

The Fiscal Impact of the Opioid Epidemic in the New England States

By Riley Sullivan

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The Fiscal Impact of the Opioid Epidemic in the New England States

I. Introduction

The opioid epidemic has received mounting attention in recent years from state, federal, and local policymakers across the ideological spectrum. Indeed, on October 26, 2017, President Trump declared it a national public health crisis.¹ While that declaration will hopefully lead to a faster resolution of this epidemic, thousands of individuals across New England and the country have dealt with this crisis for over a decade already. The rise in the abuse of—and addiction to—opioids such as heroin and prescription pain relievers, and the rapid increase of fatal overdoses in recent years, shows that this trend affects every community. Understanding the direct fiscal impact is key to acknowledging the scope and magnitude of the epidemic beyond the major human and social costs. While opioid abuse has many direct and indirect fiscal costs, few studies try to quantify these costs. This report estimates a sample of direct fiscal costs for the six New England states, relative to the United States.

This dearth of information can be attributed to the breadth of opioid-related government service areas, which range across many different government department budgets. A lack of direct line-item budgeting associating certain costs with opioids further complicates information-gathering. While the costs discussed and estimated in this report are tied to opioid abuse, it is understandable why in practical terms these costs are not clearly delineated as opioid costs. Administrative costs are not generally broken down into how much money is spent on policing opioid crimes. Recent increases in funding for federal and state programs created to combat the opioid epidemic illustrate that this epidemic is pinching state budgets.

As state revenues continue to fall short of expectations despite a period of sustained economic growth, it is important to consider areas of cost growth and constrained revenue growth.² The costs of the opioid epidemic extend beyond those analyzed in this report. The costs in this report are the expenditures most directly linked to opioid abuse that have been analyzed in the past to estimate costs (Mark et al. 2001), but indirect costs can have many different origins. Increased reliance on social welfare programs as a result of lost wages and productivity due to opioid addiction adds a wide-ranging number of budget items touched by the epidemic. Because of the large number of affected individuals, decreased tax revenues from those same lost wages can have major implications

This report provides new insights into the direct fiscal cost of the opioid epidemic to the New England states.

1 Lenny Bernstein, Jenna Johnson, and John Wagner, "Trump Declares the Opioid Crisis a National Public Health Emergency," *The Washington Post*, October 26, 2017. https://www.washingtonpost.com/politics/trump-declares-opioid-crisis-a-public-health-emergency-critics-say-plan-falls-short/2017/10/26/8883762e-ba60-11e7-be94-fabb0f1e9ffb_story.html?utm_term=.522de4b87054.

2 See Joshua Miller, "State Falls Short on Tax Revenue. Way Short. Again," *The Boston Globe*, May 3, 2017. <https://www.bostonglobe.com/metro/2017/05/03/state-falls-short-tax-revenue-way-short-again/MEo0VjLmClOplvuceMbCul/story.html>.

Table 1

Estimated Fiscal Cost of Opioid Abuse
New England States and the United States, Various Years

	CT	ME	MA	NH	RI	VT	US
Costs							
Criminal Justice	\$95,082,553	\$11,867,007	\$197,875,208	\$7,158,854	\$29,303,093	\$11,119,959	\$5,649,074,311
Medical Treatment	\$177,191,048	\$57,978,644	\$340,102,280	\$16,350,336*	\$51,515,476	\$24,490,438	\$8,286,883,952
Medical Complications	\$37,724,815	\$31,365,741	\$81,602,124	\$13,033,324	\$9,472,727	\$15,163,926	\$2,234,057,343
Total	\$309,998,417	\$101,211,392	\$619,579,612	\$36,542,514 *	\$90,291,296	\$50,774,323	\$16,170,015,606
Per Capita	\$89.80	\$79.13	\$96.19	*	\$89.89	\$83.48	\$50.99
% Total State Gov. Expenditure, 2015	0.99	1.14	0.98	*	1.04	0.78	0.74

*New Hampshire hospital treatment data are unavailable.

Notes: Author's calculations using various public data sources. See references for detail.

for state budgets (Florence et al. 2016). Child welfare agencies have experienced a marked uptick in services they need to provide as a result of parental drug abuse.³ The costs described within are the most directly related to opioid addiction, but the myriad other programs affected and potential lost tax revenue would also need to be considered for a full picture of the fiscal implications. Despite the lack of these data in the analysis, it remains clear that the opioid epidemic has had a substantial fiscal impact on the New England states.

Key findings of this report include:

- As a percentage of total state government expenditures, the New England states spend a greater share on opioid-related costs than the average U.S. state, hovering around 1 percent of the state budget for four of the New England States compared to 0.74 percent nationally (Table 1).
- Each New England state with complete data spends more than the per-state national average of opioid-related expenses, when normalized by population.
- Treating opioid use disorder on both an emergency and a long-term basis has high associated costs, which in the New England states make up the majority of fiscal costs. Estimates for medical treatment associated with opioids reach as high as \$340 million annually in Massachusetts alone.
- The opioid epidemic receives a great deal of attention because it affects many different communities. Preventing the spread of opioid addiction is a high priority for many policymakers, but innovative solutions are necessary to reduce the societal, human, and fiscal costs of the epidemic.

3 See Teresa Wiltz, "Drug Addiction Epidemic Creates Crisis in Foster Care," *Stateline*, October 7, 2016. <http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2016/10/07/drug-addiction-epidemic-creates-crisis-in-foster-care>.

Table 2

Estimated Fiscal Cost of Criminal Justice Expenditures for Opioids New England States and the United States, Various Years

	CT	ME	MA	NH	RI	VT	US
Costs							
Police Protection	\$38,579,656	\$4,856,174	\$93,518,366	\$3,131,951	\$11,845,714	\$4,645,627	\$1,962,253,487
Judicial & Legal	\$24,756,988	\$1,830,978	\$40,285,250	\$991,015	\$4,232,009	\$1,818,491	\$874,006,225
Corrections	\$23,685,603	\$3,826,379	\$46,233,503	\$1,623,262	\$6,664,203	\$3,302,585	\$1,463,313,341
Probation	\$6,787,007	\$1,348,339	\$16,309,995	\$994,359	\$6,501,004	\$1,062,369	\$1,182,701,835
Parole	\$1,273,299	*	\$1,528,094	\$418,268	\$60,163	\$290,887	\$166,799,423
Total	\$95,082,553	\$11,861,870*	\$197,875,208	\$7,158,854	\$29,303,093	\$11,119,959	\$5,649,074,311
Per Capita	\$26.48	\$8.93*	\$29.72	\$5.41	\$27.87	\$17.76	\$17.96

*Parole data for Maine are unavailable.

Notes: Police protection costs, judicial and legal costs, and corrections costs are for arrests related to opioid, cocaine, and their derivatives; probation and parole costs are for drug-related offenses. Author's calculations using various public data sources. See references for detail.

II. Criminal Justice Costs

Policing Costs

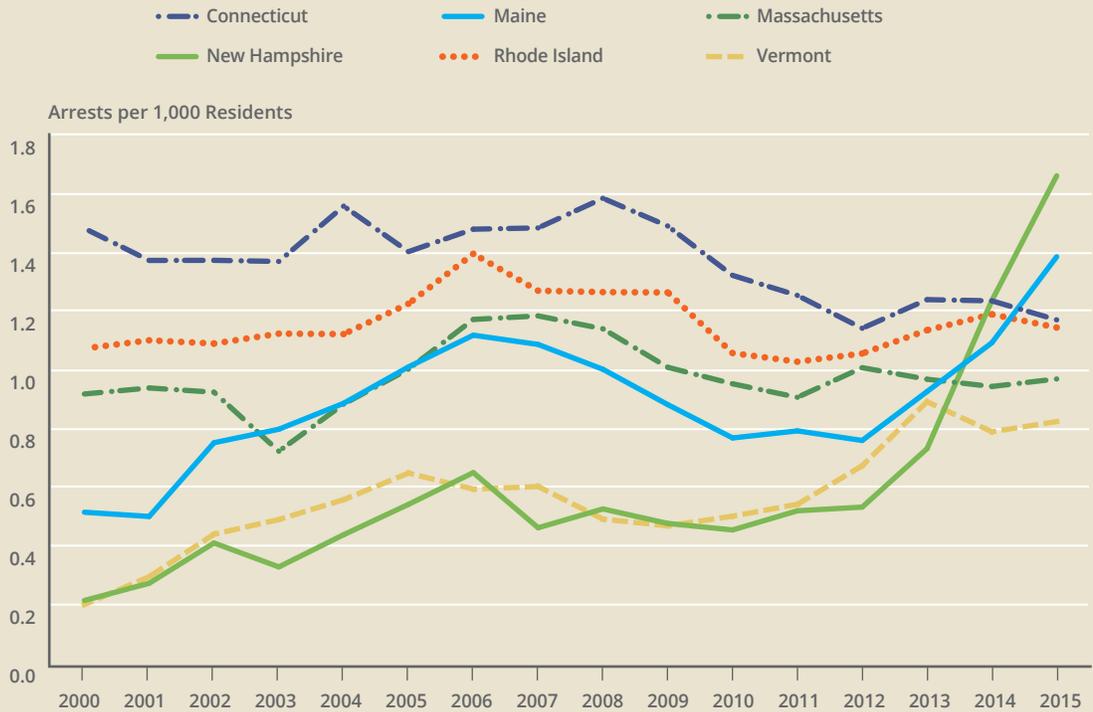
The opioid epidemic impacts many components of the criminal justice system, as shown in Table 2. The criminal justice costs explored in this report are incurred by state and local agencies and departments and reported to the U.S. Census Bureau, which accordingly calculates public safety expenditures by state. The Bureau of Justice Statistics (BJS) then analyzes this data, breaking down public safety costs into more specific categories such as policing, court costs, and corrections. Policing and court costs include costs for agency and court personnel (police officers, prosecuting district attorneys, judges, and court staff), equipment, and operating costs.

Every year thousands of individuals become involved in the criminal justice system as a result of illegal substance use. The first areas explored in this report are policing and court costs. The increased policing and prosecution of illegal drug use over the last several decades led to an increase in the population with a criminal record and growth of the incarcerated population (Alexander 2012). In the wake of the opioid epidemic, there has been a decreased emphasis on policing some types of drug users, particularly individuals with a small amount of marijuana. As a result, the number of total drug arrests has not increased dramatically. Separating out the types of drug arrests, however, clearly shows that arrests in the category of drugs that includes heroin and opioids have increased significantly over the last fifteen years. Due to data limitations in how crimes are categorized, sometimes costs for criminal justice expenditures fall under total drug offenses, and other times the costs fall under

The opioid epidemic imposes significant police, judicial, legal, and supervisory costs on states in the region.

Figure 1a

Arrests per 1,000 Residents for Opium, Cocaine & Derivatives New England States, 2000–2015



Sources: Federal Bureau of Investigation Uniform Crime Reporting Program Data: Arrests by Age, Sex, and Race, 2000–2015.

a more specific category of “opium, cocaine, and their derivatives,” which includes all heroin and opioid-related crimes.

While there are some general trends in increased arrests in the opioid category, as shown in Figure 1a, differences exist across the New England states. Even with respect to marijuana arrests, the New England states show different trends. Marijuana was decriminalized or legalized in each state at different times, reflected in the steep drop-off in different years by state as shown in Figure 1b.⁴ While marijuana arrests in four states decreased over the fifteen-year period in varying degrees, New Hampshire experienced an increase from 2013–15.⁵ The rate of increase for opioid arrests in New Hampshire was much greater than the rate of increase for marijuana arrests, but the rise in both categories resulted in a significant increase in total drug arrests (Figure 1b).

Several New England states with significant opioid use issues are taking innovative approaches to combatting the epidemic. New Hampshire, which has spent the least per capita of the New England states on opioid-related criminal justice costs, is one of the states most severely impacted by fatal opioid overdoses in the United States. The state has garnered national attention in this area and within the last two years has increased policing of substances in general in order to combat the rising opioid abuse.⁶ In 2016 (for which arrest data were not available at the time of writing this report),

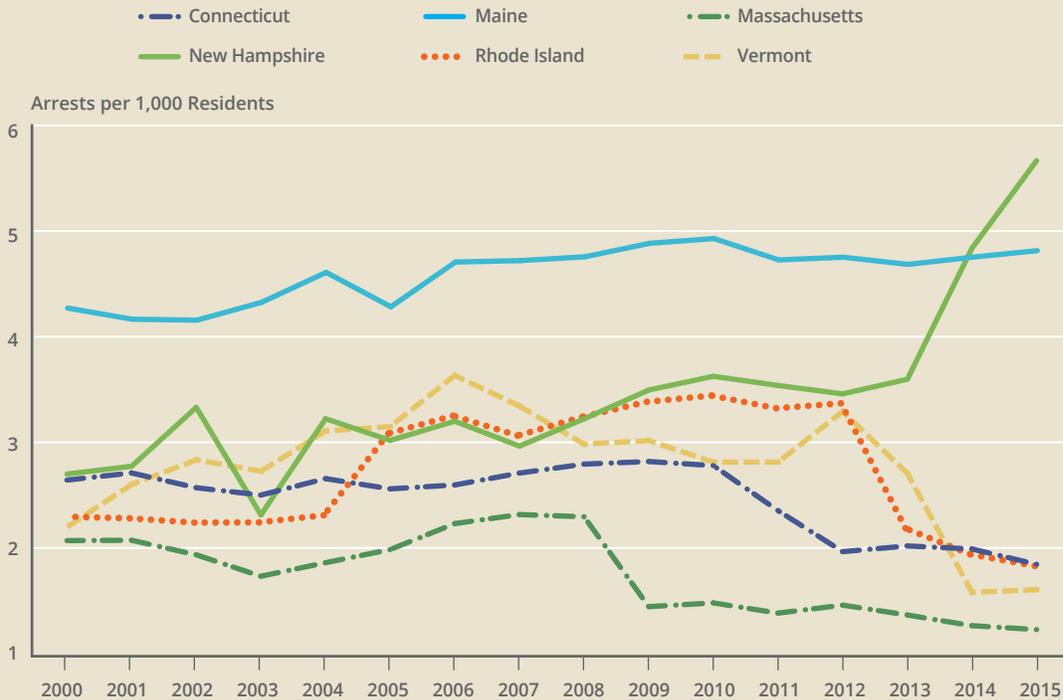
4 See National Conference of State Legislatures, “Marijuana Overview,” August 30, 2017. <http://www.ncsl.org/research/civil-and-criminal-justice/marijuana-overview.aspx>.

5 Maine did not experience a drop in the time period shown, but a voter referendum in 2016 did legalize the marijuana industry, which begins sales in 2018.

6 Liam Stack, “Trump Calls New Hampshire a ‘Drug -Infested Den,’ Drawing the Ire of Its Politicians,” *The New York Times*, August 3, 2017. <https://www.nytimes.com/2017/08/03/us/trump-new-hampshire-drug-den>.

Figure 1b

Arrests per 1,000 Residents for All Drug Crimes New England States, 2000–2015



Sources: Federal Bureau of Investigation Uniform Crime Reporting Program Data: Arrests by Age, Sex, and Race, 2000–2015.

New Hampshire's legislature passed an expansion of its Granite Hammer anti-drug program, which focuses on drug dealers rather than users. While the additional \$1.5 million in resources through Granite Hammer is distributed throughout the state, nearly half is given to the cities of Manchester and Nashua, both of which have been severely impacted by fatal overdoses. These additional funds are funneled into adding resources such as police officers in areas most affected by the epidemic.⁷

In addition to targeted arrests and allocating additional resources, other means of policing have begun to be employed to fight the opioid epidemic. Gloucester, Massachusetts, gained national attention in 2015 when the police chief announced an amnesty program allowing drug users to surrender their contraband and receive substance abuse treatment, instead of charges and a potential corrections sentence.⁸ After the first year of operation, nearly 400 individuals had come to the station under the amnesty program, and it had also been replicated at over 100 other departments across the country. The placements from the Gloucester Police Department into detox and rehabilitation facilities were more successful than placements made by hospital-based referrals (Schiff et al. 2016).

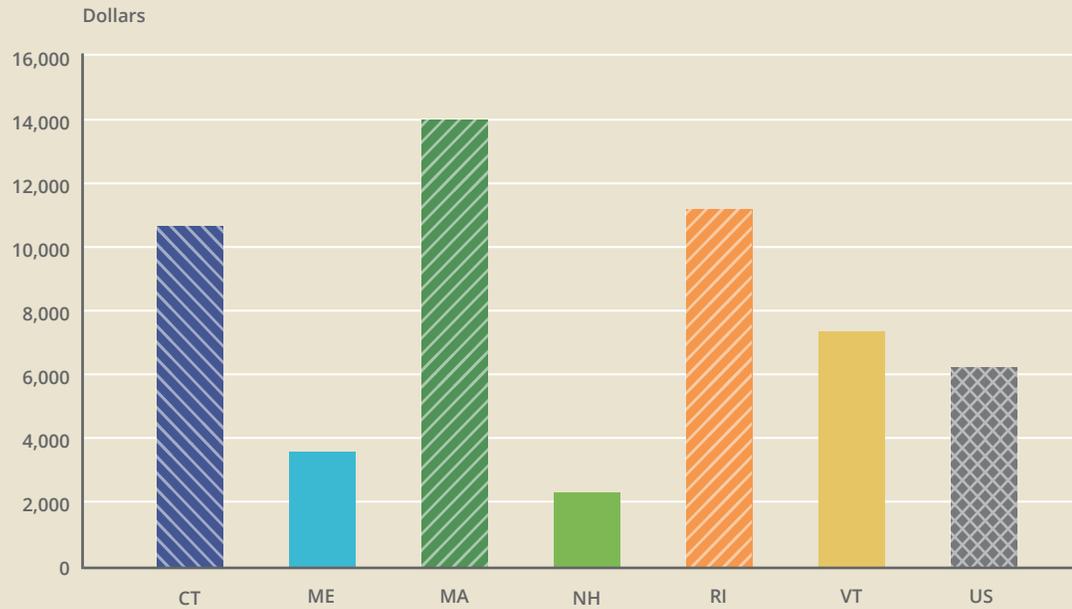
The most recent uniform data on criminal justice expenditures for each state are from 2012. The cost figures in Table 2 are calculated using BJS expenditure data and the percentage of total arrests that fall into the category of "opium, cocaine, and their derivatives." A similar cost estimation strategy has been used in other widely cited reports (Mark et al. 2001). Despite the lack of recent data to

7 Casey McDermott, "State Hands Out \$1.5M in 'Granite Hammer' Grants for Anti-Drug Enforcement," *New Hampshire Public Radio*, September 28, 2016. <http://nhpr.org/post/state-hands-out-15m-granite-hammer-grants-anti-drug-enforcement>.

8 Katharine Q. Seelye, "Massachusetts Chief's Tack in Drug War: Steer Addicts to Rehab, Not Jail," *The New York Times*, January 24, 2016. <https://www.nytimes.com/2016/01/25/us/massachusetts-chiefs-tack-in-drug-war-steer-addicts-to-rehab-not-jail.html>.

Figure 2

**Police Protection Related to Opium, Cocaine & Derivatives:
Cost per 1,000 Residents**
New England States and the United States, 2012



Source: Author's calculations using various public data sources. See references for detail.

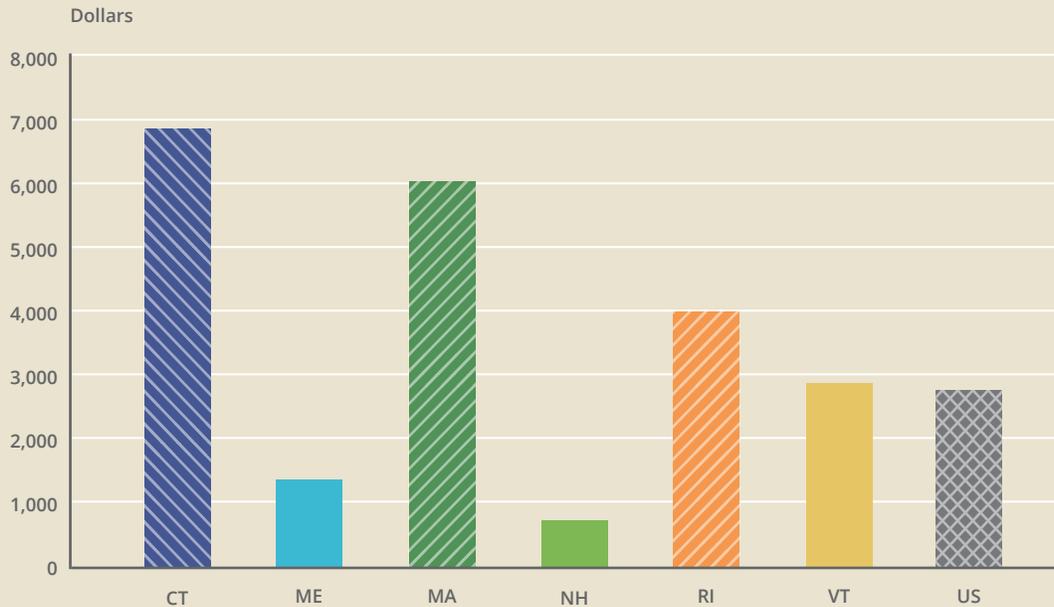
reflect programs such as New Hampshire's Granite Hammer, policing and executing arrests for drug crimes in recent years have cost each state in New England a minimum of \$3 million annually and up to over \$90 million in Massachusetts (Table 2). The level of spending varies significantly by state. When adjusted for state population, the spending on police protection by each New England state remains uneven, with Massachusetts at the top, New Hampshire and Maine below the national average, and the remaining three New England states above the US average (Figure 2). Despite major regional variations in arrest rates (Clifford and Sullivan 2017), the cost of policing opioid crimes and drug crimes impacts all New England states.

Judicial and Legal Costs

All six New England states have unique judicial and legal systems that handle the flow of cases differently. The BJS provides judicial costs data from 2012. Analyzing these data against the Federal Bureau of Investigation's Uniform Crime Reporting Program data on opioid arrests allows for calculating each state's judicial and legal expenditures related to opioid abuse. The cost is substantial in all six New England states, with four states spending over \$10 million in 2012, even before the height of the epidemic (Table 2). As with arrest expenditures per capita, Maine and New Hampshire are significantly below the national average for judicial and legal expenditures (Figure 3). The other four New England states all spend more than the national average on judicial and legal costs for opioid-related crimes.

Figure 3

Judicial and Legal Expenditures Related to Opium, Cocaine & Derivatives: Cost per 1,000 Residents New England States and the United States, 2012



Source: Author's calculations using various public data sources. See references for detail.

This rise in opioid abuse leads to opioid crimes taking up a larger share of available resources for police departments and courts.⁹ Due to a lack of annual data, it is difficult to see the cost trends in recent years, but as the percentage of arrests for opioid crimes continues to increase, it is logical to infer that the share of costs for policing and prosecuting opioid crimes would also trend upward.

Corrections Costs

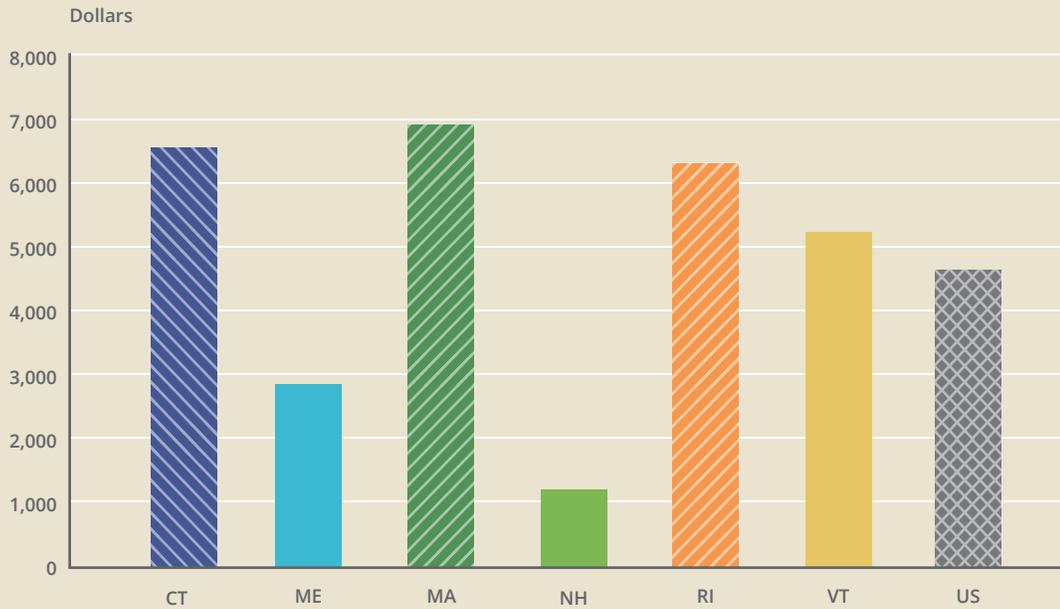
In addition to policing and legal costs, corrections are included in criminal justice costs. The U.S. Census Bureau collects data on corrections facilities that house incarcerated individuals to determine the expenditures covering public safety; the BJS analyzes these data. BJS estimates encompass the total costs of staffing and operating corrections facilities—prisons and penitentiaries, reformatories, jails, and houses of correction, including addiction services provided within a corrections facility. In addition to incarcerated individuals, the total corrections population includes individuals on community supervision, probation, and parole. Probation and parole estimates are from 2015 data for all sentences being served for any drug-related crime, from the Bureau of Justice Statistics' Annual Probation Survey and Annual Parole Survey.

In New England, state prisons house felons who are serving longer sentences. Jails house prisoners serving shorter sentences and are generally operated more locally, at the county level. However, there are some jurisdictional differences across the New England states: if a state has a unified system—as is the case in Connecticut, Rhode Island, and Vermont—the state operates its jails and

9 Katie Zezima, "As Opioid Overdoses Rise, Police Officers Become Counselors, Doctors and Social Workers," *The Washington Post*, March 12, 2017. <https://www.washingtonpost.com/national/as-opioid-overdoses-rise-police-officers-become-counselors-doctors-and-social-workers/2017/03/12/>.

Figure 4

Arrests Related to Opium, Cocaine & Derivatives: Corrections Cost per 1,000 Residents New England States and the United States, 2012



Source: Author's calculations using various public data sources. See references for detail.

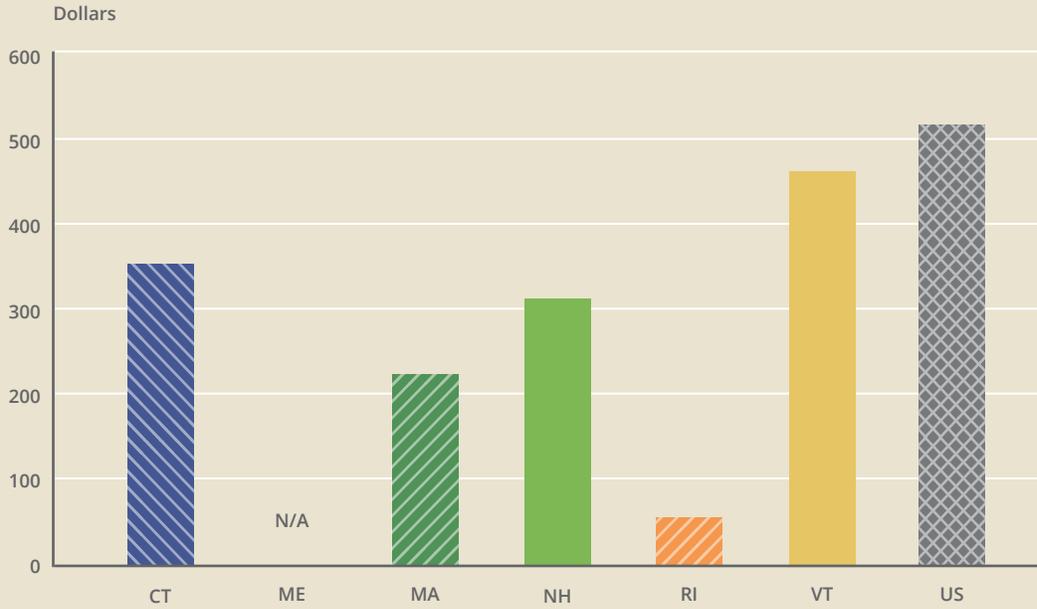
prisons. As presented in this report, the costs of incarcerating individuals serving sentences for opioid offenses are the costs associated with jails and prisons for each state. Just like the policing and judicial and legal costs, the most recent data available from the BJS are from 2012 (Table 2). The cost once again is in the millions of dollars, with the estimated cost to Massachusetts almost \$50 million annually. Maine and New Hampshire are the only states in the region below the national average once again, and it is clear that criminal justice spending across these categories is correlated. It is important to note that these estimates are based on the share of arrests for drug offenses. Many other offenses, including non-drug-related violent and property crimes, are plausibly committed while under the influence, which would push the annual cost of incarceration related to opioids even higher.

A primary criticism of the war on drugs that began in the 1980s is the resulting increase in the U.S. corrections population. For decades, repeat drug users have received long sentences for felony convictions as a result of mandatory minimum sentencing laws (Alexander 2012). In New England and elsewhere in the United States, the opioid epidemic has prompted a movement to reduce such harsh penalties in favor of more compassionate treatment for addiction. Unlike previous drug epidemics, the opioid crisis is increasingly viewed as a public health issue, making treatment a palatable alternative to sentencing.

Beyond jail and prison sentences, probation and parole account for the remainder and the majority of individuals involved with the criminal justice system. Parole is used after an offender exits prison or jail. Parole terms vary according to the individual case but generally involve regular meetings with a parole officer, drug tests, and other offender-specific requirements. Violating these terms usually results in re-incarceration. Probation is often used in lieu of incarceration for first-time offenders who committed lower-level criminal acts, usually misdemeanors. Probation, which lets the offender remain

Figure 5

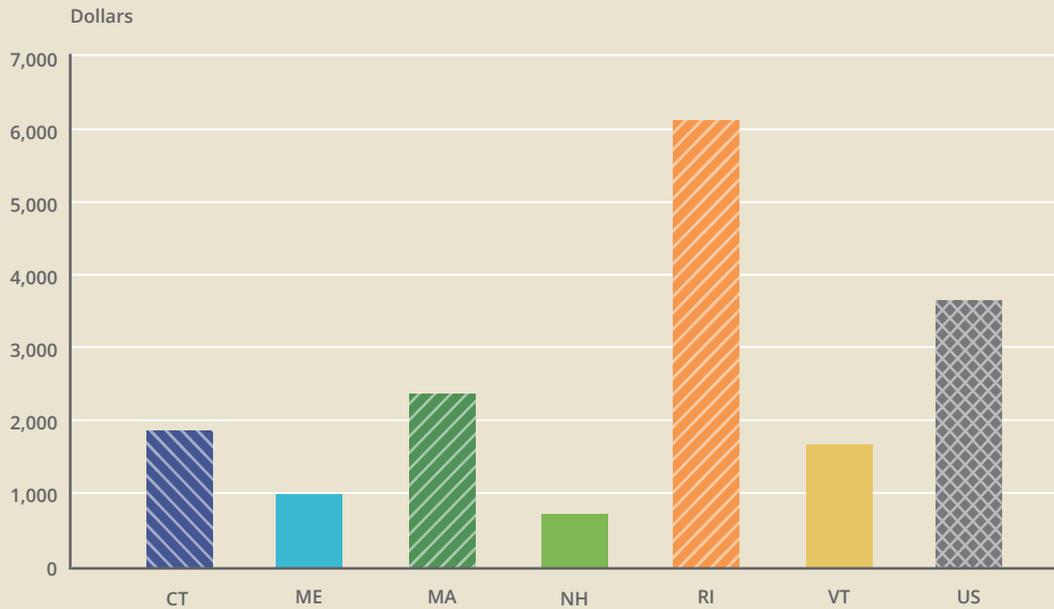
Parole for Drug-Related Offenses: Cost per 1,000 Residents
New England States and the United States, 2015



Source: Missing Maine data. Author's calculations using various public data sources. See references for detail.

Figure 6

Probation for Drug-Related Offenses: Cost per 1,000 Residents
New England States and the United States, 2015



Source: Author's calculations using various public data sources. See references for detail.

Table 3

Estimated Fiscal Cost of Treatment for Opioids New England States and the United States, Various Years

	CT	ME	MA	NH	RI	VT	US
Costs							
Medication Assisted Therapy	\$96,110,248	\$29,516,144	\$149,406,380	\$16,350,336	\$25,177,776	\$15,566,288	\$2,773,955,152
Hospital Inpatient	\$68,691,700	\$22,708,000	\$149,872,800	*	\$22,140,300	\$7,096,250	\$4,749,949,800
Emergency Department	\$12,389,100	\$5,754,500	\$40,823,100	*	\$4,197,400	\$1,827,900	\$762,979,000
Total	\$177,191,048	\$57,978,644	\$340,102,280	*	\$51,515,476	\$24,490,438	\$8,286,883,952
Per Capita	\$52.83	\$46.60	\$54.28	*	\$53.04	\$41.50	\$25.96

*New Hampshire medical treatment cost data are unavailable.

Notes: Author's calculations using various public data sources. See references for detail.

in the community, typically does not involve as much structured supervision and as many requirements as parole. A probation officer still supervises and conducts periodic check-ins to ensure that the individual is complying with specific behavioral mandates—such as producing clean drug tests—that cannot be violated without repercussions. The 2015 data in Figures 5 and 6 illustrate the cost of these community supervision methods, which is high for probation due to the large number of people on probation, particularly in Rhode Island.¹⁰ Probation and parole also allow an individual to work on maintaining sobriety outside a correctional institution. Though many jails and prisons now offer substance abuse services, offenders have a greater variety of treatment options available to them while on community supervision.

Not only do criminal charges for drug crimes directly impact state budgets through corrections costs, they also can have long-term negative repercussions on job prospects, which could make an individual more reliant on social services or cause the state to collect less tax revenue on decreased earnings (Mark et al. 2001). If an individual can maintain sobriety after contact with the criminal justice system, then some of these costs may be mitigated. An individual who does not receive proper treatment for an addiction may become a repeat offender, potentially receiving an even longer sentence and continuing to increase the corrections-related costs of opioid use.

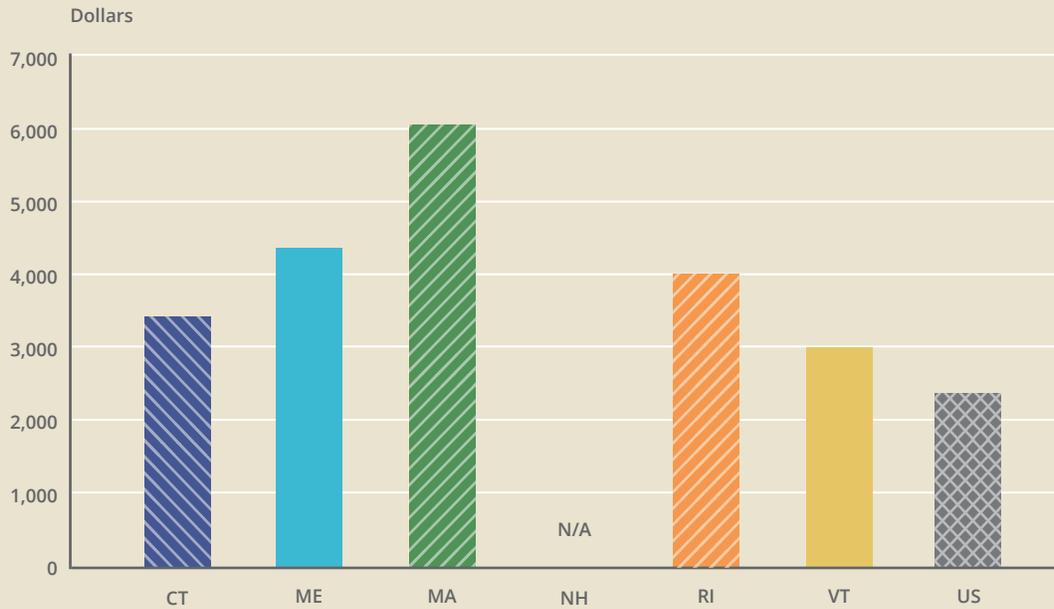
III. Treatment Costs

The ultimate goal of treatment for opioid abuse is to help save lives and families. Successful treatment can reduce the long-term costs and consequences of opioid abuse and associated fiscal costs.

10 This is driven by the number of individuals on probation in Rhode Island rather than a higher cost of supervision per individual. Rhode Island has a rate of community supervision far above the national average. For more information on the criminal justice landscape around New England, see Clifford and Sullivan (2017).

Figure 7

Emergency Department Treatment for Opioid Abuse: Cost per 1,000 Residents New England States and the United States, 2014



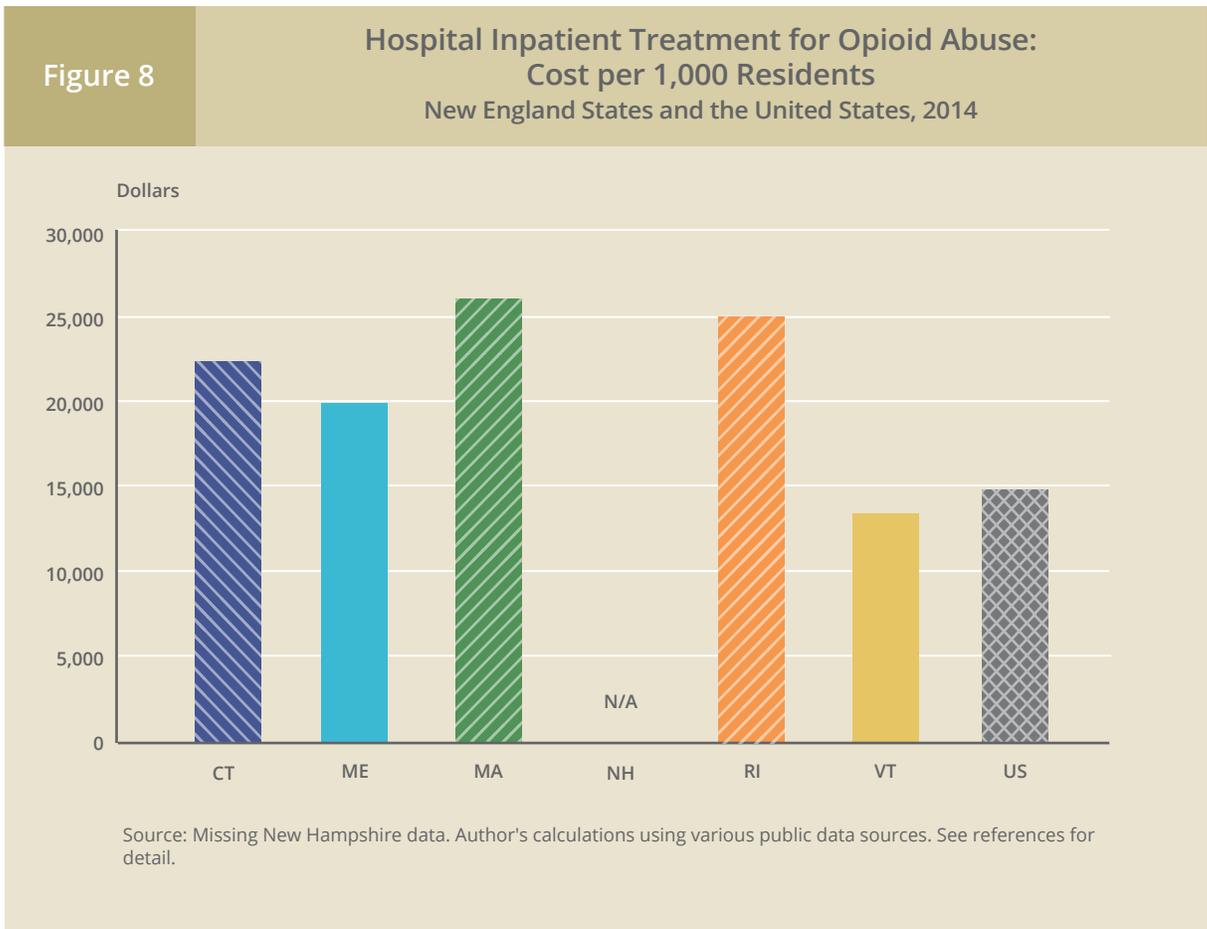
Source: Missing New Hampshire data. Author's calculations using various public data sources. See references for detail.

Costs for emergency situations (emergency room visits, hospitalizations, and overdose reversals) and long-term treatment options are very high. However, without these interventions it is likely that all of the other costs, like the criminal justice costs discussed earlier, would be even higher. Table 3 summarizes the costs associated with treatment for opioid abuse.

Treatment costs for opioid abuse range from emergency interventions, such as using naloxone (commonly known as Narcan) to combat an overdose, to residential rehabilitation and other long-term addiction services. Other emergency treatment costs include post-overdose emergency ambulance trips and hospitalizations. Addiction treatment options include everything from short-term detoxification stays lasting a few days to months-long intensive residential stays. The figures discussed in this section are total healthcare system costs by state; without healthcare claims data, it is difficult to determine how many of these costs are charged to government-subsidized plans. Since the increased costs in the private healthcare and insurance systems are likely shared with residents in the form of higher service and insurance costs, the total cost of treatment in a state is still relevant. With the increase of fatal overdoses in the last decade, these costs have been rising in all New England states (Healthcare Cost and Utilization Project: Opioid-Related Hospital Use 2005–2014).

For emergency room visits related to opioid incidents, the upward cost trend of healthcare per visit exacerbates the fiscal impact of the opioid epidemic (Kamal 2017). The number of visits in 2014 combined with the average national cost yields the per-resident cost of emergency visits for each state, excluding New Hampshire (Figure 7). The total cost of inpatient hospital stays likewise increased, with usage and cost

Treatment costs range from emergency interventions to residential rehabilitation and other long-term addiction services.



in 2014 estimated from the same data sources to arrive at an annual cost for each state (Figure 8) (Healthcare Cost and Utilization Project: Opioid-Related Hospital Use 2005–2014). The data used in Figure 7 and Figure 8 include the national average; these costs are likely even higher because New England spends more on medical care than most other regions of the country.¹¹ The per-resident cost of inpatient admissions is higher than the cost of emergency room visits due to the higher volume of inpatient admissions and higher cost of inpatient care. The annual estimated cost of opioid abuse treatment-related inpatient care in 2014 ranged from \$7 million in Vermont to almost \$150 million in Massachusetts (Table 3). When compared on a per-capita basis, five of the six New England states with available data¹² spent more than \$15,000 per 1,000 residents in 2014; four of those five spent more per capita than the national average (Figure 8).

Opioid abuse-related episodes and costs have also increased at residential and nonresidential treatment facilities.¹³ The Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration (SAMHSA)'s Treatment Episode Data Set reports admissions information for nearly all substance abuse treatment facilities in each state. The data reflect residential and nonresidential treatment episodes of varying length. Figure 9 illustrates residential

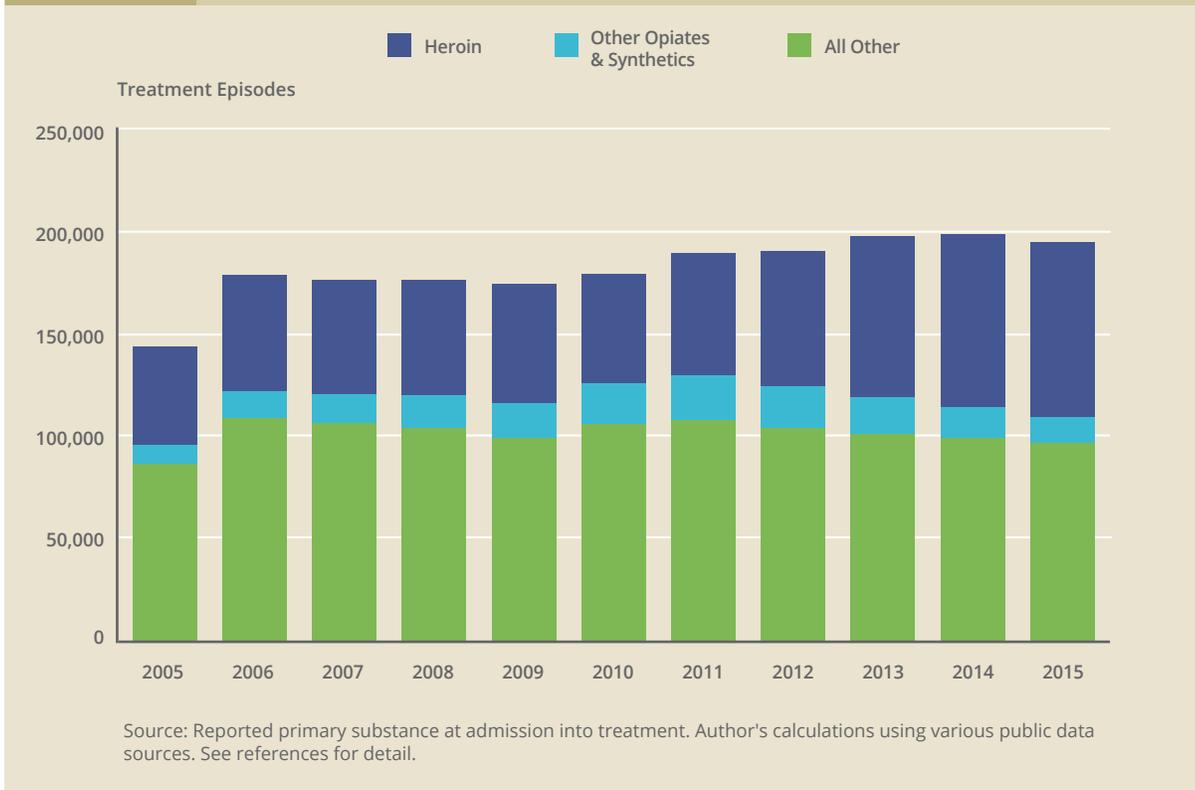
11 Kaiser Family Foundation, "Health Care Expenditures per Capita for State of Residence." <https://www.kff.org/other/state-indicator/health-spending-per-capita/>.

12 New Hampshire data are not reported to the Healthcare Cost and Utilization Project, which is the source for this data. The author made an inquiry into receiving this same data, but they were unavailable at the time of publishing. As a result, the health cost information and the total fiscal cost for New Hampshire in tables 3 and 1, respectively, are not comparable to the other New England states or the U.S. average.

13 A treatment episode is the admission of an individual into a substance abuse treatment facility, including outpatient and inpatient treatments. An individual can have multiple treatment episodes in a given year, and the increase shown in the data does not reflect how many unique patients seek treatment each year.

Figure 9

Treatment Episodes: Primary Drug Reported New England States, 2005–2015



and nonresidential treatment episodes by primary drug reported at admission; trends shown in this regional graph are similar in each New England state. From 2005 through 2011 there was an increase in opioid pain reliever admissions, followed by a slight decrease from 2011 through 2015. An increase in heroin admissions coincided with this decrease in opioid pain reliever admissions. The “All Other” category encompasses any other kind of substance abuse treatment, including treatment for alcohol abuse. Although “All Other” admissions have decreased, there is no evidence that all other substance abuse has decreased; this may be due to a lack of available beds to service the demand.¹⁴

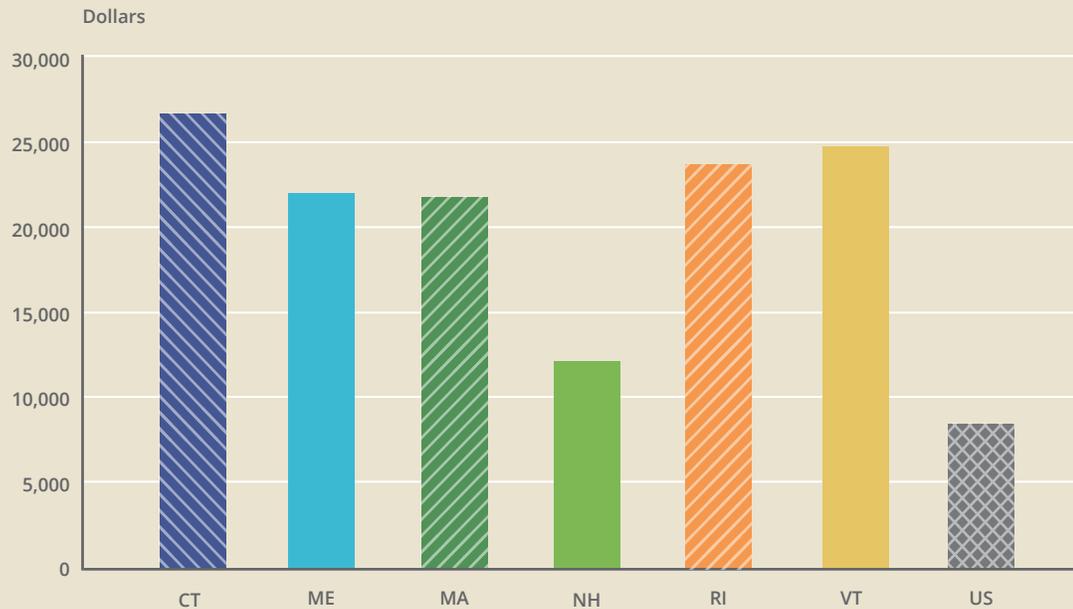
Another common treatment option includes medication-assisted treatments using drugs such as methadone, buprenorphine, and naltrexone in harm-reduction therapies. Medication-assisted opioid treatment is delivered in outpatient or inpatient settings. Using medications such as methadone to help treat opioid addiction increases retention in treatment programs and decreases drug use; and as a result, it also decreases infectious disease transmission and drug-related crimes (Zaric et al. 2000). Those starting treatment for opioid addiction often have unpleasant withdrawal symptoms such as pain and vomiting. Methadone administration and similar treatments can ease these symptoms, leading to more successful treatment and fewer relapses.

The goal of medication-assisted therapies is to gradually and safely reduce dependence on the substance; for some this process may take over a year. These therapies can help individuals function in society and prevent harm caused by continued opioid abuse, ideally reducing overall cost by minimizing emergency medical complications and increasing individuals’ ability to function in the labor

14 Laura Crimaldi, “Heroin Epidemic Exposes Deficiencies in Care System,” *The Boston Globe*, March 25, 2014. <https://www.bostonglobe.com/metro/2014/03/14/substance-abuse-treatment-system-massachusetts-overtaxed-heroin-crisis-surges/3Jy3bb7sv5UuHLAG0PukK/story.html>.

Figure 10

Medication-Assisted Treatment Facilities: Cost per 1,000 Residents New England States and the United States, 2016



Source: Author's calculations using various public data sources. See references for detail.

market and be more productive. While they have long-term benefits, these treatment options are all costly. Costs vary depending on the medication, regulations governing who administers the medication, and how frequently the medication is administered. No matter which medication is used, each medication-assisted treatment costs thousands of dollars per patient annually (Figure 10).

Treatment facilities provide an environment for supervised use of opioids, which can prevent fatal overdoses and other consequences of using opioids without supervision. The combined annual cost of medication-assisted therapies in the New England states ranges from \$16 million in New Hampshire to nearly \$150 million in Massachusetts (Table 3). Many private insurance companies now cover these treatments, but patients on government-subsidized programs constitute a significant share of the healthcare system and these policies would likewise bear a significant share of the treatment costs in each state.

The fatal overdose rate in the New England states has risen dramatically in recent years—in Massachusetts alone, almost 1,800 people died from opioid overdoses in 2015.¹⁵ Naloxone reverses the effects of an opioid overdose and has become critically important over the course of the opioid epidemic, particularly in the last five years as the number of overdoses has skyrocketed. Since 2016, Massachusetts has allocated additional funds of over \$1 million annually to equip first responders across the state with naloxone. First responders in Massachusetts alone administered naloxone nearly 10,000 times in 2015.¹⁶ The company that produces nasally administered naloxone provides it for free or at a discount to many organizations, but the sticker price

15 There were 1,799 fatal overdoses from opioids in 2015 according to the Massachusetts Department of Public Health's August 2017 Data Brief: Opioid-Related Overdose Deaths Among Massachusetts Residents. See: <https://www.mass.gov/files/documents/2017/08/31/data-brief-overdose-deaths-aug-2017.pdf>.

16 Brad Avery, "The Cost of an Overdose in Massachusetts," *MetroWest Daily News*, May 21, 2016. <http://www.metrowestdailynews.com/article/20160521/NEWS/160528946>.

of a dose ranges from \$75 to \$150, and the injectable dosage price increased from \$690 in 2014 to \$4,500 in 2017.¹⁷

IV. Health Complications Costs

The rapid increase in the cost of healthcare has received mounting attention as subsidized insurance programs put fiscal pressure on budgets. Treating health complications caused by opioid abuse contributes to these costs. These complications can strain the bandwidth of hospital systems and have fiscal impacts on government health programs such as Medicaid and Medicare. Opioid abuse and addiction can take hold quickly, with extreme physical and mental health consequences. Intravenous injection of opioids enables the drug to reach the brain the fastest and can cause a range of health complications (Mark et al. 2001). Abuse of heroin and other opioids likely causes an array of health complications beyond those discussed in this report. Table 4 lists the health complications explored in this report—some of the most directly attributable complications that have been the focus of other cost studies—but organ damage and other related health problems increase the long-term cost of opioid abuse.

Costly health consequences of opioid use include complications from intravenous drug use and neonatal abstinence syndrome.

Intravenous heroin use can spread diseases such as HIV and hepatitis B and C. Though these conditions are manageable, they require thorough medical care to enable infected individuals to maintain a healthy life. Once a person is infected, the costs of maintaining

17 Tim Craig and Nicole Lewis, “As Opioid Overdoses Exact a Higher Price, Communities Ponder Who Should be Saved,” *The Washington Post*, July 15, 2017. https://www.washingtonpost.com/world/as-opioid-overdoses-exact-a-higher-price-communities-ponder-who-should-be-saved/2017/07/15/1ea91890-67f3-11e7-8eb5-cbcc2e7bfbf_story.html?utm_term=.fd46876b7cf.

Table 4

Estimated Fiscal Costs of Medical Complications from Opioids
New England States and the United States, Various Years

	CT	ME	MA	NH	RI	VT	US
Costs							
Neonatal Abstinence Syndrome	\$25,612,800	\$25,950,249	\$60,396,016	\$9,943,076	\$5,319,979	\$12,224,409	\$1,529,196,069
HIV/AIDS	\$399,315	\$99,460	\$1,517,294	\$59,577	\$80,285	\$39,864	\$47,629,504
Hepatitis C	\$11,681,997	\$5,274,824	\$19,459,345	\$3,212,924	\$4,064,383	\$2,868,141	\$645,583,833
Hepatitis B	\$30,703	\$41,207	\$229,468	\$22,624	\$8,080	\$31,511	\$11,647,937
Total	\$37,724,815	\$31,365,741	\$81,602,124	\$13,238,200	\$9,472,727	\$15,163,926	\$2,234,057,343
Per Capita	\$10.51	\$23.60	\$12.20	\$10.00	\$8.99	\$24.21	\$7.07

Notes: HIV/AIDS and hepatitis B and C costs attributed to intravenous drug use. Author’s calculations using various public data sources. See references for detail.

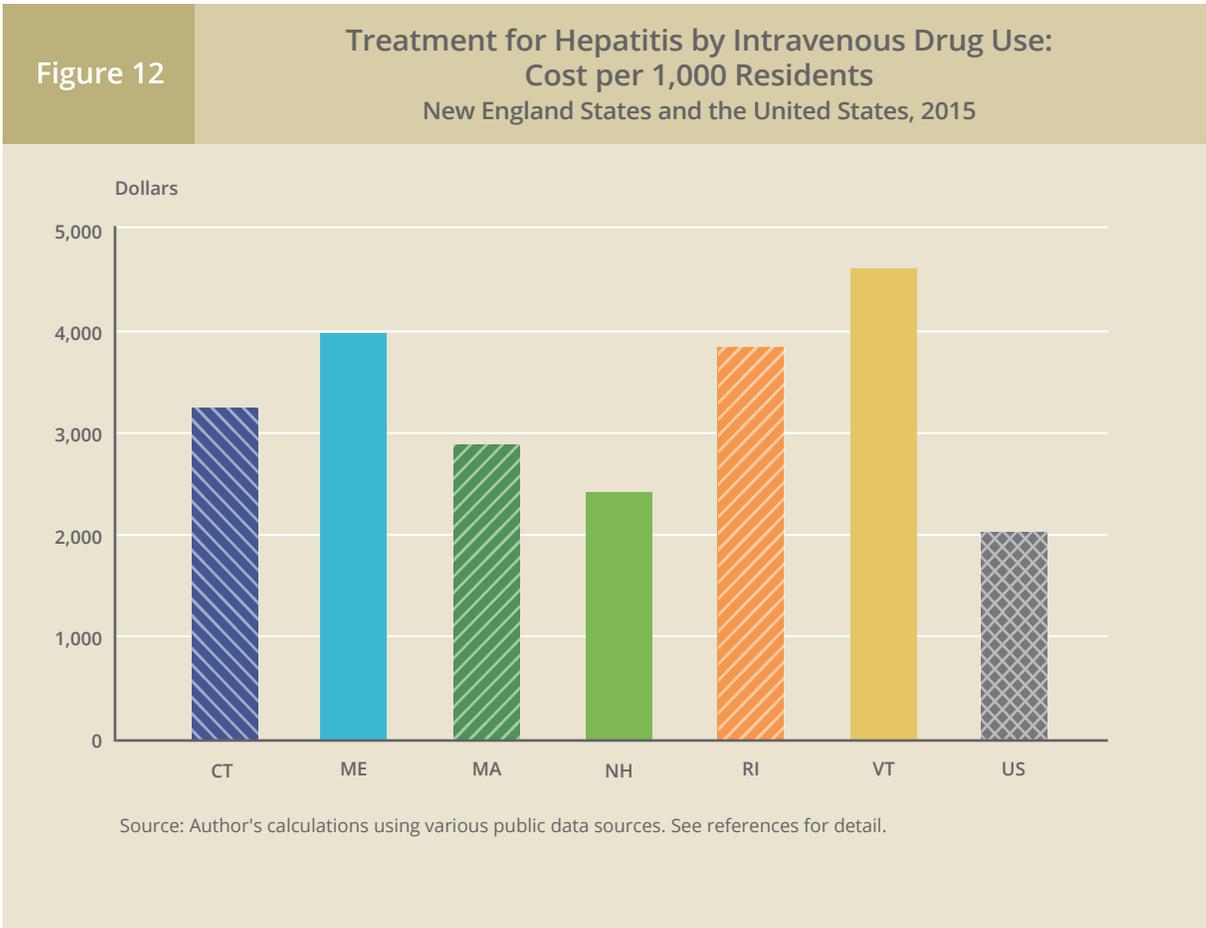
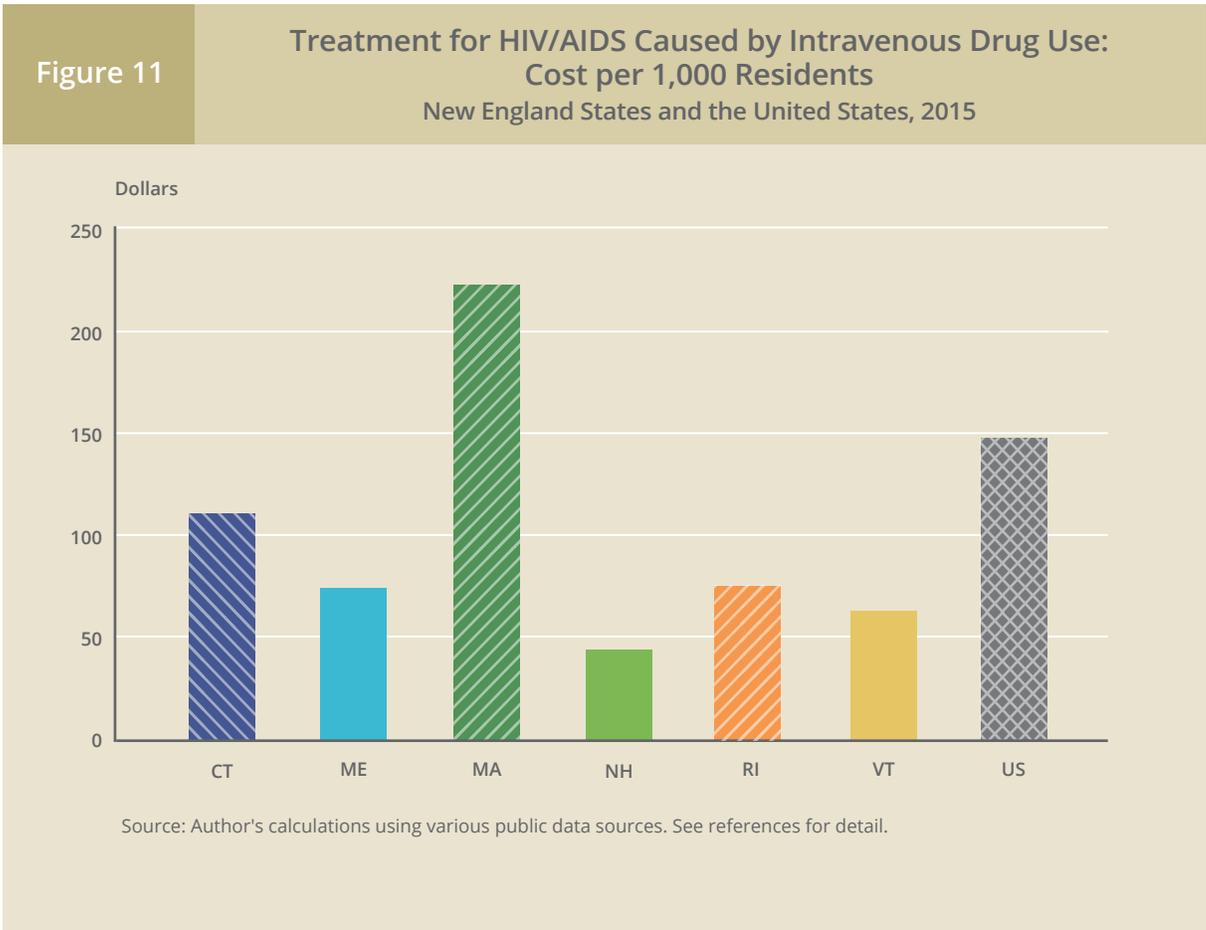
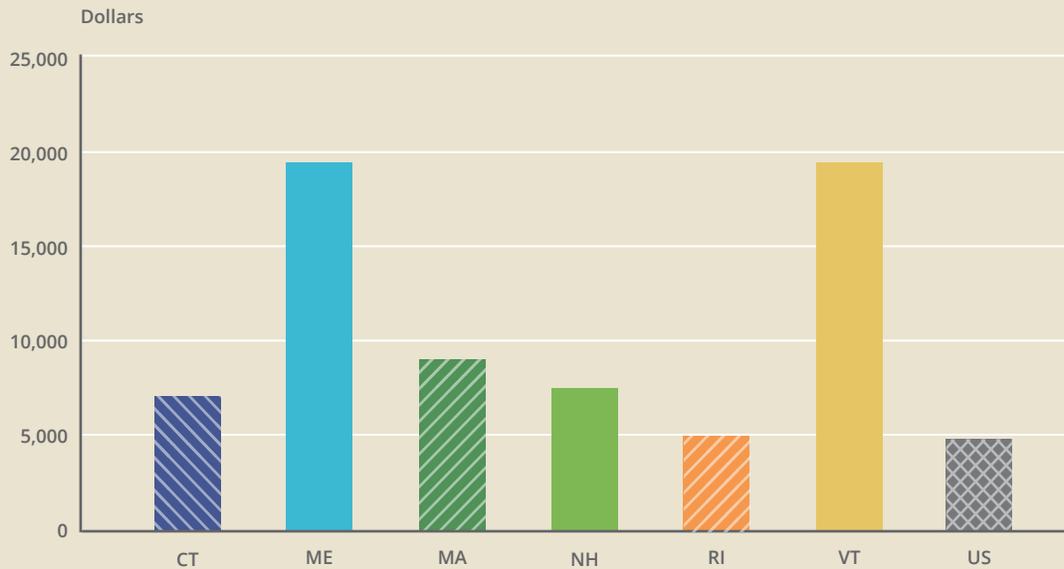


Figure 13

Treatment for Babies Born with Neonatal Abstinence Syndrome: Cost per 1,000 Residents

New England States and the United States, 2012



Source: Author's calculations using various public data sources. See references for detail.

steady health can be high, but due to the fewer cases of HIV treatment per capita than many of the other treatments in this report, the fiscal impact of intravenous drug use per state is relatively low, as shown in Figures 11 and 12. The rate of HIV infection by intravenous drug use was lower in 2015 in the New England states than in previous years due to proactive public health campaigns such as needle exchanges—where facilities accept used needles and dispose of them safely and then provide clean, safe needles (Bernard et al. 2017). These relatively inexpensive programs can yield long-term savings by helping people avoid chronic infections and associated medical complications.

Neonatal Abstinence Syndrome (NAS), which affects a child whose mother used opioids during pregnancy, is another costly opioid-abuse-related medical complication. Infants with NAS experience withdrawal symptoms after birth and can also have a range of health and developmental challenges. These infants require intensive care immediately after birth; the average cost to care for an infant with NAS in the first year of life alone is nearly \$70,000 more than the cost to care for an infant born without NAS. The data in Figure 13 are from 2012, and as opioid abuse has risen in the years since, it is plausible that the number of babies born each year with NAS has risen accordingly. The rate of NAS was notably high in Maine and Vermont. While definitive reasons for these elevated rates have not been identified, some research has pointed to the rapid increase of NAS in rural areas outpacing the growth in urban areas (Villapiano et al. 2017); other research suggests this urban-versus-rural disparity is due to the more limited access to treatment options (Brown et al. 2017).

The cost of medical complications extends beyond those described above. Still, even narrowing the frame to the health issues considered in this section illustrates that complications from opioid use and associated intravenous needle use cost New England states hundreds of millions of dollars yearly.

Reducing future costs requires prevention.

While the costs described in this section are borne by the private and public sectors, government-subsidized insurance programs pay millions of dollars each year to treat these complications (Birnbaum et al. 2011).

V. A Sample of Prevention Programs in the New England States

Once a person becomes addicted to opioids, associated state fiscal costs are high. Drug courts and innovative policing techniques described in previous sections continue to grow in popularity as a means of combatting existing opioid addiction. Reducing future costs requires prevention. Expenditures in this section are different from those previously discussed; they can reduce future fiscal costs, and they are generally not incurred the same way across states, which means that comparable cost data are not readily available.

The opioid epidemic traces its roots to the rise of prescription painkillers. From the increase in prescribing opioids in the early 1990s to the peak of prescriptions per capita in 2011, millions of Americans have been prescribed synthetic opioids to manage pain (Mattson et al. 2017). The number of prescriptions per capita varies drastically by county.¹⁸ Some counties have continued to see increases in the total number and strength of prescriptions legally prescribed, but national measures have been instituted to limit the number of pills dispensed. For example, medical professionals receive increased education about the addictive nature of opioids and alternative pain management techniques. To address this concern, all four of Massachusetts' medical schools have required classes on these topics in their curricula. Another national measure is increasing awareness about the number of opioid prescriptions within and across states. All six New England states have prescription drug monitoring programs (PDMPs), created to reduce the number of patients receiving multiple prescriptions from separate doctors, sometimes called "doctor shopping." PDMPs collect data from pharmacies on dispensed controlled substance prescriptions and make that data available to authorized users, often through a secure electronic database. The name of the patient as well as the number and strength of doses of the prescription dispensed are reported to the statewide database (Substance Abuse and Mental Health Services Administration 2017).

Reducing the number of legally dispensed opioids is important in combatting the spread of opioid addiction. Though opioid addiction has varied causes, many individuals without previous substance abuse problems develop addictions after getting legal prescriptions following an injury or surgery. Individuals may continue to seek refills on their prescriptions once the refill allotment expires, whether because of continued pain or dependency issues. Before PDMPs, doctor shopping for multiple prescriptions was much more prevalent. As the supply of legal opioid prescriptions was constrained, some resorted to getting pills through buying or stealing from friends and family with prescriptions (Mallatt 2017). When these options are exhausted, escalation to a dealer or any other criminal activity can come into play; as the addiction progresses, some then turn to heroin. The drop in the number of individuals addicted to synthetic opioid pain relievers coincided with a rise in the number of individuals seeking treatment for heroin abuse (Unick and Ciccarone 2017).

While this narrative does not apply to every person abusing opioids, it does offer an explanation for why communities are experiencing the opioid epidemic differently from past drug epidemics. Unlike the crack cocaine epidemic that spurred the 1980s War on Drugs, the current epidemic affects a wide range of communities varying in socioeconomic status; as such, it has elicited a more unified call to action. Throughout New England, over the last decade drug courts have increasingly been pushing for

¹⁸ County-level information on prescribing data are available through the Centers for Disease Control and Prevention at <https://www.cdc.gov/vitalsigns/opioids/index.html>.

mandated treatment rather than prison sentences. The number of treatment episodes originating from a court referral has increased in each of the New England states. The philosophy behind these specialty courts is that addressing the underlying causes of addiction will effect changes in criminal behavior. For instance, in Massachusetts, drug courts focus on probationary periods, with mandatory long-term treatment as a condition of avoiding tougher sentencing. Even more specialized drug courts have emerged in response to the opioid epidemic, such as the New York State Family Drug Court, which reintegrates drug users into their families; successful reintegration decreases other required services, reducing some of the social costs of a fractured family, like an increased reliance on social welfare programs.¹⁹ While the volume of arrests related to opioid crimes has risen steadily in the last fifteen years, the criminal justice system has found innovative ways to respond to substance abuse disorders.

Legislators across the ideological spectrum treat the opioid epidemic as a public health crisis. At the state and federal levels, they are proposing ways to fight the opioid epidemic. Many want to learn more about the causes of the epidemic to inform policy responses. In 2015, Massachusetts lawmakers passed legislation mandating the matching of several state administrative datasets, to support analysis increasing an understanding of the opioid epidemic.²⁰

VI. Conclusion

While this research focuses on fiscal impact, the opioid epidemic has incurred tremendous non-fiscal costs. Communities across New England and the nation are devastated daily because of deaths and dependencies caused by this epidemic. Despite national political and media attention, there are still many unknowns. To date, little research comprehensively quantifies the epidemic's fiscal impact on the region. This report assembles available data on the fiscal impact of the opioid epidemic on criminal justice, treatment, and related health expenditures in the New England states. Significant areas are not addressed in this report. Many more local and state government agencies are impacted than are analyzed here; accordingly, estimates provided in this report should be considered a lower bound in the potential range of associated fiscal costs.

Beyond these expenditures, the opioid epidemic's impact on state revenues is plausibly also significant and could affect regional fiscal health. Individuals incarcerated for drug crimes or in residential treatment programs are not earning wages. Evidence also suggests that non-institutionalized individuals using opioids are more likely out of work than employed, resulting in the same impact of lost revenue (Krueger 2017). Further research into the impact of opioid abuse on employment and labor force participation could contribute to a fuller understanding of the epidemic's fiscal cost.

Additional research could also examine the far-reaching non-fiscal costs to the region. The cost to families across the region likely exceeds these fiscal costs: grandparents are unexpectedly raising their grandchildren, children of opioid abusers suffer an emotional and psychological toll, and adolescents across the region must grapple with addiction at very young ages. This epidemic impacts individuals and families across the region. Understanding the fiscal costs is just one area that merits further discussion.

Because the most recent data do not reflect the years following the increase of the opioid epidemic, estimated costs of criminal justice, rehabilitation treatment, and medical care are also likely

Additional research on the impact of the opioid epidemic on revenues and labor force participation is needed for a full picture of the economic costs.

19 Amelia Schonbeck, "Courts that Save Opioid Victims' Family Life," *The New York Times*, September 26, 2017. <https://www.nytimes.com/2017/09/26/opinion/courts-that-save-opioid-victims-family-life.html>.

20 Massachusetts Session Laws Acts of 2015, Chapter 55, "An Act Requiring Certain Reports for Opiate Overdoses." <https://malegislature.gov/Laws/SessionLaws/Acts/2015/Chapter55>.

even higher. As state revenues fall short, these expenditures further squeeze budgets. Annual costs estimated in this report are around 1 percent of each New England state's total state government expenditure, significantly higher than the per-state national average of state government expenditures (0.74 percent). Addressing the opioid epidemic requires novel solutions and innovative pilot programs. These new projects may require additional expenditures up front, but with opioid abuse's far-reaching impact on so many parts of a government's budget, long-term costs could rise even higher without further action. Further analysis of the costs of new programs will yield a more complete understanding of the fiscal impact of the opioid epidemic.

References

- Alexander, Michelle. 2012. *The New Jim Crow*. New York: The New Press.
- Bernard C.L., D.K. Owens, J.D. Goldhaber-Fiebert, and M.L. Brandeau. 2017. "Estimation of the Cost-Effectiveness of HIV Prevention Portfolios for People who Inject Drugs in the United States: A Model-Based Analysis." *PLOS Medicine* 14(5).
- Birnbaum, Howard G., Alan G. White, Matt Schiller, Tracy Waldman, Jody M. Cleveland, and Carl L. Roland. 2011. "Societal Costs of Prescription Opioid Abuse, Dependence, and Misuse in the United States." *Pain Medicine* 12(4): 657–667.
- Brown, J.D., A.J. Goodin, and J.C. Talbert. 2017. "Rural and Appalachian Disparities in Neonatal Abstinence Syndrome Incidence and Access to Opioid Abuse Treatment." *The Journal of Rural Health* 34(1): 6-13.
- Clifford, Robert, and Riley Sullivan. 2017. "Criminal Records in New England: Crime, Conviction, and Barriers to Employment." New England Public Policy Center Policy Report 17–1. Boston: Federal Reserve Bank of Boston.
- Florence, Curtis, Chao Zhou, Feijun Luo, and Likang Xu. 2016. "The Economic Burden of Prescription Opioid Overdose, Abuse, and Dependence in the United States, 2013." *Medical Care* 54(10): 901–906.
- Health Policy Commission. 2016. *Opioid Use Disorder in Massachusetts*. Boston: Commonwealth of Massachusetts Health Policy Commission.
- Kamal, Rabah. 2017. "What are the Current Costs and Outcomes Related to Mental Health and Substance Abuse Disorders?" Peterson-Kaiser Health System Tracker. Menlo Park, CA: Kaiser Family Foundation.
- Krueger, Alan. 2017. "Where Have All the Workers Gone? An Inquiry into the Decline of the US Labor Force Participation Rate." *Brookings Papers on Economic Activity*. Washington: Brookings Institute.
- Lowery-North, Doug. 2015. "Reducing Costs in the Emergency Department." Atlanta, GA: Emory University School of Medicine.
- Mallatt, Justine. 2017. "The Effect of Prescription Drug Monitoring Programs on Opioid Prescriptions and Heroin Crime Rates." Working Paper No. 1292. West Lafayette, IN: Purdue University Department of Economics.
- Mark, T. L., G. E. Woody, T. Juday, and H. D. Kleber. 2001. "The Economic Costs of Heroin Addiction in the United States." *Drug and Alcohol Dependence* 61: 195–206.
- Martin, Joyce A., Brady E. Hamilton, Michelle J.K. Osterman, Sally C. Curtin, and T.J. Mathews. 2013. "Births: Final Data for 2012." *National Vital Statistics Reports* 62(9). Hyattsville, MD: National Center for Health Statistics, Centers for Disease Control and Prevention.
- Mattson, Christine L., Lyna Schieber, Lawrence Scholl, Rose A. Rudd, Puja Seth, Likang Xu, Nana Otoo Wilson, and Leonard Paulozzi. 2017. "Annual Surveillance Report of Drug-Related Risks and Outcomes." Atlanta, GA: Centers for Disease Control and Prevention.
- National Institute of Health. 2015. *Dramatic Increases in Maternal Opioid Use and Neonatal Abstinence Syndrome*. Bethesda, MD: National Institute on Drug Abuse.
- National Institute of Health. 2017. *Medications to Treat Opioid Addiction: How Much Does Opioid Treatment Cost?* Bethesda, MD: National Institute on Drug Abuse.
- Schiff, Davida M., Mari-Lynn Drainoni, Megan Bair-Merritt, David Rosenbloom. 2016. "A Police-Led Addiction Treatment Referral Program in Massachusetts." *New England Journal of Medicine* 375: 5202–5203.
- Substance Abuse and Mental Health Services Administration. 2017. "Prescription Drug Monitoring Programs: A Guide for Healthcare Providers." *In Brief* 10(1). Rockville, MD: Substance Abuse and Mental Health Services Administration.
- Unick, G. J., and D. Ciccarone. 2017. "US Regional and Demographic Differences in Prescription Opioid and Heroin-Related Overdose Hospitalizations." *International Journal of Drug Policy* 46: 112–119.
- Villapiano, Nicole L. G., Tyler N. A. Winkelman, and Katy B. Kozhimannil. 2017. "Rural and Urban Differences in Neonatal Abstinence Syndrome and Maternal Opioid Use, 2004 to 2013." *JAMA Pediatrics* 171(2): 194–196.
- Zaric, G. S., P. G. Barnett, and M. L. Brandeau. 2000. "HIV Transmission and the Cost-Effectiveness of Methadone Maintenance." *American Journal of Public Health* 90(7): 1100–1111.

References in Tables and Figures

- Bureau of Justice Statistics. 2015. *Justice Expenditure and Employment Extracts, 2012–Preliminary*. Washington: Office of Justice Programs, US Department of Justice. *Data used in Tables 1 and 2; Figures 2, 3, and 4.*
- Centers for Disease Control and Prevention. 2017. *Surveillance for Viral Hepatitis – United States, 2015*. Atlanta, GA: Centers for Disease Control and Prevention. *Data used in Tables 1 and 4; Figure 12.*
- Centers for Disease Control and Prevention. 2016. *Surveillance for Viral Hepatitis – United States, 2014*. Atlanta, GA: Centers for Disease Control and Prevention. *Data used in Tables 1 and 4; Figure 12.*
- Connecticut Department of Public Health. 2016. *Fact Sheet; Neonatal Abstinence Syndrome in Connecticut*. Hartford, CT: Connecticut Department of Public Health. *Data used in Tables 1 and 4; Figure 13.*
- Gebo, Kelly A., John A. Fleishman, Richard Conviser, James Hellinger, Fred J. Hellinger, Joshua S. Josephs, Philip Keiser, Paul Gaist, and Richard D. Moore. 2010. “Contemporary Costs of HIV Health Care in the HAART Era.” *AIDS* 24(17): 2705–2715. *Data used in Tables 1 and 4; Figure 11.*
- Healthcare Cost and Utilization Project (HCUP). 2017. *HCUP Fast Stats–Opioid-Related Hospital Use*. Rockville, MD: Agency for Healthcare Research and Quality. *Data used in Tables 1 and 3; Figures 7 and 8.*
- Healthcare Cost and Utilization Project (HCUP). 2016. *HCUP Fast Stats–Trends in Inpatient Stays*. Rockville, MD: Agency for Healthcare Research and Quality. *Data used in Tables 1 and 3; Figures 7 and 8.*
- Ko, Jean Y., Stephen W. Patrick, Van T. Tong, Roshni Patel, Jennifer N. Lind, and Wanda D. Barfield. 2016. “Incidence of Neonatal Abstinence Syndrome—28 States, 1999–2013.” *Morbidity and Mortality Weekly Report* 31(65). Atlanta, GA: Centers for Disease Control and Prevention. *Data used in Tables 1 and 4; Figure 13.*
- New Hampshire Department of Health and Human Services. 2015. *Neonatal Abstinence Syndrome*. Concord: New Hampshire Department of Health and Human Services, New Hampshire Bureau of Drug and Alcohol Services. *Data used in Tables 1 and 4; Figure 13.*
- Rhode Island Public Health Institute. 2016. *Epidemiological Profile: The Hepatitis C Epidemic in Rhode Island*. Providence: Rhode Island Department of Health. *Data used in Tables 1 and 4; Figure 12.*
- National Archive of Criminal Justice Data. 2016. *Annual Parole Survey, 2015*. Washington: US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. *Data used in Tables 1 and 2; Figure 5.*
- National Archive of Criminal Justice Data. 2016. *Annual Probation Survey, 2015*. Washington: US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. *Data used in Tables 1 and 2; Figure 6.*
- National Archive of Criminal Justice Data. 2016. *Uniform Crime Reporting Program Data: Arrests by Age, Sex, and Race. 2000–2015. Uniform Crime Reports*. Washington: US Department of Justice, Federal Bureau of Investigation. *Data used in Tables 1 and 2; Figures 1, 2, 3, and 4.*
- National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. 2017. *State Health Profiles*. Atlanta, GA: Centers for Disease Control and Prevention. *Data used in Tables 1 and 4; Figure 11.*
- Owusu-Edusei, Kwame, Harrell W. Chesson, Thomas L. Gift, Guoyu Tao, Reena Mahajan, Marie Cheryl Bañez Ocfemia, and Charlotte Kent. 2013. “The Estimated Direct Medical Cost of Selected Sexually Transmitted Infections in the United States, 2008.” *Journal of the American Sexually Transmitted Diseases Association* 40(3): 197–201. *Data used in Tables 1 and 4; Figure 12.*
- Pew Center on the States. 2009. *One in 31: The Long Reach of American Corrections*. Washington: The Pew Charitable Trusts. *Data used in Tables 1 and 2; Figures 5 and 6.*
- Pew Center on the States. 2009. *One in 31 U.S. Adults Are Behind Bars, on Parole or Probation*. Washington: The Pew Charitable Trusts. *Data used in Tables 1 and 2; Figures 5 and 6.*
- Razavi, Homie, Antoine C. El-Khoury, Elamin Elbasha, Chris Estes, Ken Pasini, Thierry Poynard, and Ritesh Kumar. 2013. “Chronic Hepatitis C Virus (HCV) Disease Burden and Cost in the United States.” *Hepatology* 57(6): 2164–2170. *Data used in Tables 1 and 4; Figure 12.*
- Substance Abuse and Mental Health Services Administration. 2016. *Treatment Episode Data Set (TEDS): 2005–2015. National Admissions to Substance Abuse Treatment Services*. Rockville, MD: Substance Abuse and Mental Health Services Administration. *Data used in Tables 1 and 3; Figure 9.*

Substance Abuse and Mental Health Services Administration. 2017. *National Survey of Substance Abuse Treatment Services (N-SSATS): 2016. Data on Substance Abuse Treatment Facilities. BHSIS Series S-93, HHS Publication No. (SMA) 17-5039.* Rockville, MD: Substance Abuse and Mental Health Services Administration. *Data used in Tables 1 and 3; Figure 10.*

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