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BY FACTORS THAT COULD BE MORE RAPIDLY ADDRESSED

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The Opioid Epidemic Was Not Caused by Economic Distress But by Factors that Could be More Rapidly Addressed

Janet Currie and Hannes Schwandt

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**ABSTRACT**

Without the opioid epidemic, American life expectancy would not have declined in recent years. In turn, the epidemic was sparked by the development and marketing of a new generation of prescription opioids and provider behavior is still helping to drive it. There is little relationship between the opioid crisis and contemporaneous measures of labor market opportunity. Cohorts and areas that experienced poor labor market conditions do show lagged increases in opioid mortality, but the effect is modest relative to the scale of the epidemic. Instead, we argue that there are specific policies and features of the U.S. health care market that led to the current crisis. It will not be possible to quickly reverse depressed economic conditions, but it is possible to implement policies that would reduce the number of new opioid addicts and save the lives of many of those who are already addicted.

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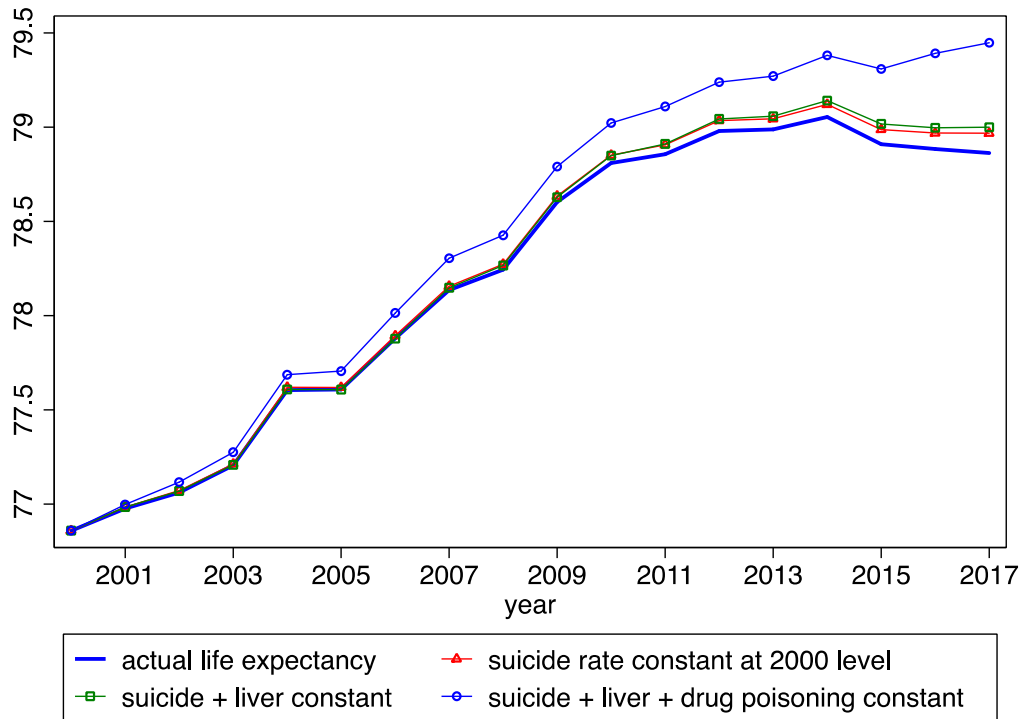
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Deaths due to drug overdoses, mainly involving opioids, have more than tripled since 1999, reaching a peak of 70,000 deaths in 2017. The U.S. leads the world in consumption of opioids, accounting for 72.9% of sales of Oxycodone and similar drugs (United Nations, 2018). The number of deaths due to opioids dwarfs the toll from previous drug epidemics in the U.S. Figure 1 shows that mortality from opioids is so great, that without these deaths U.S. life expectancy would have continued to rise after 2013 instead of falling.

Figure 1: Actual and counterfactual life expectancy without deaths of despair



Notes: The blue solid line shows actual life expectancy over time. The three lines with triangle, square, and circle markers show counterfactual life expectancy estimates. The line with triangles assumes constant death rates for suicides at their 2000 level, the line with squares shows constant death rates for suicides and liver disease at their 2000 level, and the line with circles assumes constant death rates for suicides, liver disease and drug poisoning at their 2000 level. Source: Authors' calculations based on Vital Statistics mortality data.

The epidemic is raging in all parts of society, but it has hit poor and less educated people harder: Those with only a high school degree are 2.5 times more likely to die than people with a graduate degree, and people in poverty are 1.4 times more likely to die than people with incomes at or above five times the poverty line (Altekruse et al., 2020). It is often argued that opioid deaths are more common among people of lower socioeconomic status because low and declining status leads to opioid addiction and other deaths of despair (Case and Deaton, 2015). Yet, decades of research show that people of lower socioeconomic status are almost always at higher risk from any new health scourge, just as they are currently more likely to die from Covid-19. Poverty is like a drought in a wooded area—even given plenty of fuel, in order for there to be a forest fire there has to be a spark.

We argue that the development and marketing of a new generation of prescription opioids sparked the epidemic and that provider behavior is still helping to drive it. We first show that there is little relationship between the opioid crisis and contemporaneous measures of labor market opportunity. We next consider the relationship between opioids and labor market opportunity over the longer term. Cohorts and areas that experienced poor labor market conditions do show lagged increases in opioid mortality, but the effect is modest relative to the overall size of the epidemic. In the third section, we turn to the policies and features of the U.S. health care market that led to the current crisis. Understanding how we got here is extremely important because it shows that there is a lot of hope. It will not be possible to quickly reverse economic circumstances in depressed parts of the country, but it is possible to implement policies that would reduce the number of new opioid addicts and save the lives of many of those who are already addicted.

### **Part 1: The relationship between opioid use and contemporaneous measures of employment, unemployment, and labor force participation**

Two ideas about the relationship between opioids and employment have become widely accepted. The first is that unemployment leads directly to opioid abuse. The second is that opioid abuse makes people unemployable. Both of these ideas have a grain of truth in them. For example, in a study of men in New Jersey who were out of the labor force, Krueger (2017) found that over 50% reported taking prescription opioids daily. However, this does not prove that pain medication *causes* people to drop out of the labor force. For example, someone with chronic back pain might drop out of the labor force and then be prescribed opioids. In this case, the patient's back pain rather than opioid use is what caused them to leave the labor force.

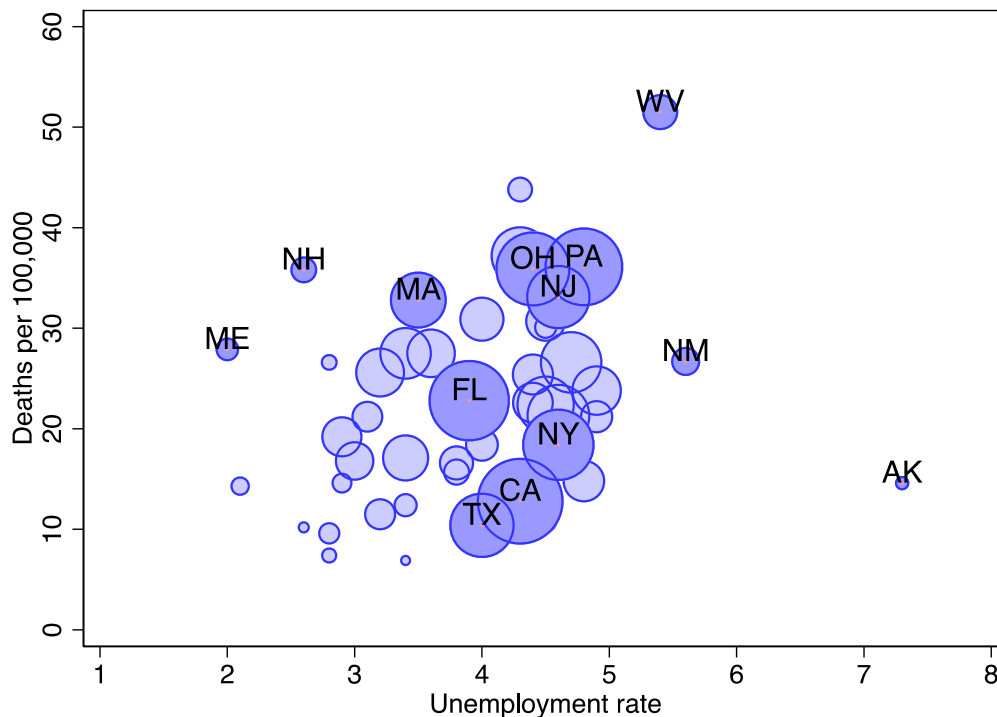
Opioid use is not the main reason for declining labor force participation over time. Declines in male labor force participation among lower-skilled prime age men began well before the current opioid crisis. For example, Parsons (1980) pointed out that the share of men 45-54 who were not participating in the labor force rose from 4.2% to 8.4% between 1948 and 1976 with similar increases for other prime aged men. These trends reflect falling demand and low wages for these workers combined with the growth of other sources of income support, such as disability payments (Council of Economic Advisors, 2016).

Declining labor force participation among women is a more recent phenomena. After growing from 43% to 78% of prime age women between 1962 and 2000, prime age female labor force participation fell to 75% in 2016, with declines closer to 10 percentage points among women with a high school education or less. These recent declines parallel the ongoing declines in labor force participation among less skilled men, suggesting that in recent years similar forces have been at work for men and women (Black and Schanzenbach, 2017).

There is some support for the idea that unemployment can affect opioid use. For example, Venkataramani et al. (2020) found that areas where car plants had shut down experienced increases in opioid overdoses that became statistically significant by five years after the closing. Yet unemployment cannot be the major driver of the epidemic. Most Americans do not live beside a shuttered car plant, and the fraction employed in manufacturing declined steadily from

26.4% to 14.4% between 1970 and 2000 (U.S. Bureau of Labor Statistics, 2020). The opioid epidemic first gained a foothold in the prosperous period prior to the recession of 2008. As the epidemic peaked in 2017-2018, unemployment was at its lowest level in decades. And while a great deal of attention has been focused on opioid deaths in depressed areas with persistently high unemployment, the majority of opioid deaths occurred in large states with low unemployment rates (Currie and Schnell, 2018). A final fact that does not fit the popular narrative is that although African-Americans have persistently high unemployment relative to other Americans, the epidemic seemed to start first among non-Hispanic whites, and had a particularly large impact on white women (Singhal, 2016).

Figure 2: Overdose deaths per 100,000 vs. unemployment rate, by state, 2018



Notes: State-level data on unemployment for March 2018 is available here: <https://www.bls.gov/opub/ted/2018/eight-states-at-historically-low-unemployment-rates-in-march-2018.htm>. Data on overdose death rates and numbers of deaths in 2018 by state is available here: [https://www.cdc.gov/nchs/pressroom/sosmap/drug\\_poisoning\\_mortality/drug\\_poisoning.htm](https://www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.htm). Larger bubbles indicate more deaths.

Figure 2 plots state opioid death rates in 2018 against the unemployment rate. The size of the bubbles indicates the number of deaths in each state. Seven states, California, Florida, Pennsylvania, Ohio, Texas, and New Jersey (in order of number of deaths) accounted for 42% of all of the opioid deaths in that year. The unemployment rates in all these states were very similar, even though in Ohio, the death rate was 35.9 per 100,000 and in Texas it was 10.4 per 100,000. West Virginia fits the stereotype, with both relatively high unemployment and the highest death rate at 51.5 per 100,000 population. But other states are outliers in the other

direction—for example both Massachusetts and New Hampshire had lower than average unemployment rates but high opioid death rates.

Furthermore, most people taking opioids are working. Currie, Jin, and Schnell (2019) analyze data from all retail pharmacies in the U.S. and find that 85% of the opioids prescribed for working aged people were paid for by private health insurance, which is employer provided. It is important to look at prescription opioids because most people who abuse opioids began with legally prescribed medications (Schnell, 2019). For example, 80% of heroin users began by misusing prescription opioids (National Institute on Drug Abuse, 2020).

Even states with low unemployment have relatively depressed areas, so it is important to look at smaller geographies, like counties. Currie, Jin, and Schnell focus on the relationship between employment and opioid prescribing in the U.S. at the county level between 2006 and 2014. They look at employment rather than unemployment because unemployment rates come from national surveys that do not produce reliable county-level estimates. Employment data come from actual counts of people on the payroll because employers pay payroll taxes. The raw data actually show a positive relationship between employment and opioid prescribing at the county level, which is because people who are employed are more likely to have prescription drug insurance that covers opioids.

To ask whether changes in opioid prescribing affect employment, they use prescriptions for the elderly as an instrument for prescriptions for working aged adults. The underlying assumption is that higher prescribing for the elderly is correlated with higher prescribing for other groups, but has no direct effect on employment of prime aged adults. To examine the reverse question of whether changes in employment cause changes in opioid prescribing, they instrument employment changes using a shift-share instrument based on the idea that national employment shocks to say, the oil industry, will have a larger impact on oil producing regions.

They find that there is actually a small positive relationship between changes in opioid prescribing and changes in employment for females in areas with low levels of education. And there is no systematic relationship between changes in opioid prescribing and changes in employment rates for men. These results differ from some that have been reported in the literature for several reasons.<sup>1</sup> First, they focus on the more accurate employment data rather than on unemployment. Second, they use a longer time period and include county-level fixed effects to control for fixed long-term differences between counties (e.g. in Harlan County is different than San Diego in many ways). Third, they use all states, rather than a small subset. Fourth, they use instrumental variables to account for omitted time-varying third factors that could drive correlations between unemployment and opioid use.

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<sup>1</sup> Hollingsworth et al. (2017) report that a one percentage point increase in county unemployment rates is associated with a 3.55% increase in opioid fatalities. Carpenter et al. (2017) find that a one percentage-point increase in the state unemployment rate is associated with a 0.0004 percentage point increase in the probability of having a substance use disorder involving analgesics in the past year. Both studies include fixed effects but neither deals with of time varying omitted variables. Harris et al. (2019) find a large negative effect of opioid prescribing on employment-to-population ratios, using data on 10 states but do not include county fixed effects given a short time series (2013-2015).

Like much of the rest of the literature, Currie, Jin, and Schnell focus on prescription opioids, but in 2014 the number of deaths due to illegal opioids overtook the number of deaths due to prescription opioids. Still, Figure 2, deals with all opioid deaths and tells the same story – the relationship between opioid use and contemporaneous measures of labor force activity is weak. Hence, other factors must underlie the sharp increase in opioid deaths.

## **Part 2: The relationship between longer-term measures of economic prospects and opioid deaths**

It might take years or even decades for economic disadvantage and socioeconomic decline to translate into addiction, sickness, and death. Several recent studies have taken a longer-term perspective – either by focusing on structural economic changes from import competition and automatization or by following unlucky cohorts of people who entered the labor market during recessions. Both approaches find that socioeconomic decline is linked to increases in opioid mortality, though the effects are quite small relative to the size of the problem.

### *Impacts of structural change*

Autor, Dorn, and Hanson (2013) established that import competition originating from China's economic rise led to dramatic declines in U.S. manufacturing jobs. Autor, Dorn, Hanson (2018) find that when measured over decades, these reductions in manufacturing jobs increased mortality due to drug and alcohol poisonings. Pierce and Schott (2020) find similar effects of trade shocks on mortality in the twelve years following the U.S. granting of permanent normal trade relations to China in 2000. These effects are only present for non-Hispanic whites and are stronger for males, who were most impacted by trade-related declines in manufacturing. Adda and Fawaz (forthcoming) confirm these mortality results and document increases in illness and chronic pain. They point out that it is the persistence of these structural economic shocks that makes them deadly.

U.S. manufacturing jobs also declined due to automation and the rise of robotics. Charles, Hurst, and Schwartz (2019) use shift share instruments to analyze the mortality impacts of all of the shocks that affected national manufacturing activity and find positive effects on drug abuse and overdose deaths.

While this literature on structural change finds a relationship between manufacturing job losses and overdose deaths, economic decline cannot explain the magnitude of the opioid epidemic. For example, Pierce and Schott's (2020) estimates imply that a shift from the 25<sup>th</sup> to the 75<sup>th</sup> percentile of trade exposure can explain only up to 11.5% of the overall drug overdose deaths in 2017.<sup>2</sup> Charles, Hurst, and Schwartz (2019) caution that it is difficult to extrapolate their estimates to the aggregate since there may be confounding factors that they do not account for in their estimates. Ruhm (2019) does examine the role of confounding factors in the estimated relationship between economic decline and rising opioid deaths at the county level. He finds that

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<sup>2</sup> Pierce and Schott (2020) find that an interquartile shift in trade exposure is associated with an increase of 2.5 drug overdose deaths per year. Overall age-adjusted U.S. drug overdose mortality was 21.7 in 2017.

after adding controls for counties' age and education structure, long-term changes in economic conditions explain at most one-ninth of the growth in overall drug-related mortality rates and very little of the variation in deaths due to prescription opioids. In other words, the epidemic has not been limited to areas experiencing negative structural change, but has raged in many other parts of the country that were not suffering such decline. For example, Bloom et al. (2019) show that the west coast and New England benefitted from Chinese import competition, but New Hampshire and Massachusetts have still been hit hard by opioids (Stopka et al., 2019).

### *Long-run effects of business cycle fluctuations*

Business cycle fluctuations are another important source of economic dislocation. However, downturns are followed by upturns and it can be difficult to distinguish the impact of downturns on health outcomes in subsequent years. One group that bears the mark of temporary economic downturns for many years or even decades is new labor market entrants. Entering the labor market in a recession is associated with income losses that persist for years (Oyer, 2006; Kahn, 2010; Oreopoulos et al., 2012; Schwandt and von Wachter, 2019). For every percentage point increase in the local unemployment rate at labor market entry, recession graduates suffer an income loss of about 3% which fades out only over 10 to 15 years.<sup>3</sup>

Schwandt and von Wachter (2020) link mortality rates for cohorts defined by their state and year of birth to the economic conditions these cohorts faced around labor market entry. To account for endogenous graduation timing and migration, the authors predict a cohort's graduation year and location using the average education and migration rates of surrounding cohorts. This setting allows the authors to analyze the causal impact of local recessions at labor market entry on mortality up to age 50.

They find that affected cohorts have lower mortality which is driven by reductions in traffic and workplace accidents. (See also Ruhm, 2000; Miller et al., 2009; He, 2016; Strumpf et al., 2017). However, increases in mortality start to appear around 15 years after labor market entry and last over the rest of the time these cohorts can be followed. Unlucky cohorts are more likely to die of drug overdoses, liver disease, and other causes linked to poor health behaviors, such as heart disease and lung disease. Each percentage point increase in the unemployment rate at a cohort's labor market entry leads to a 2% increase in overall mortality and in deaths of despair. A moderate recession at labor market entry, increasing the unemployment rate by three percentage points, would therefore increase mortality in midlife by about 6%.

The mortality impacts of entering the labor market during a recession are economically important but they explain only a small share of the overall increases in drug overdose deaths. Only a small number of cohorts over the past decades were hit by a recession at labor market entry. And even in the hypothetical case that all cohorts experienced a strong recession at

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<sup>3</sup> Recessions typically affect hiring more than firing. Those who enter the labor market in a downturn tend to start at lower-quality firms and take many years and repeated movements across firms to climb the job quality ladder and close the payment gap (Oreopoulos et al., 2012).



graduation, the implied increase in opioid mortality would only amount to one-eighth of the overall opioid mortality increase observed in the past two decades (Schwandt and von Wachter, 2020, p.16).

### **Part 3: The real causes of the opioid epidemic and policy responses**

As we have described, neither contemporaneous or long-term economic conditions can explain the severity of the U.S. opioid epidemic. This tragic situation is due to three factors. First, beginning in the late 1970s, new ideas about pain began circulating: Physicians began to believe that many patients suffered needlessly and that physicians had a duty to monitor and treat pain as “the fifth vital sign” (Wailoo, 2014). These changes were reflected in the rise of pain medicine as a specialty.

Second, companies like Purdue Pharma began aggressively marketing a new generation of opioids as a safe, non-addictive way to treat pain. Purdue spent hundreds of millions of dollars targeting doctors, hospitals, medical schools, and sponsored continuing medical education seminars which doctors take to maintain their accreditation (Van Zee, 2009). OxyContin, which was approved in 1995, was specifically promoted as safe for chronic pain as well as for conditions like wisdom tooth extraction. We now know that despite Purdue’s claims, drugs like OxyContin are extremely addictive. For example, Barnett et al. (2017) showed that emergency room patients treated by doctors who were high prescribers of opioids were more likely to be taking opioids six months later than patients treated by low prescribers in the same hospitals, indicating that many people became addicted through a one-time exposure to the drugs.

Prior to the marketing push, most doctors had believed that opioids were too addictive and dangerous for anyone except terminally ill patients. Aggressive marketing by pharmaceutical companies changed those perceptions: Sales of opioid pain killers quadrupled between 1999 and 2013 (Paulozzi et al., 2011), fueling the rise in overdose deaths. Alpert et al. (2019) show that in states where OxyContin was marketed more aggressively, deaths rose faster.<sup>4</sup> Deiana et al. (2020) show that companies marketed opioids more aggressively in years when raw material prices were lower (so that profit margins were higher) and that prescriptions rose more in places with more health care suppliers per capita.

Third, the U.S. is unusual in having little public oversight of medical prescribing in general, and of opioids in particular. Any doctor or dentist can prescribe opioids, and the maximum allowable dose is higher than in most other countries. Other countries require special training to prescribe opioids (Japan); require patients to register to use opioids (France, Italy, and Portugal); or require doctors to use special prescription pads for opioids (many countries) (Ho, 2019). Some countries with centralized health insurance systems do not cover opioids for non-cancer

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<sup>4</sup> They exploit cross-state variation in the triplicate prescribing regulations that initially limited prescribing of OxyContin more in some states than others. Court documents that have come to light as a result of the lawsuit against Purdue show that less marketing was targeted to states with these programs, and that these states saw slower growth in overdoses even twenty years after the introduction of OxyContin.

care, or to require pre-authorization for such uses. Countries with centralized health insurance systems may also cover alternative therapies, such as physical therapy for back problems, as a first line treatment. In the U.S. alternative therapies are often more expensive than prescription opioids.

### *Physician prescribing practices as key driver of the epidemic*

The result of these factors is that U.S. physicians prescribe too many opioids.<sup>5</sup> Opioids are commonly prescribed in situations where other safer alternatives are available and where they are ineffective over the long term. For example, given that people build up tolerance to opioids, they are not suitable for non-terminal chronic pain, such as from back problems. According to the National Institute on Drug Abuse (2020) 21 to 29% of patients prescribed opioids for chronic pain misuse them, between 8 and 12% develop an opioid use disorder, and 4 to 6% of those who misuse prescription opioids start taking heroin. Moreover, patients still frequently receive a 30-day supply of opioids when a 3 day supply would likely suffice, creating a risk of diversion to the secondary market. In 2016 the Centers for Disease Control belatedly issued guidelines in an attempt to curb these practices (Dowell et al., 2016). But these guidelines are not binding on U.S. physicians.

Why do physicians overprescribe? Some may simply be unaware of the dangers. Schnell and Currie (2018) show that physicians from higher-ranked medical schools prescribe fewer opioids, and that this effect is greater in specialties such as family medicine where doctors would be expected to have less training in pain management.<sup>6</sup> In some cases, physician pay may be directly linked to patient satisfaction which in turn could be linked to successful pain management (Van Zee, 2009). It is possible that patients are influenced by direct-to-consumer advertising and ask for opioid pain medications – the U.S. is one of only three countries in the world that allow such advertising (Ventola, 2011). Some physicians may also use opioids as a way to compete for patients; taken to an extreme, this could lead to the “pill-mills” that became a feature of the American addiction landscape in the 2000s (Temple, 2015).

### *Policies to curb overprescribing*

The most concrete step so far towards reducing the abuse of prescription opioids is the development of state prescription drug monitoring programs (PDMPs). A PDMP is a statewide electronic database with information about the dispensing of all “scheduled” drugs including opioids. Dispensers must report information about patients, prescribers, and the drugs prescribed. PDMPs are meant to prevent “doctor shopping” by patients who collect multiple prescriptions from different doctors either for their own use or for resale. PDMPs were rolled out unevenly, and initially doctors were only encouraged rather than required to use them. Meara et al. (2016) found no effect of having a PDMP per se on opioid use (although her study

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<sup>5</sup> U.S. physicians also over-prescribe addictive benzodiazepines relative to doctors in other countries. Taking benzodiazepines with opioids increases the probability of a fatal overdose (Sun et al., 2017).

<sup>6</sup> Doctors with little specialized training in pain medicine prescribe the majority of opioids in the U.S.

focused on the disabled elderly rather than all opioid users). Buchmueller and Carey (2018) and Anca et al. (2019) show that making PDMPs mandatory for doctors did reduce opioid deaths in states where this was done.

PDMPs could potentially be used to identify physicians with improper prescribing behavior, in order to intervene to change their behavior, but this has rarely been done. Doctor et al. (2018) study a program in San Diego that linked death records to the PDMP in order to identify physicians who had prescribed opioids to patients who later overdosed. They show that informing physicians about these overdoses was effective in getting doctors to reduce their prescribing. Still, PDMPs may be having an impact: opioid prescriptions peaked in 2012 at 81.3 per 100 people, and had fallen to 51.4 per 100 people by 2018 (Centers for Disease Control and Prevention, 2020).

Schnell (2017) points out that it is important to not only crack down on the “secondary market” for pain pills that has sprung up (by implementing measures like the PDMPs), but to get doctors to reduce their unnecessary prescribing to legitimate patients as well. She shows that well-intentioned doctors may actually prescribe more opioids if they become less worried about pain pills being diverted to other users.

#### *Treatment of existing addiction*

Simply reducing prescriptions without addressing treatment could harm people who are already addicted to prescription opioids. An important natural experiment shows how consequential this effect could be. In 2010, OxyContin was reformulated to make it harder to abuse. Alpert et al. (2018) and Evans et al. (2019) demonstrate that many OxyContin users switched to illegal opioids, and that as much as 80% of the increase in deaths due to heroin overdoses since 2010 is due to this reformulation. More recently, the U.S. market has been flooded with fentanyl, most of it made in China and simply mailed to the U.S. in small packages. Fentanyl is much deadlier than heroin, since tiny quantities kill (Jones et al., 2018). And it will be very difficult to stop the flow of fentanyl into the country without the cooperation of Chinese authorities working to stop the production of the drug.

These considerations make effective treatment for opioid addiction an urgent public health priority. Unfortunately, less than 30% of people with a substance abuse problem receive treatment (Center for Behavioral Health Statistics and Quality, 2016). Moreover, many U.S. programs emphasize an “abstinence-only” approach, whereas medication-assisted treatment (MAT) with drugs such as buprenorphine is much more effective in terms of saving lives. Patients in abstinence-only treatment often overdose if they relapse, since they have lost their tolerance for opioids. Ironically, while any U.S. doctor can prescribe opioids without any special training or oversight, doctors must obtain special licenses to prescribe MAT and are restricted in the number of patients they can treat (University of Michigan Behavioral Health Workforce Research Center, 2019).

One bright spot in terms of drug treatment policy in recent years has been the adoption of Naloxone Access Laws. These laws permit naloxone, an overdose-reversing drug, to be prescribed to “third parties,” or make it available without a prescription. Rees et al. (2019) show

that these laws reduced opioid deaths by 9 to 11%, with the largest reduction coming from deaths due to prescription drugs. Moreover, the laws did not increase the use of opioids as some had feared.

What this means is that we must look at the opioid epidemic for what it is: A perfect storm that arose from a combination of newly available opioids, new attitudes about the importance of pain management, aggressive marketing, loose and decentralized prescribing practices, and lack of access to effective treatment. The solution to the problem must lie in addressing these root causes.

## **Conclusions**

The implementation of mandatory PDMPs, new guidelines for opioid prescribing, and laws promoting naloxone have already made a dent in the epidemic. The number of overdoses fell 4.1% in 2018 relative to 2017 (Hedegaard et al., 2020), enough to cause life expectancy to resume its rising trend. However, in 2018, the prescribing rate was still 51.4 prescriptions per 100 persons (more than 168 million total opioid prescriptions). If 8 to 12% of those treated with opioids go on to develop an opioid use disorder, then our medical system is still generating many new addicts.

Policies that would address these problems include increasing access to non-addictive pain treatment, expanding the use of overdose-reversing drugs, and improving access to medication assisted treatment by removing barriers to medication assisted treatment. It took 20 years to get to where we are and the problem will not go away overnight. But implementing common-sense, evidence-based policies aimed at the opioid epidemic itself can save lives.

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