New England Public Policy Center



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Exploring Causes of and Responses to the Opioid Epidemic in New England

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EXECUTIVE SUMMARY

The opioid epidemic remains rampant in New England, where, from 2015 through 2017, more than 10,000 people died from opioid overdoses. In 2017, each of the six states experienced an overdose-death rate that was greater than the national average. Beyond causing a high number of deaths, the opioid epidemic is costing New England productive workers. People with the most severe problems stemming from opioid-use disorder tend to be in the 25–44 age group, but no one is immune. The epidemic affects people of every type—all ages and all races, men and women, residents of rural areas and of urban areas.

To better understand the factors behind the epidemic and the extent to which the crisis affects the region, this report investigates the relationships between opioid abuse and various economic indicators in New England counties over the last two decades. In reviewing the data, we find they generally support the view that an increase in the supply of (and access to) opioids is the most critical factor behind the crisis. The New England counties that have the lowest rates of legal opioid prescribing are associated with the lowest rates of fatal overdoses.

This is not to discount the importance of local economic conditions, but they do not seem to explain the variation in opioid abuse we see across the region. Measures of economic distress that initially appear to be associated with opioid abuse become less influential when considered jointly with prescribing rates. There is a connection between economic conditions and opioid abuse, and limited access to health care in economically distressed communities helps to account for that link, but the strongest connection involves prescribing patterns. Opioid prescribing rates vary more significantly across counties nationally than do other health-care metrics (McDonald, Carlson, and Izrael 2012); research also shows they vary widely across medical specialties (Levy et al. 2015), across departments in hospitals, and across physicians within an emergency room (Barnett, Olenski, Jena 2017).

Although the entire New England region has been hit hard by the epidemic, the individual states have had differing policy responses. These include increasing education about alternative approaches to pain management, monitoring prescriptions, increasing access to recovery treatment, and enhancing criminal justice efforts to crack down on illicit opioid use. Our analysis compares the experiences of Vermont and New Hampshire during the early years of this decade, and the findings suggest that treating the epidemic as a public health problem holds the most promise. States such as Vermont that were quick to prioritize medical treatments are faring better in combatting the crisis than are New Hampshire and other states that initially approached opioid abuse primarily as a criminal justice matter.



I. Background

How severe is the opioid problem across New England?

New England is at the forefront of the opioid epidemic.¹ In 2017, the overdose-death rate in every New England state, after we adjust for the age composition of each state's population, was notably higher than the national average of 21.7 per 100,000 people (see Figure 1).² In New Hampshire, which ranked fourth highest for fatal drug overdoses in the country, the rate, at 37.0 per 100,000 residents, was nearly double the national rate. In addition, the state led the nation in overdose deaths per capita from fentanyl, a powerful synthetic opioid that has, to some extent, replaced heroin across New England. The New England state with the lowest overdose-death rate was Vermont, at 23.2 per 100,000 residents, which is still about 7 percent greater than the national rate. In 2010, New Hampshire and Vermont had similar rates of fatal overdoses, but the rates diverged in the years after the states made differing policy responses to the epidemic.

¹ Opioids include prescription opioid pain relievers, methadone, heroin, and synthetic opioids (for example, fentanyl).

² The numbers used in this report are for all drug overdoses excluding those from alcohol. The numbers come from the Centers for Disease Control and Prevention (CDC). The vast majority of these overdoses are opioid related, and due to differences in reporting and toxicology report timing, these broader numbers are best for making comparisons across jurisdictions. Massachusetts releases overdose data that are specifically related to opioids, and they are consistent with the broader overdose measure used in this report. From 2014 through 2016, the correlation coefficient of the CDC all-drug-overdose data and the Massachusetts opioid-only overdose data at the county level is 0.99, which means the two measures are very highly correlated.



Note(s): Values for counties with fewer than 10 fatal overdoses in a year are suppressed. Stars denote state capitals. Source(s): Centers for Disease Control and Prevention WONDER data and Vermont Department of Public Health.

Some of the most jarring numbers describing the opioid epidemic come from the sharp increases in fatal-overdose rates across the nation in recent years. Figure 2 shows the 2016 rates of fatal overdoses per 100,000 residents by counties across New England. Between 2000 and 2016, the number of fatal overdoses increased in all counties where data are available.³ Fatal-overdose rates more than tripled in the majority of the region's counties. The map shows a great deal of variation in the severity of the epidemic, even within states and across urban areas and rural areas. The major indicators of opioid abuse used throughout this report are fatal drug overdoses by county and rates of legal opioid prescriptions dispensed by county. Of course, county-level data may hide some revealing correlations that occur at a more local level (see "Limitations of County-level Data," page 6).

³ If there were fewer than 10 fatal overdoses in a year in a given county, the number of fatal overdoses in that county is suppressed.

Limitations of County-level Data

County-level data may be aggregated too highly to identify precise correlations between opioid-use measures and data relating to the economy or labor force. Counties often span rural and urban areas, booming cities and towns in decline, and high-income and low-income neighborhoods. As an illustration of how diverse a county can be, consider Middlesex County in Massachusetts, just west of Boston. It is home to some of the state's most affluent towns (Weston and Carlisle) as well as some of the old manufacturing centers that are struggling economically (Lowell and Everett).^a We expect that the county averages for opioids prescribed, fatal overdoses, unemployment rates, and suicide rates hide much diversity at the town or even neighborhood level, yet many of the metrics used in this report are not available for geographic areas smaller than the county. Consequently, the correlations presented in this report are less robust than we would like, and the true patterns in the data may be concealed behind the data aggregation.

a https://www.bostonfed.org/data/data-tools/new-england-city-data.aspx

What do we know about the interaction between the opioid epidemic and the economy, and how might policymakers respond to this relationship?

Understanding the factors that drive the opioid epidemic is crucial to developing policies that respond effectively to it. The two most prominent explanations for the cause of the crisis—one focused on how and when these lethal drugs became available and the other on depressed local economic conditions making people vulnerable to opioid abuse—call for potentially disparate policy recommendations. If the epidemic's key driver is over-prescribing, policymakers might respond with prescription-drug management, investments to increase access to recovery treatment and health insurance, and investments in law enforcement. If, on the other hand, dim economic prospects in their local areas cause people to turn to opioids to escape the despair of everyday life, policymakers might invest more heavily in economic development, education, job training, public transfer programs, and perhaps trade policy.

The research literature provides support for both views of the cause of the crisis. Support for the idea that weak labor market prospects and a corresponding sense of economic despair can lead people to abuse opioids comes from, among others, Case and Deaton (2017). The authors identify the opioid crisis as an important cause of recent increases in mortality among middle-aged, non-Hispanic, white Americans. These "deaths of despair" are likely the result of long, debilitating addiction problems. This explanation suggests that poor economic conditions in years past have led to higher rates of opioid abuse and fatal overdoses today. Moreover, opioid-related mortality rates have risen more quickly in rural counties than in urban counties over the past two decades (Monnat and Rigg 2018), though the epidemic blights urban, suburban, and rural communities throughout New England (Monnat 2016).

Krueger (2017) presents evidence that labor force participation has fallen more in areas where relatively more opioid pain medication has been prescribed. The findings suggest that the increased availability of opioids may have led to more people becoming addicted to the drugs and dropping out of the labor force, accounting for perhaps 20 percent of the observed decline in male labor force participation between the 1999–2001 and 2014–2016 periods. On the other

hand, Currie, Yin, and Schnell (2018) find that the increased availability of opioids has had a small, positive effect on employment levels for women, possibly because some women who would otherwise stop working are able to manage chronic pain with opioids and therefore remain in the labor force. The authors find no effect on employment levels for men. Economists from the Federal Reserve Bank of Cleveland, after accounting for other demographic factors, find that individuals in areas with increased opioid-prescribing rates are less likely than those in other areas to be in the workforce (Aliprantis and Schweizter 2018). Their research concludes that prescribing is the driv-

In 2017, every New England state's overdose-death rate was greater than the national average.

ing factor behind the opioid crisis, and it rejects the hypothesis that deteriorating labor markets from the Great Recession worsened the epidemic. Ruhm (2018) similarly finds the fatal-overdose epidemic likely reflects "drug problems" primarily, rather than poor economic conditions, and that while counties with more depressed economies do have higher overdose rates, that correlation is the result of many other county-level characteristics.

Ghertner and Groves (2018) identify a correlation between poverty and opioid use nationwide, but the authors specifically note that the New England counties do not follow the national pattern. Because the experiences of New England counties differ from that of the nation as a whole, we use more than a dozen different measures to examine these counties and help illuminate the relationships between prescribing rates, overdoses, and economic indicators across the region.

II. Does Economic Despair Cause People to Abuse Opioids?

We use a variety of measures in an attempt to capture aspects of community malaise that could be associated with a depressed economy. We look at how these county-level characteristics have changed over time and the association between these changes and changes in a county's rate of fatal overdoses to determine whether the overdoses are "deaths of despair."⁴ These characteristics include the types of jobs that remain in a county, the labor force participation rate of prime-age residents, the rate of disability insurance receipt, and the suicide rate. We use the average annual fatal-overdose rate for 2014 through 2016 to measure a county's experience with the opioid epidemic.

⁴ All relationships displayed in the figures are statistically significant at the p=0.05 level unless otherwise noted.



The disappearance of high-paying jobs for workers without higher education is one aspect of "economic despair" that has received considerable attention (Autor 2010; Autor 2014). Changes to the New England economy in recent decades have led to sharp declines in the share of jobs in the manufacturing, construction, natural resources and mining, and goods-producing sectors in many counties. Figure 3 shows the change in the number of jobs in these four sectors by county between 1990 and 2010.



It seems plausible that the communities that have lost jobs in sectors such as manufacturing and construction would be prime places for opioid abuse to take hold, if poor local economic prospects cause residents to seek an escape or a coping mechanism through drug abuse. Figure 4 shows that counties that experienced larger declines of these "good jobs" between 1990 and 2010 tended to have higher overdose-death rates in the 2014–2016 period, but the association is relatively weak. There is substantial variation in overdose deaths across the counties regardless of the percentage change in jobs in these sectors.

Declining labor force participation rates are of significant concern to policymakers regionally and nationally. The trend of baby boomers transitioning into retirement helps to explain the declining rates, but lower labor force participation among the prime-age population (25 through 54 years old) is of particular concern, in large part because that population overlaps with the population most disproportionately affected by the opioid epidemic. Low rates of labor force participation among prime-age residents could be driven by a dearth of good-paying local jobs that has prompted those residents to exit the labor force.



Such a situation would plausibly be correlated with despair, which could lead to higher rates of opioid abuse in that community. This hypothesis is explored in Figure 5. The figure shows the association between recent (2014 through 2016) fatal-overdose rates and the change in the labor force participation rate between 2000 and 2010 of residents who were in the 25–54 age range. Contrary to the anticipated relationship, Figure 5 indicates that the counties with greater increases in prime-age labor force participation experienced slightly higher overdose-death rates in the 2014–2016 period. There are also reasons to look at how the opioid epidemic affects the labor force (see "Impact of Opioids on the Labor Force," page 11).

Impact of Opioids on the Labor Force

At the same time that the opioid epidemic has gripped the New England states, the region has struggled to find workers in the face of low unemployment rates and an aging labor force. The share of the population in the prime ages for working (25 to 54 years old) declined in every New England state between the 2000 census and the 2010 census, as baby boomers moved into their near-retirement or retirement years.^b

To make matters worse, the proportion of people aged 25 to 54 who are employed or looking for work—that age group's labor force participation rate—has declined as well. For the United States as a whole, the labor force participation rate for people aged 25 to 54 fell from 83.8 percent in 1996 to 81.3 percent in 2016, with men accounting for a larger share of the drop than women. The numbers for the decline in the New England states are similar to the national figures. To the extent that opioid abuse is causing some of these men and women to drop out of the labor force, the opioid epidemic may be exacerbating already tight labor markets.

Aside from addiction rendering people incapable of holding down jobs, opioid abuse may have cascading implications for the labor force. For example, a grandparent who might otherwise be working may need to withdraw from the labor force to care for a grandchild whose parent has become addicted and is unable to provide a stable home life. Indeed, friends and relatives of an individual suffering from opioid-use disorder are all at risk of having to alter their work schedules due to the addiction.

Because no definitive finding about the cause-and-effect relationship between the opioid epidemic and the labor force emerges from the literature, we explore correlations between two indicators of opioid abuse and two indicators of employment for the New England counties. The opioid-abuse indicators are prescribing rates and fatal overdoses; the employment indicators are labor force participation rates and the employment-to-population ratio. If high rates of opioid abuse cause a decrease in labor force participation, then the counties that experience the sharpest increases in overdose deaths over time or the counties that have the highest rates of fatal overdoses should experience the steepest declines in labor force participation.

Many factors plausibly affect a county's labor force participation rate and its rate of opioid abuse. While there appears to be some association between an increased rate of fatal overdoses and a decline in the labor force participation rate in any given county across New England, the connection between the two is not strong enough to be conclusive. Without linked data at the individual level, it is difficult to determine which factor precedes the other. If a data set existed that linked earnings and treatment records over time, we likely would be able to conclusively determine whether poor economic prospects precede opioid abuse or opioid abuse causes personal finances to deteriorate.

b Vermont experienced the largest drop in the population of residents aged 25 to 54, at 7.4 percent. Connecticut had the smallest decline, at 2.2 percent.



The "deaths of despair" studied by Case and Deaton (2017) are largely driven by suicides, as well as overdoses. Figure 6 shows a very strong correlation between a New England county's suicide rate in 2010 and fatal-overdose rate for 2014 through 2016.⁵ Fatal overdoses are more likely to occur in counties where there is or has been a high rate of suicides. In other words, if a county is afflicted with one of these problems, it is likely afflicted with both. This link between suicides and fatal overdoses could stem from any of several possibly correlated factors, including limited access to health care, which is explored more in Section IV.

As the opioid epidemic gained momentum in New England, higher proportions of workingage people across the region applied for and enrolled in the Social Security Disability Insurance (SSDI) program. Particularly among working-age adults in northern New England, the share enrolled in SSDI increased more than the national average between 2000 and 2014 (Manchester 2016). Some of this increase may be linked to the opioid epidemic; recent research shows that in states where there is greater use of prescription opioids, as measured by opioids prescribed or

⁵ If there is evidence that an overdose death is intentional, it is double-counted, appearing in both the suicide and fatal overdose data.



opioid shipments, a larger share of people are enrolled in disability insurance (Cutler, Meara, and Stewart 2017). In several New England counties, relatively large shares of the working-age population were enrolled in SSDI in 2016, and the change in the share of adults aged 18 to 64 enrolled in SSDI between 2000 and 2010 is positively related to the rate of fatal overdoses, as shown in Figure 7. Counties where people struggle to find jobs that can accommodate their disabilities may also be areas where opioids provide an escape from pain and the challenges of daily living.

Beyond SSDI benefits, other forms of transfer payments, such as Temporary Assistance for Needy Families (TANF) benefits and unemployment benefits, logically could be associated with



areas that are economically distressed. In Figure 8, the association between an increase in the transfer-payment share of total income in a community and an increase in the number of fatal overdoses is apparent.⁶ As with the other measures in this section, no one state is driving the trend; the counties are mixed along this measure regardless of which state they are in.

While most of these factors individually support an association between opioid abuse and local economic indicators, none fully captures the degree of "economic despair" within a county. As a final test of a link between local economic conditions and the opioid crisis, we use an index that is based on a variety of indicators for economic distress. The Distressed Community Index (DCI), developed by the nonprofit Economic Innovation Group, evaluates counties along seven metrics to determine how distressed their economies are relative to those of the rest of the counties in the

⁶ A transfer payment is a one-way payment to a person for which no money, good, or service is given or exchanged at the time of receipt. Transfer payments are made to individuals by the federal government through various social-benefit programs, including Social Security. Retirement and disability benefits, medical benefits, and unemployment insurance are the largest components of transfer payments.



United States.⁷ The higher its index score, the more distressed the county is. The DCI appears to be positively correlated with fatal overdoses; that is, counties with higher levels of distress also experience more fatal overdoses per capita (Figure 9).

Most, though not all, of the indicators representing economic despair at the county level reviewed in this report appear to be associated with opioid deaths. These associations, however, are mostly weak and often not statistically significant. Furthermore, national research indicates that other local factors and increased access to prescription opioids may actually account for the link between opioid deaths and economic despair.

⁷ Full details on the Economic Innovation Group's measure are available in its report titled "The 2017 Distressed Communities Index." In this case, for consistency with the other data, the areas observed are counties, though zip-code-level and Congressional-district analyses are also available. The factors that contribute to an area's score include the size of the population that is 25 years old and older and without a high school diploma or equivalent; the share of habitable housing that is unoccupied, excluding properties that are for seasonal, recreational, or occasional use; the share of the prime-age population (aged 25 through 54) not currently working; the share of the population living under the poverty line; the median income expressed as a percentage of the state's median income; the percent change in the number of jobs between 2011 and 2015; and the percent change in the number of business establishments between 2011 and 2015.

III. Did the Availability of Opioids Cause the Crisis?

Four out of five individuals who use heroin previously abused prescription pain medications (American Society of Addiction Medicine 2016). Before the late 1990s, synthetic opioids were prescribed primarily to palliative care patients to ease their pain at the end of life. In 1996, pharmaceutical companies began campaigns to persuade doctors to increase the administration of these pain relievers. The launch of the campaigns coincides with an increase in the prescribing of synthetic opioids, which was followed shortly thereafter by an increase in fatal overdoses.⁸ Several state attorneys general recently have filed lawsuits against the manufacturer of OxyContin, Purdue Pharma, for the role it allegedly played in the opioid epidemic. The lawsuits claim that company executives intentionally downplayed the risks of addiction to prescription opioids to doctors and consumers, and that this deliberate misrepresentation assisted in the spread of the epidemic.⁹ In marketing its extended-release oxycodone, according to the lawsuits, the pharmaceutical manu-

An increases in the supply of (and access to) opioids is the most critical factor behind the crisis. facturer mined prescription data to identify physicians who prescribed opioids with greater-than-average frequency (especially primary care physicians) and focused its sales efforts on them and the regions where they practiced (McDonald, Carlson, and Izrael 2012).¹⁰

Following the campaigns that the pharmaceutical companies allegedly used to boost sales, many doctors prescribed opioids to non-terminal patients to manage pain, and many patients became addicted to these medications. Often after an addicted patient exhausts the supply of prescriptions, he or she turns to street drugs usually heroin or fentanyl—because they are relatively cheaper than illegally sourced prescription opioids and, in many localities, more

accessible, in part because doctors and policymakers have limited the supply of prescription opioids in recent years (which is discussed more in Section V). The prescribing of pain medications peaked nationally in 2011, and by the time controls were placed on the supply, the damage of over-prescribing already had impacted New England. Section IV of this report examines some of the correlations between prescribing rates at the start of the decade and recent fatal-overdose rates, and we analyze these correlations across New England counties with different economic characteristics.

From the initial availability of a new class of opioids in the early 1990s through the peak of prescriptions per capita in 2011 and more recent years, millions of Americans have been prescribed synthetic opioids to manage pain (Mattson et al. 2017). The number of prescriptions per capita

⁸ Keefe, Patrick Radden "The Family That Built an Empire of Pain," The New Yorker, October 30, 2017.

⁹ Miller, Joshua, "Mass. Attorney General Maura Healey Sues Opioid Maker Purdue Pharma," The Boston Globe, June 12, 2018.

¹⁰ According to a lawsuit filed by the Massachusetts attorney general, the manufacturer of OxyContin implemented a strategy in 2001 to place the blame on addicts for the spate of overdoses that began at that time and to label the addicts as reckless criminals. That same suit outlines how the manufacturer attempted to generate goodwill among physicians and medical students to combat negative reports about opioid addiction. See Anderson, Travis, "Five Things You Should Know about the Mass. Suit Targeting OxyContin Maker Purdue Pharma," *The Boston Globe*, January 16, 2019.



varies dramatically by region, even by county across New England (see Figure 10).¹¹ The distribution of these counties with high prescribing rates is spread throughout northern and southern New England and spans urban and rural areas, though many of the counties with the most prescriptions per capita are concentrated in Maine and New Hampshire.¹² Some counties have continued to see increases in the total number and strength of legal prescriptions, but national and state measures have been instituted to limit the number of pills dispensed.

¹¹ County-level prescribing data are available through the Centers for Disease Control and Prevention. Prescription totals are measured as the number of prescriptions filled per 100 residents.

¹² See the online appendix for the prescribing rates and fatal overdose rates for the New England counties.



As shown in Figure 11, the New England counties that had the highest rates of prescribing during the 2010–2012 period are more likely to be the counties with the highest fatal-overdose rates during the period from 2014 through 2016. As will be discussed later, however, state policy responses to the opioid epidemic that expand access to effective recovery treatments can have substantial effects on fatal-overdose rates. Across the United States, opioid-prescribing patterns vary significantly. Geographic variation in opioid-prescribing rates is greater than that observed for other health-care services. Nationally, higher prescribing rates are positively correlated with some county-level factors, including the poverty rate, the uninsured rate, the number of practicing medical doctors per capita, and the percentage of residents who are white (McDonald, Carlson, and Izrael 2012).¹³ A white patient is nearly 50 percent more likely to receive an opioid pain reliever for an emergency room visit than is a black or Hispanic patient (Pletcher, Kertesz, and Kohn 2008).

Several other factors have been identified as potentially influencing variation in opioidprescribing patterns, including regional differences in medical cultures, characteristics of the recipients seeking prescriptions, and environmental and systemic determinants, such as manufacturers marketing these drugs (King et al. 2014). Using prescribing rates as a catch-all for these factors is not ideal, because they combine elements reflecting the local supply of opioids

¹³ Several hypothesized factors are not correlated, such as the income inequality, the percentage of college graduates among the population, and the number of surgeries or emergency department visits per capita. The remaining geographic variation in opioid-prescribing rates may be explained by several factors. One is that the lack of consensus about using opioids for pain management resulted in individual prescribers setting their own prescribing pattern. Another is that variation may stem from differences in local medical subcultures, which may be reinforced by policies and attitudes of licensing boards and other local regulators.



(through doctors, health-care providers, and the actions of the pharmaceutical industry) and the local demand for opioids (including the extent of drug addiction, the overall health of the population, and access to health care). Once we control for the impact of economic factors, however, the resulting policy recommendations, if they are based on an association between prescribing patterns and opioid deaths, will be the same regardless of whether the prescribing rates reflect the supply or the demand for opioids. If high prescribing rates are strongly associated with increases in the number of fatal overdoses, then continued efforts to rein in excess prescribing are important for combatting the epidemic, as is increased access to recovery treatment.

The implementation in recent years of state-specific policies designed to mitigate the effects of the epidemic also could explain differences in outcomes in economically similar counties. The different trajectories of states' outcomes likely could be the result of prioritizing different policy options. This subject will be discussed more in Section V. In the next section, we explore some of the other potential county-level correlates to determine which, if any, have strong associations with the opioid epidemic.

IV. Intersection of Opioid Prescribing, Despair, and Fatal Overdoses

As demonstrated in Section II, there are associations between various measures of economic despair and fatal-opioid-overdose rates at the county level, with the DCI distress measure having the strongest relationship with overdose deaths. It appears, however, that the association between the DCI and opioid-prescribing rates is even stronger. Figure 12 shows that counties with

higher levels of economic distress, as measured by the DCI, tended to have higher rates of opioid prescribing in the 2010–2012 period, when prescription numbers peaked.

While the research literature notes a great deal of ambiguity in the reasons for the wide variation in prescribing rates, it is possible that some of the apparent association between economic conditions and opioid-related deaths is driven by the link between economic distress and opioid-prescribing patterns. To explore this possibility, we simultaneously examine the associations between fatal opioid overdoses and both economic distress and prescribing patterns. Figure 13 shows the average fatal-overdose rates for the 2014–2016 period for the New England counties in relation to prescribing rates in the years 2010 through 2012 and to various economic-distress measures. The prescribing rates and economic-distress measures both are broken down into ter-

New England counties with the highest prescribing rates experienced the highest fatal-overdose rates four years later. ciles (thirds) of their respective distributions. A clear pattern emerges: Counties with the lowest rates of opioid prescribing have the lowest levels of fatal overdoses, regardless of their performance on a range of metrics related to the local economy and possible despair.¹⁴

In Figure 13, Panel A, counties are divided into terciles by their DCI value as well as their prescribing rates. The counties with the lowest prescribing rates have lower rates of fatal overdoses regardless of how they score on the DCI scale. The counties with the highest distress rate and lowest prescribing rate still fare better than the counties with the lowest distress and high prescribing rates.

Panel B shows the change in the share of income from transfer payments between 2000 and 2010. Again, the counties with the lowest prescribing rates have significantly lower rates of fatal overdoses than do counties with higher prescribing rates, regardless of the change in how income in the county is derived. Panel C presents a nearly identical story, with the counties that have the lowest levels of opioid prescriptions per capita also having the lowest rates of fatal overdoses, regardless of their employment rate. Panel D divides counties by poverty rates in 2010 and indicates that the counties with the lowest number of opioid prescriptions per capita are the ones with the lowest rates of fatal overdoses, regardless of how many residents are living in poverty.

Figure 13 divides counties into groupings that logically could lead to very different experiences with the opioid epidemic.¹⁵ Despite these differences, the trend holds: The counties with lower numbers of opioid prescriptions per capita during the peak years of prescribing have had the lowest rates of fatal overdoses in recent years, regardless of the other metrics. This finding contributes to the evidence that prescribing patterns have played an integral role in the spread of the opioid crisis across the New England states.

Limited health-insurance coverage or, more broadly, poor health-care access could be the mechanism that accounts for the apparent association between opioid-overdose deaths and economic distress (discussed in Section II), which may actually be driven by prescribing patterns (as shown in Figure 13). Prior to health-care reform, the loss of a job often also meant the loss of health-care benefits. Individuals with limited access to medical treatment and effective pain-management care are most at risk of turning to strong medications to manage pain due to a lack of

¹⁴ As described in Section III, opioid-prescribing rates vary dramatically across counties nationally, but they are correlated to several factors. In New England, counties with higher rates of prescribing are more likely to have larger shares of transfer income; higher rates of uninsured residents; larger shares of job loss in the manufacturing, goods producing, natural resources and mining, and construction sectors; and be more distressed according to the DCI.

¹⁵ We also divided counties by the age of the population, population growth, rural acreage, and many other metrics from Section III. Each of these alternatives yields the same pattern as the one shown in Figure 13, but they are not included here for space.



Source(s): Authors' calculations using Economic Innovation Group's Distressed Communities Index, Bureau of Economic Analysis, Centers for Disease Control and Prevention WONDER data, and Centers for Disease Control and Prevention prescribing data.





preventative-care options or because procedures to address the cause of the pain are too costly. Although access to health insurance has increased, the quality of health care varies substantially by patients' socioeconomic status. According to the US Department of Health and Human Services, people on Medicaid are more likely to be prescribed opioids, and at higher doses and for longer durations, which increases their risk for addiction and its consequences. They also are less likely to have access to evidence-based addiction treatment (Behavioral Health Coordination Committee 2013). Figure 14A, shows a positive correlation between the 2010 uninsured rates in the New England counties and the average number of fatal opioid overdoses in 2014 through 2016.¹⁶

16 Insurance coverage data come from the US Census Bureau's Small Area Health Insurance Estimates Program.



Uninsured rates and prescribing patterns are even more strongly correlated (Figure 14B), especially when the analysis excludes Massachusetts, which enacted health-care reform before the rest of the country did.

Uninsured rates are just one measure of the overall health of a county's population. Another is the rate of preventable hospital stays, which is the frequency of hospitalizations for diagnoses that are treatable through outpatient services. A high rate suggests that the quality of care provided in the outpatient setting is less than ideal. The measure may also represent a tendency by the local population to use hospitals as a main source of health care rather than primary care providers. Figures 15A and 15B show the associations between preventable hospital stays and fatal overdoses and prescribing rates. These associations further support the assertion that reduced access to quality health care is related to higher opioid-abuse rates. Combined, Figures 13 through 15B suggest that an important reason counties with high levels of economic distress have suffered high rates of fatal opioid overdoses is that the residents of those counties have poor access to health care and are more likely to be prescribed opioids in lieu of more time-consuming and costly pain-management treatment.



V. Can State Policies Make a Difference?

Nationwide in 2016, an estimated 2.1 million people had a substance-use disorder related to prescription opioids.¹⁷ However, only a fraction were receiving recovery treatment: 17.5 percent in 2016 (Rudd et al. 2016a). The number of overdose deaths linked to prescription opioids was five times greater in 2016 than in 1999 (Rudd et al. 2016b). The New England states have responded to the epidemic in various ways. Vermont, for example, has stressed a medical approach involving treatment and recovery, while New Hampshire initially focused on a law enforcement or criminal justice approach to reduce the supply of opioids and punish those who illegally distribute the drugs. The two states had similar rates of opioid-overdose deaths in 1999, but in 2016, Vermont's rate was close to the national average, and New Hampshire's was the third highest in the country. A shift to a treatment-based approach in New Hampshire coincided with the state's rate of fatal overdoses declining between 2016 and 2017.

Medical approach

The public health and research communities have found that medication-assisted treatment (MAT) can cut the mortality rate from all causes among addiction patients by half or more (Sordo et al. 2017). Rather than imposing abstinence on a person with opioid-use disorder, MAT uses drugs such as methadone and buprenorphine to alleviate cravings and withdrawal symptoms. The drugs do not produce a sense of euphoria, and patients tend to tolerate them well.¹⁸ However, MAT drugs do not work for all opioid users. As many as 40 percent of users may prefer not to take medications, have a negative physical response to them, or do not see the intended results. But those for whom the treatment works are able to undertake everyday activities, such as going to school or work or meeting any other obligations.

The New England states have embraced MAT to varying degrees. Vermont is the leader in this area, having chosen to treat its opioid epidemic as a public health crisis relatively early. In 2012, the Vermont Legislature authorized a program that integrates treatment for substance-use disorder into primary care. The program, known as the hub-and-spoke model, provides intensive treatment (MAT), often daily, in treatment-center hubs. If needed, hub users may also receive psychological therapy and access to a social worker. Follow-up care often takes place in primary care offices—spokes—and generally occurs weekly, monthly, or even less frequently. In 2014, then-Governor Peter Shumlin devoted his State of the State speech to the opioid problem, spurring local governments to action. Medicaid now pays for most of the expenses incurred by the Vermont system's more than 8,000 opioid-addiction patients, each of whom costs, on average, nearly \$16,600 a year. The hubs no longer have long wait times, and the state estimates that about half of its opioid users are in treatment. Across the country, only 15 percent to 20 percent of opioid users are in specialty treatment (Center for Behavioral Health Statistics and Quality 2016).

Massachusetts and Rhode Island also have embraced MAT. Massachusetts offers methadone through licensed treatment programs, and state-funded buprenorphine programs are located throughout the state. Massachusetts General Hospital now offers MAT in its emergency department, and recently passed legislation allows MAT treatment in the state's correctional facilities. Rhode Island is increasing its capacity to provide MAT throughout the state.

¹⁷ Substance Abuse Center for Behavioral Health Statistics and Quality. Results from the 2016 National Survey on Drug Use and Health: Detailed Tables. SAMHSA. Published September 7, 2017. Accessed March 7, 2018.

¹⁸ Methadone is administered only in a clinic, typically one to four times a day, whereas buprenorphine is a take-home drug taken once or twice a day. Another drug used in MAT is a long-acting form of naltrexone (Vivitrol) that prevents any opioid drug from producing rewarding effects, such as euphoria. The US Food and Drug Administration approved its use in 2010. Vivitrol is injected once a month after full detoxification. These medications may be the best forms of opioid-addiction treatment, but they may not be effective for all opioid users.

The remaining New England states have been slower to implement MAT. Maine now has more than 7,000 MAT slots available, in addition to 350 residential-treatment beds and 50 detox beds (Maine Department of Health and Human Services 2017). Connecticut offers MAT as well as methadone clinics in several locations, but use of these programs is not yet widespread. New Hampshire has been slow to fully support the MAT approach. As of February 2018, New Hampshire had 13 MAT programs, seven of which were located in hospitals (Bureau of Drug and Alcohol Services 2018). Among all the states in the country, New Hampshire has the second-lowest per capita spending on services to help drug users overcome addiction (only Texas spends less per capita), and it ranks at the bottom nationally in availability of treatment programs.¹⁹ According to a 2017 report from the Geisel School of Medicine at Dartmouth College that is based in part on survey responses from drug users and emergency department personnel, several factors contribute to the state's escalating opioid problem.²⁰ They include a low number of medical-treatment providers per capita, an absence of needle-exchange programs, significant barriers to accessing the overdose-reversal drug naloxone (Narcan), and, according to some survey respondents, the state's abundance of rural areas where treatment options are lacking. Regarding the last factor, a recent federal grant will help increase the number of MAT centers throughout the state.²¹

One tool for addressing the variation in prescribing patterns is increased education for medical professionals about opioids and about alternative approaches to pain management. Contributing to the disparate rates of opioid prescribing are the differences in local medical subcultures, which may be reinforced by policies and attitudes of licensing boards and other local regulators. With more knowledge about effective pain management, medical professionals may be able to improve patient quality of life by treating pain but reducing the number of opioid prescriptions dispensed in a county. To this end, the curricula of all four of Massachusetts's medical schools include required classes on effective pain management.

Some New England states are treating the opioid epidemic as a public health crisis.

Another strategy has been to increase awareness about the number of opioid prescriptions within and across states. Each New England state uses a prescription-monitoring program (PMP, sometimes called a prescription-drug-monitoring program, or PDMP), a state-run database that tracks controlled prescription drugs dispensed to patients within the state. Prescribers, pharmacists, and other health-care and public health professionals can use a PMP to identify and address misuse, abuse, and diversion of prescription drugs. In Connecticut, for example, data from the PMP show that opioid prescriptions dropped almost 18 percent between 2015 and 2017.

Recently imposed limits on prescriptions in the New England states also play a role in combatting the opioid epidemic. As of 2016, Massachusetts law places a seven-day limit on opioid prescriptions for new users, requires training for providers, and mandates that prescribers check the PMP before issuing a prescription.²² Maine and Vermont passed similar laws four years ago, and a recent federal grant is being used to analyze the effectiveness of these laws.²³ Connecticut law imposes a seven-day limit on new prescriptions to adults, and as of 2017 it places a five-day

¹⁹ Seelye, Katharine Q., "How a 'Perfect Storm' in New Hampshire Has Fueled an Opioid Crisis," *New York Times*, January 21, 2018.

²⁰ Green, Susan, "HotSpot Study Shines New Light on the Granite State's Opioid Crisis," *Dartmouth Geisel School of Medicine News*, August 23, 2017.

²¹ Steinhauser, Paul, "New Hampshire to Land Big Boost in Opioid Treatment Funding," Concord Monitor, June 14, 2018.

²² Massachusetts Medical Society, "What You Must Know about the New Opioid Laws," Vital Signs, April 2016.

^{23 &}quot;Maine Med, University of Vermont Get Federal Grant to Study Opioid Prescribing Laws," *Portland Press Herald*, September 19, 2018.

limit on prescriptions to minors. Strict regulations on the dosage and strength of prescriptions in Rhode Island went into effect in 2017.²⁴ The treatment and prescription-management efforts may be paying off. In 2017, Massachusetts and Rhode Island saw declines in the numbers of opioid-related deaths, based on provisional data, likely illustrating that treating the opioid epidemic as a public health problem and promoting wide access to MAT are effective policy responses. The numbers of fatal opioid overdoses in Vermont and New Hampshire held relatively steady from 2016 to 2017. Maine and Connecticut have not yet turned the corner in terms of fatal overdoses. Compared with 2016, each state experienced an increase of more than 10 percent in the number of people who died from opioid overdoses in 2017.

Law enforcement approach

For many years, New Hampshire has relied primarily on a law enforcement approach to fighting the opioid epidemic. The New Hampshire Department of Safety's Narcotics and Investigations Unit investigates individuals and organizations involved in the illegal trafficking of controlled substances and makes arrests. In addition, to stem the supply of illegal opioid prescriptions, the unit investigates crimes involving the diversion of pharmaceutical drugs.

Two developments in the summer of 2018 illustrate how New Hampshire has continued to employ law enforcement strategies to control the opioid epidemic while expanding its medical approach to the crisis. First, federal prosecutors focused on New Hampshire's Hillsborough County, including the cities of Manchester and Nashua, in a crackdown on dealers of synthetic opioids.²⁵ Hillsborough is one of the nation's 10 counties hardest hit by the drug crisis. In each of these 10 counties, local prosecutors hand off all "readily provable" cases involving the distribution of synthetic opioids to the district's US attorney's office. The cases are tried at the federal level, regardless of the quantity of drugs involved. Federal judges, unlike their state-level counterparts, are bound by mandatory minimum sentences. Second, as noted earlier, the federal government has allocated additional funding (announced in June 2018) that will enable New Hampshire to add treatment centers throughout the state. This new federal initiative is aimed at states with small populations and high rates of fatal drug overdoses.

In a twist on the law enforcement approach, the town of Gloucester, Massachusetts, started the innovative Angel program in 2015. It encourages drug users to turn in their drugs to police stations (without fear of arrest) and to get treatment. During the program's first year of operation, addicts who voluntarily came to the police seeking help were placed in treatment 95 percent of the time. Gloucester police established a relationship with a local treatment center to make placement easier, and the department also paired each drug user with a volunteer "angel" for emotional support if he or she needed it. Between June 2015 and February 2017, more than 200 police departments in 28 states replicated the Angel program in some form.²⁶

²⁴ Rhode Island Department of Health, "Updated Opioid Use Regulations Take Effect in Rhode Island," April 12, 2017.

²⁵ Greene, Britta, "New Drug Enforcement Surge to Focus on Hillsborough County," New Hampshire Public Radio, July 17, 2018.

²⁶ MacQuarrie, Brian, "Angel' Opioid Initiative Thrives Despite Exit of Gloucester Police Chief," *The Boston Globe*, February 21, 2017.

VI. Concluding Thoughts

Much of the literature and county-level data analyzed here support the view that increased prescribing rates and inadequate access to health care are the primary factors driving the opioid epidemic in New England. The counties where legal prescriptions have been dispensed at the greatest rates have experienced, on average, the most substantial increases in fatal overdoses. The most striking numbers come from looking at the prescription indicators and metrics of despair jointly. Across the board, the counties with the lowest prescribing rates have had the lowest rates of fatal overdoses, regardless of the condition of the local economy.

Inadequate access to health care appears to partially explain the association between local economic factors and opioid-related deaths. The connection between lower rates of health-insurance coverage (as well as high rates of preventable hospital stays) and higher prescribing rates in the New England counties provides additional suggestive evidence that inadequate access to quality health care is a contributing factor to the spread of the crisis.

The implementation of prescription-drug-monitoring programs to reduce the volume of legally prescribed opioids is one example of states using policies to turn the tide on this epidemic. The experiences of the New England states present a compelling case for choosing evidence-based policies to combat the epidemic. Early on, Vermont took bold action to address the crisis when it gave as many residents as possible access to medication-assisted treatment options. Now it is the only New England state with a fatal overdose rate that is close to the national average.

Recognizing the factors that are associated with causing the opioid epidemic is essential to determining where to focus efforts to curtail the crisis. At the same time, understanding the effects of the epidemic is important for implementing policies and services that will mitigate its consequences. While this report cannot conclusively determine a direct link between the opioid epidemic and the local economies, the connections between a county's prescribing patterns, socioeconomic factors, and number of fatal overdoses has yielded further evidence that over-prescribing is a crucial element behind the epidemic.

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