The Opioid Epidemic, the Fifth District, and the Labor Force

BY SONYA WADDELL

In 2016, there were more than 63,600 drug overdose deaths in the United States, 70 percent more than the number of motor vehicle deaths the same year. The age-adjusted rate of overdose deaths has more than tripled since 1999. Of the deaths in 2016, about two-thirds were related to opioids; those deaths increased fivefold since 1999.

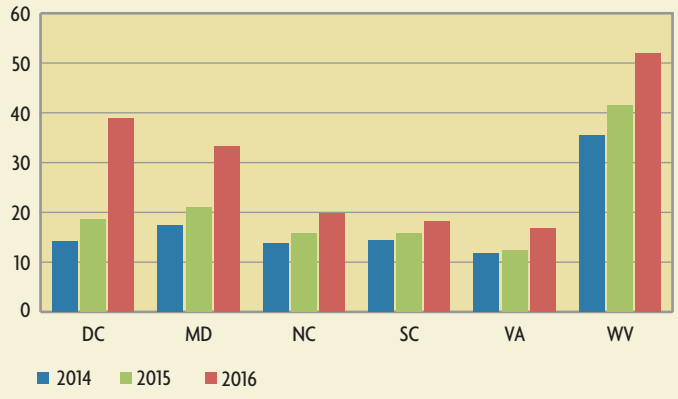
Certain states in the Fifth Federal Reserve District — which includes the District of Columbia, Maryland, North Carolina, South Carolina, Virginia, and most of West Virginia — have been particularly hard hit by the increased opioid use and misuse. The most striking data come out of West Virginia. At 52 deaths per 100,000 people, West Virginia had the highest drug overdose death rate in the country in 2016, followed by Ohio at 39.1 deaths. In fact, three district jurisdictions — West Virginia, Maryland, and D.C. — were in the top seven states for fatal drug overdoses, and most of those were opioid-related. (See chart.)

Many have tried to quantify the economic impact of the national opioid crisis. For example, in an October 2016 article, Curtis Florence, Chao Zhou, Feijun Luo, and Likang Xu of the Centers for Disease Control and Prevention (CDC) estimated the national economic burden of prescription opioid abuse in 2013 (including health care costs, criminal justice costs, and lost productivity costs) to be $78.5 billion. In a later paper, Alex Brill and Scott Ganz of the American Enterprise Institute and Georgia Tech estimated the 2015 per capita state- and county-level economic burden of the opioid crisis. They estimated that the per capita nonmortality costs were highest in D.C. ($493) and New Hampshire ($360), and the highest per capita total costs (including mortality) were in West Virginia ($4,378) and D.C. ($3,657).

Apart from the obvious public health concerns created by the crisis, there are two primary economic reasons why a Federal Reserve Bank such as the Richmond Fed seeks to better understand the impact of the opioid crisis. First, a Reserve Bank is tasked with understanding economic conditions in its region and identifying any economic impact of the use and misuse of opioids on the district's states and localities is part of that effort. Second, the Fed's dual mandate of maximum employment and stable prices requires an understanding of any factor that might affect labor markets. With historically low unemployment and widespread stories of employers struggling to find workers, it becomes even more relevant to understand the extent to which the opioid crisis affects the pool of available labor throughout the nation.

Drug Overdose Death Rates in the Fifth District

Deaths per 100,000 people



SOURCE: Centers for Disease Control and Prevention

Documenting the Crisis

The CDC looks at three primary categories of opioids: natural and semisynthetic opioid analgesics that are often available by prescription (such as morphine, codeine, oxycodone, and hydrocodone); synthetic opioid analgesics (such as tramadol and fentanyl); and heroin. According to the CDC, processing and analyzing death certificates indicates two distinct but interconnected trends in the opioid epidemic: an increase in deaths from prescription opioid overdoses over a 17-year period, and a recent surge in illicit opioid overdoses driven mainly by heroin and illegally made fentanyl. (See chart.)

So what explains the national evolution of the opioid crisis outlined by the CDC? First, there is evidence that much of the addiction to opioids in the United States began with a prescription. Three out of four new heroin users report abusing prescription drugs before using heroin, and people who are addicted to prescription opioids are 40 times more likely to also be addicted to heroin. Further, opioid prescription rates rose considerably for two decades starting in the mid-1990s, just prior to the beginning of the rise in opioid-related deaths.

In the Fifth District, overdose death rates have been highest in West Virginia — where the rate of opioid prescribing has also been high. Data from the CDC indicate that at the peak of opioid prescribing in West Virginia (2009), medical professionals in the state wrote 146.9 opioid prescriptions per 100 people. This was the highest prescription rate

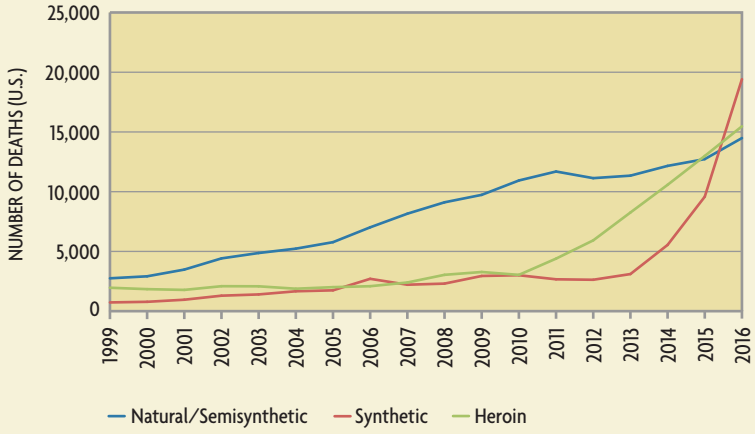
in the country by a wide margin: The next highest rates were in Tennessee, Kentucky, and Alabama, which had rates in the 130s. On the other hand, conditions are changing. By 2016, the rate in West Virginia was down to 96 prescriptions per 100 people. This was still the highest in the Fifth District, and one of the highest in the nation, but it ranked below some states with much higher prescription rates: Alabama (121.0), Arkansas (114.6), Tennessee (107.5), Mississippi (105.6), Louisiana (98.1), Oklahoma (97.9), and Kentucky (97.2).

Two other factors in the evolution of the crisis involved the reformulation of a specific drug and a decline in the price of heroin. One of the most widely prescribed drugs was OxyContin, made by Purdue Pharma, which contained a formulation that released the active ingredient (oxycodone) over the course of 12 hours. Users soon realized, however, that the extended release properties could be circumvented by crushing the pill into a powder that could be snorted, smoked, or liquefied and injected. In August 2010, Purdue Pharma stopped shipping its original formulation of OxyContin and began shipping exclusively a new formulation, what they called an abuse-deterrent formulation, which was much more difficult to abuse.

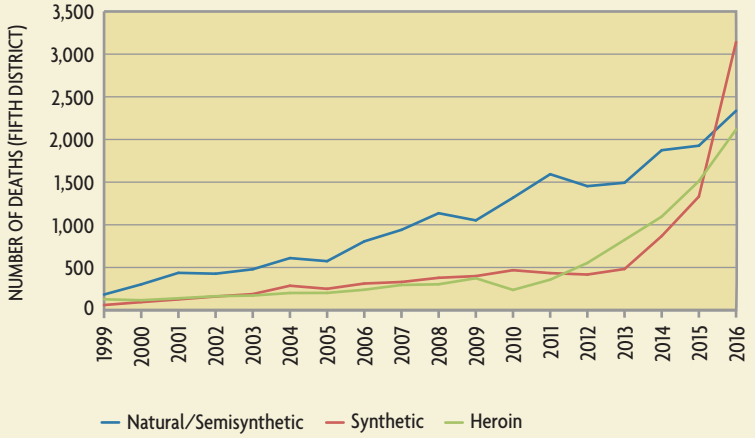
A few papers, including a January 2017 National Bureau of Economic Research (NBER) working paper by Abby Alpert of the Wharton School and David Powell and Rosalie Liccardo Pacula of the RAND Corporation, as well as a 2018 NBER working paper by William Evans and Ethan Lieber of the University of Notre Dame and Patrick Power of Boston University, indicate that rather than reduce overall opioid misuse or overdose deaths, this reformulation led to the substitution of heroin for other opioids. Evans, Lieber, and Power argue that each prevented prescription or semisynthetic opioid death was replaced with a heroin death. A big part of the reason was that the price of heroin fell from more than $3,000 per pure gram in 1981 to less than $500 per pure gram in 2012. This, in turn, was due primarily to vastly increased supply and increased purity, primarily coming from Mexico. In 2014, 79 percent of U.S. heroin came from Mexico, compared to 15 percent a decade earlier.

A final piece of the evolution came with the increase in overdoses from illicit synthetic opioids, such as fentanyl. Pharmaceutical fentanyl is a synthetic opioid pain reliever that is 50 to 100 times more potent than morphine and is thus often used to treat severe pain. But the increase in fentanyl-related overdoses and deaths in the United States arose from illicit fentanyl that is often mixed with heroin or cocaine, both with and without the user's knowledge.

Opioid Overdose Deaths by Type for the United States



Opioid Overdose Deaths by Type for the Fifth District



SOURCE: Centers for Disease Control and Prevention/Kaiser Family Foundation

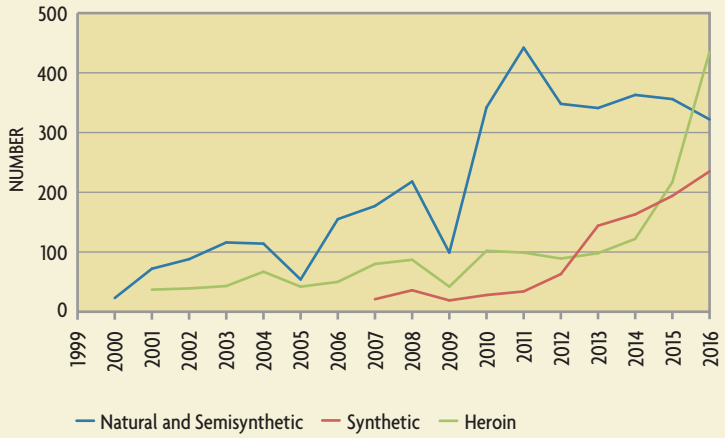
The rate of overdose deaths involving synthetic opioids other than methadone doubled from 2015 to 2016 and confiscations of fentanyl have been on the rise.

Although the national pattern in the evolution of the opioid crisis holds true in the Fifth District overall (see chart), it is not consistent across states. In West Virginia, for example, the natural and semisynthetic opioid deaths are only just being overtaken by synthetic opioid deaths, and heroin use is far lower. (See chart on next page.) In the District of Columbia, however, heroin overdose rates are well above those of prescription drug rates. (See chart on next page.)

Effect of Opioid Use on the Labor Force

In May 2018, the U.S. unemployment rate fell to 3.8 percent — a rate so low that it has been seen only a handful of times in the 70-year history of the series. Yet the share of the population aged 25 to 54 years — the prime working-age population — in the labor force has fallen from a high of almost 85 percent in the late 1990s to less

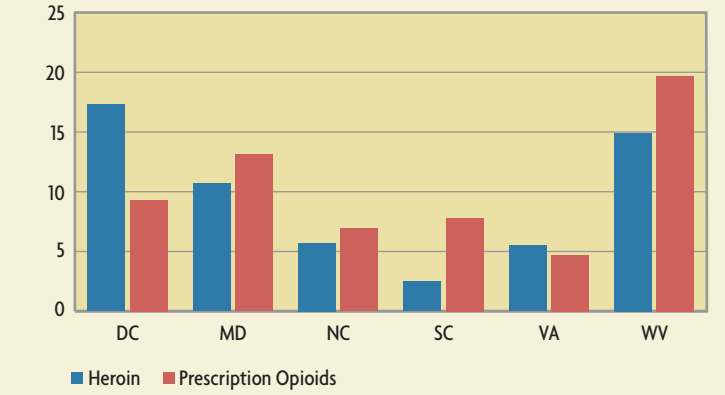
Opioid Overdose Deaths by Type in West Virginia



SOURCE: Centers for Disease Control and Prevention/Kaiser Family Foundation

Drug Overdose Death Rates: Prescription vs. Heroin

Deaths per 100,000 people in 2016



SOURCE: Centers for Disease Control and Prevention

than 81 percent by the end of 2015, although it has since risen to around 82 percent. There are reports that drug use explains much of the decline in labor force participation, and, in fact, many employers report high rates of drug test failure among job applicants. The evidence, however, is mixed.

Most of the work done to disentangle the relationship between opioid use and employment outcomes corroborates the intuition that higher overdose rates and higher prescription rates are correlated with worse employment outcomes. In one of the most cited papers, published by the Brookings Institution in 2017, Alan Krueger of Princeton University reported two major findings. First, in a survey of 571 prime-aged men out of the labor force, 31 percent reported taking prescription pain medication on the previous day. Further, nearly 80 percent of those who took prescription pain medication in the initial survey also reported taking it in a follow-up survey. Second, by linking 2015 county-level opioid prescription rates to individual labor force data in two time periods (1999-2001 and 2014-2016), Krueger finds that labor force participation is lower in areas of the United States with a higher rate of opioid prescriptions and that labor force participation fell more in the 15-year period in areas with a high rate of opioid prescriptions. These results hold when controlling for things like demographics, the share of employment in manufacturing, and fixed characteristics of counties.

Although the relationship between the high level of opioid prescription rates at the outset and sharper declines in labor force participation suggests the possibility of a causal link from opioid prescriptions to employment outcomes, that leap requires, among other things, differences in opioid prescription rates to be independent of factors related to the labor market. For example, both prescription rates and labor force participation rates could be related to, say, workers' health conditions. Krueger himself refers to the results as "preliminary and highly speculative."

Another widely discussed work is that of Anne Case and Angus Deaton of Princeton University published in 2017. They document, among other things, a rise in mortality predominantly among white, non-Hispanic, lower-educated Americans due to drugs, alcohol, and suicide. They refer to these as "deaths of despair," and they narrate, in their words, a "preliminary but plausible story in which cumulative disadvantage from one birth cohort to the next — in the labor market, in marriage and child outcomes, and in health — is triggered by progressively worsening labor market opportunities at the time of entry for whites with low levels of education." With respect to opioids, they argue that the prescription of opioids for chronic pain was not a fundamental factor but added "fuel to the flame," making the epidemic much worse than it otherwise would have been. In other words, the opioid epidemic is a symptom of a larger problem.

The question of whether bad economic circumstances lead to higher opioid use fits into a larger literature that works to understand the effect of changing economic circumstances on health outcomes. The results of these analyses are mixed. Some earlier work by Christopher Ruhm of the University of Virginia suggests that recessions might improve health outcomes because, for example, unemployed people may have more leisure time for physical activity. On the other hand, other researchers have shown a negative effect of individual job displacement on health outcomes. Recently, Kerwin Kofi Charles, Erik Hurst, and Mariel Schwartz of the University of Chicago found that a decline in manufacturing in a local area in the 2000s had large and persistent negative effects on employment rates, hours worked, and wages and that declining local manufacturing employment increased opioid use and

deaths. Further, Ruhm, Alex Hollingsworth of Indiana University, and Kosali Simon of Indiana University reported in a 2017 NBER working paper that increased unemployment in a county increases opioid fatalities. In this paper, however, they do not address the possibility of reverse causality — that is, whether an increase in opioid fatalities has an adverse effect on employment outcomes. In other words, in this economy in which firms struggle to find skilled workers to fill vacancies, is the opioid epidemic further restricting our pool of available labor?

To answer this question, Janet Currie and Jonas Jin of Princeton University and Molly Schnell of Stanford University used quarterly county-level data on opioid prescription rates and employment-to-population ratios and engaged an econometric technique that allowed them to tease out causality. They find no effect of opioids on employment-to-population ratios for men and find that for women, a doubling of opioid prescriptions would lead to a 3.8 percent increase in employment for women in counties with education above the mean and a 5.2 percent increase in employment for women in counties with education below the mean. Thus, they argue that although opioids are addictive and dangerous, they may allow some women to work who would otherwise leave the labor force.

In contrast, Dionissi Aliprantis and Mark Schweitzer from the Federal Reserve Bank of Cleveland — whose Fed district has also been particularly impacted by the opioid crisis — published a working paper in May 2018 that finds evidence that opioid availability does decrease both employment and labor force participation. They do not find that the opioid prescription rate affects the number of unemployed in the same way, but — consistent with anecdotal reports — they do find that opioid prescription levels affect the individual's decision to participate in the labor force at all. In other words, an increase in opioid prescriptions reduces the chance that someone will be employed, but rather than joining the ranks of unemployed, they fall out of the labor force altogether — that is, they stop looking for a job. They also found that opioids reduced participation rates more for prime-aged men in geographies with high prescription rates than in geographies with lower prescription rates. If these results are true, then there are particular implications for West Virginia, which, in addition to having a high rate of opioid prescriptions and drug overdoses, also maintains the lowest labor force participation rate of all states in the country.

So why the different results? The answer is not clear. The two papers used different estimation strategies and different data, and researchers are still working to investigate where the different approaches might have led to different results. There does seem to be a relationship between labor market outcomes and opioid prescriptions, but empirically understanding the nature of that relationship is important to policy determination, and the question of correlation versus causality is still an open one.

Where Do We Go Next?

Much remains to be understood about the crisis and its effects. One area of uncertainty is the quality of the data that we use. Two of the most commonly cited data sources are the National Survey on Drug Use and Health, which relies on self-reporting and excludes the incarcerated or those living on the street, and overdose death rates, which can be understated since many death certificates in drug overdose cases do not specify the drug involved. Furthermore, while the data we have — prescription rates and overdose death rates — might be correlated with the phenomena we are seeking to study, such as misuse, abuse, or nonfatal overdose rates, they are not the same. Better data on misuse and not just deaths would help researchers to better understand the impact of the crisis.

In addition, data limitations thus far require analysis to be done at the county level. Could there be counties where misuse is high among those living there but where prescription rates or overdose rates are low because, for example, the high-prescribing doctors are in neighboring counties or there is less illicit fentanyl on the market? What does data at the county level not tell us about an individual's use of opioids or an individual's relationship to the labor market?

The paper by Currie, Jin, and Schnell brings into question the causal relationship between prescription opioid use and employment-to-population ratios. But they do not address the relationship between heroin use and labor market outcomes; it is not unreasonable to think that while, in many cases, a prescription for opioids might enable a person to keep working, heroin use might be a different story. As the national crisis evolves from a prescription drug epidemic to an illicit drug epidemic, researchers will need to find a way to better understand the relationship between illicit drug use and labor market participation. In other words, there is much left to learn. **EF**