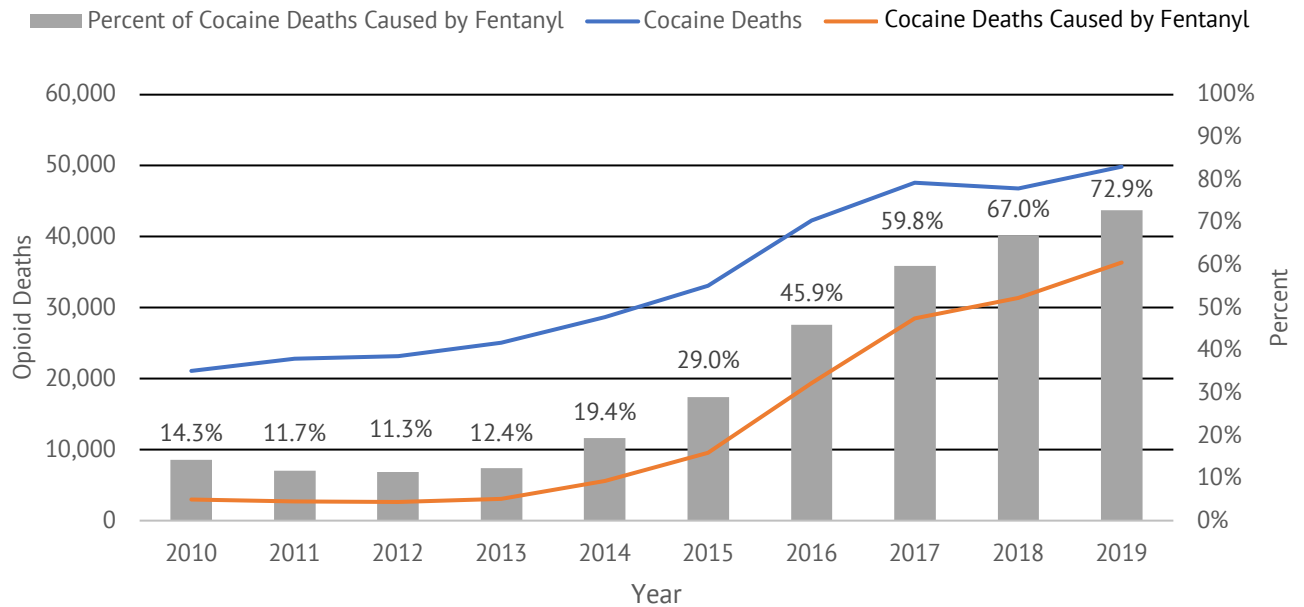
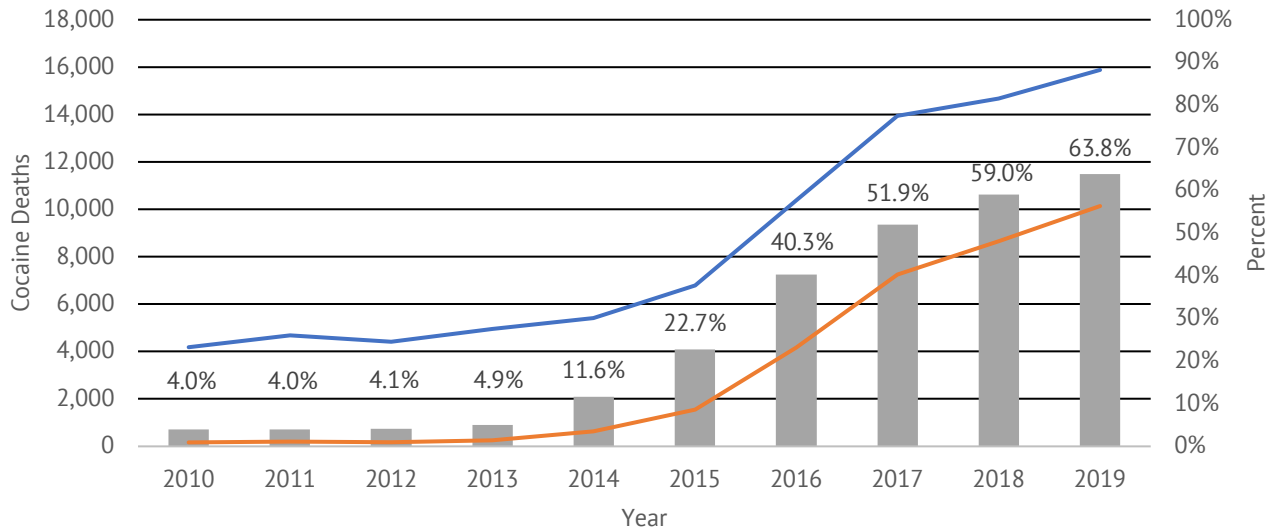
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<sup>28</sup> Jacob James Rich and Robert Capodilupo, “Opioid Prescribing Mediating State Policy Intervention Effects on Drug Overdose Mortality,” *medRxiv*, 16 May 2021, <https://doi.org/10.1101/2021.05.13.21257109>.

<sup>29</sup> “Multiple Cause of Death Data,” CDC WONDER, [www.cdc.gov](http://www.cdc.gov), 2018, <https://wonder.cdc.gov>, Accessed 18 August 2020.



**FIGURE 7: PROPORTION OF COCAINE AND OPIOID OVERDOSE DEATHS CAUSED BY FENTANYL OVER TIME**



Source: "Multiple Cause of Death Data," CDC WONDER, www.cdc.gov, 2019, <https://wonder.cdc.gov>. Accessed 18 August 2020.

## PART 4

# COSTS

When analyzing the effectiveness of any public policy in meeting its desired goal, it is necessary to weigh the costs relative to the benefits. According to a 2009 study on the costs of PDMPs, the initial implementation of the PDMP can cost anywhere from \$450,000 to \$1,500,000 a year. The report also notes that the “annual operating costs range from \$125,000 to nearly [\$1,000,000], with an average annual cost of about \$500,000.”<sup>30</sup> While this sum of funding certainly does not make up a significant share of any state’s annual budget, it seems counterproductive that a state would spend any revenue whatsoever on programs when evidence suggests they may actually contribute to heightened overall rates of opioid overdose deaths. Drug overdoses for 2020 are projected to surpass 86,000, and it might be no coincidence that PDMPs are now operating in all but one state.<sup>31</sup>

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<sup>30</sup> *Maryland Advisory Council on Prescription Drug Monitoring Legislative Report*, Maryland Advisory Council, [msa.maryland.gov](http://msa.maryland.gov), 31 December 2009, <http://msa.maryland.gov/megafile/msa/speccol/sc5300/sc5339/000113/012000/012478/unrestricted/20100355e.pdf>, Accessed 18 August 2020.

<sup>31</sup> *Overdose Deaths Accelerating During COVID-19*, Centers for Disease Control and Prevention, 17 December 2020, <https://www.cdc.gov/media/releases/2020/p1218-overdose-deaths-covid-19.html>, Accessed 5 April 2021.

## PART 5

# CONCLUSIONS

This study finds that PDMPs fail at their major goal to reduce opioid overdoses. Although PDMPs successfully decrease prescription rates, they also increase the use of black market opioids. Consequently, as PDMPs cut off users from legal channels of prescribing and force them to switch to more-dangerous illicit drugs, this unforeseen substitution to illegally purchased heroin and fentanyl is the principal reason why PDMPs ultimately lead to more drug overdose deaths.

According to Dr. Jeffrey Singer, a practicing physician in Phoenix, Arizona and senior fellow at the Cato Institute, users who are cut off from legal channels of prescribing do just that. He notes that as a doctor, he is “faced with the decision between giving [someone addicted to prescription opioids] another prescription under the condition that he’ll see me in two weeks so we can talk about this again, or cutting him off and risking that he’ll go get some counterfeit Percocet and maybe die of an overdose because it contained fentanyl or carfentanil.”<sup>32</sup>

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<sup>32</sup> Jeffrey A. Singer, *The Myth of an Opioid Prescription Crisis*, Cato Institute, 2017.

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Therefore, the evidence against the effectiveness of PDMPs provided by this study should be seen as a way to reorient the policymaking community away from this dogmatic reliance on the PDMP as a necessary component of a state's opioid crisis response policy and toward exploring more-effective solutions. Millions of taxpayer dollars are spent nationwide on the administration of these ineffective programs each year. Since these records are already collected and published publicly by the DEA as de-identified distribution measurements at the ZIP-code level within a year of prescribing, PDMPs are redundant for most research purposes.

## PART 6

# RECOMMENDATIONS

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The revenue spent on PDMPs, which appear to increase opioid overdose deaths, would best instead target addiction intervention. The research from which this study is based also includes observations on several different control variables that may inform policymakers about likely targets for assistance.<sup>33</sup> Notable is the relationship between opioid prescribing and population density. Rural areas tend to consume more opioids, but this observation is not necessarily due to more addiction. Cities contain fewer manual laborers per capita, which means rural areas might have higher levels of genuine pain that needs treatment. Additionally, there is generally a positive relationship between population density and most types of drug overdose.

This latter finding is at odds with the popular “deaths of despair” hypothesis for the opioid crisis. The “Mortality and Morbidity in the 21st Century” study holds that “increases in

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<sup>33</sup> Jacob James Rich and Robert Capodilupo, “Opioid Prescribing Mediating State Policy Intervention Effects on Drug Overdose Mortality,” *medRxiv*, 16 May 2021, <https://doi.org/10.1101/2021.05.13.21257109>.

deaths of despair are accompanied by a measurable deterioration in economic and social wellbeing.”<sup>34</sup> According to this hypothesis, because of economic hardship, older white men in rural areas disproportionately turn to narcotics such as opioids as a means of escapism, increasing drug use, and thus, the risk of overdose. This idea is at odds with this study’s analysis of socioeconomic conditions, with race, sex, age, poverty, poverty, and median income having no consistent effects on drug overdose deaths.<sup>35</sup>

Drugs purchased on the black market are far more dangerous than those prescribed legally, due to a consumer’s lack of information about the true contents of the substance and inability to consult dosage regimens with a doctor. Thus, restrictions on prescribing—though well-intended—seem to be making opioid use more dangerous, as users are pushed to underground markets to meet their demand. How to address this conundrum is not obvious, but evidence from abroad may shed light on effective interventions for the United States.

Access to medication-assisted treatments (MATs), which replace illicitly-sourced opioids for milder opioid prescriptions like buprenorphine under the supervision of a doctor, has been shown to greatly reduce the chance of an overdose death.<sup>36</sup> When France removed its licensing requirement from all physicians to provide buprenorphine, the country saw a reduction in opioid overdose deaths by 79% within four years.<sup>37</sup> The Netherlands took a similar approach with medication-assisted treatments (MATs) that actually provided prescription heroin for free to adults with opioid use disorder, which basically eliminated all overdose deaths and new addictions in the country.<sup>38</sup> Although providing prescription opioids to those addicted to opioids is controversial, it is important to remember that

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<sup>34</sup> Anne Case and Angus Deaton, *Mortality and Morbidity in the 21st Century*, Brookings Institution, 2017.

<sup>35</sup> Jacob James Rich and Robert Capodilupo, “Opioid Prescribing Mediating State Policy Intervention Effects on Drug Overdose Mortality,” *medRxiv*, 16 May 2021, <https://doi.org/10.1101/2021.05.13.21257109>.

<sup>36</sup> Sarah E. Wakemen, et al., “Comparative Effectiveness of Different Treatment Pathways for Opioid Use Disorder,” *JAMA Network Open*, 5 February 2020, <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2760032>, Accessed 18 February 2021.

<sup>37</sup> Marc Auriacombe, et al., “French Field Experience with Buprenorphine,” *The American Journal on Addictions*, 18 February 2010, <https://onlinelibrary.wiley.com/doi/abs/10.1080/10550490490440780>, Accessed 18 February 2021.

<sup>38</sup> Thijs Roes, “Only in the Netherlands Do Addicts Complain About Free Government Heroin,” *Vice News*, 6 May 2014, <https://www.vice.com/en/article/xwp74q/only-in-the-netherlands-do-addicts-complain-about-free-government-heroin>, accessed 9 March 2021; Gerard Arnoldus Kalkman, et al., “Trends in use and misuse of opioids in the Netherlands: a retrospective, multi-source database study,” *The Lancet*, 20 August 2019, [https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667\(19\)30128-8/fulltext](https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(19)30128-8/fulltext), accessed 9 March 2021.

addictions are often facilitated by black markets targeting at-risk populations, such as the young and mentally impaired. In this spirit, one of the last actions of the Trump administration was to direct the Department of Health and Human Services to similarly remove the licensing requirement from all physicians in the United States to prescribe buprenorphine for addiction treatment. Although one of the first actions taken by the Biden administration was to reintroduce the licensing requirement, the president recently reversed this decision and again removed the training requirement to prescribe buprenorphine.



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*By providing greater access to legal opioids such as buprenorphine and methadone through medication-assisted treatments (MATs), access to health care could allow users to better treat their drug addictions, likely working toward a decrease in deaths.*

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One hypothesis in the literature argues access to medication-assisted treatments (MATs), or drugs used to treat opioid addiction, decreases drug-related mortality. According to one 2019 study, “[g]rowth in prescriptions used to treat opioid use disorder greatly outpaced other drugs, suggesting important gains in access to addiction treatments.”<sup>39</sup> By providing greater access to legal opioids such as buprenorphine and methadone through medication-assisted treatments (MATs), access to health care could allow users to better treat their drug addictions, likely working toward a decrease in deaths. However, we find no statistically significant evidence to suggest that Medicaid expansion, a policy that increases access to health care, is linked to similar reductions in overdose deaths, which might be because Medicaid didn’t cover addiction treatment through 2019.<sup>40</sup> Regardless, this analysis

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<sup>39</sup> Benjamin Cher, Nancy E. Morden, and Ellen Meara, “Medicaid Expansion and Prescription Trends,” *Medical Care* 57, no. 3 (2019).

<sup>40</sup> Jonathan Cooper, “Oklahoma Becomes 1st State To Expand Medicaid Coverage To Include Opioid Treatment,” *News 9*, 14 March 2021, <https://www.news9.com/story/60512f0af707160bbbe651c9/oklahoma-becomes-1st-state-to-expand-medicaid-coverage-to-include-opioid-treatment>, Accessed 7 May 2021.

suggests that prescriptions provided through either MAT or diverted means are indistinguishable in their ability to reduce opioid-related deaths.

In terms of the policy controls, several of these variables are also of note. This study finds that “pill mill” laws, which are regulations on pain management clinics that require practitioners to receive state certification and comply with staffing regulations, are loosely associated with a 24.7% average increase in cocaine-related deaths.<sup>41</sup> Thus, by affecting the availability of legal opioids, the presence of pill mill laws may also contribute to users being forced to substitute with illicit opioids like fentanyl for less-available prescription opioids, which then taints the illegal cocaine supply.

This study finds that the revenue spent on PDMPs might find more beneficial use in pursuit of treating addiction. After terminating all PDMP policies, the revenue spent currently on prescribing interventions should be reappropriated to subsidizing opioids for proven treatments like medication-assisted treatment (MAT) with drugs like buprenorphine and methadone, and allowing Medicaid to cover addiction treatment services.

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<sup>41</sup> “Pain Management Clinic Laws,” PDAPS, [www.pdaps.org](http://www.pdaps.org), 1 June 2018, <http://pdaps.org/datasets/pain-management-clinic-laws>, Accessed 18 August 2020.



# ABOUT THE AUTHORS

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