

Did Substance Abuse during the Pandemic Reduce Labor Force Participation?

Jeremy Greenwood, University of Pennsylvania

Nezih Guner, Universitat Autònoma de Barcelona, ICREA, and the Barcelona School of Economics

Karen Kopecky, Federal Reserve Bank of Atlanta and Emory University

Summary:

The labor force participation rates of prime-age US workers dropped in March 2020—the start of the COVID-19 pandemic—and have still not fully recovered. At the same time, deaths from substance abuse were elevated during the pandemic relative to trend, indicating the number of people abusing substances may have increased, and those who abuse opioids and crystal methamphetamine have lower labor force participation rates than those who don't abuse these substances. Could increased substance abuse during the pandemic be a factor contributing to the fall in labor force participation? Estimates of the number of additional people with a substance-use disorder during the pandemic presented in this article suggest that increased substance abuse accounts for between 9 percent and 26 percent of the decline in prime-age labor force participation between February 2020 and June 2021.

Key findings:

1. Substance abuse deaths rose during the pandemic.
2. If increased deaths reflect similar increases in user rates, increased substance abuse can account for between 9 percent and 26 percent of the decline in prime-age labor force participation between February 2020 and June 2021.

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Key words: COVID-19 pandemic, substance abuse, labor force participation

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About the Authors:

Jeremy Greenwood Jeremy Greenwood is a professor of economics at the University of Pennsylvania.

Nezih Guner Nezh Guner is a research professor in the Department of Economics and Economic History at Universitat Autònoma de Barcelona and a research professor at the Barcelona School of Economics.

Karen Kopecky Karen Kopecky is a research economist and adviser at the Federal Reserve Bank of Atlanta and a visiting scholar at Emory University.

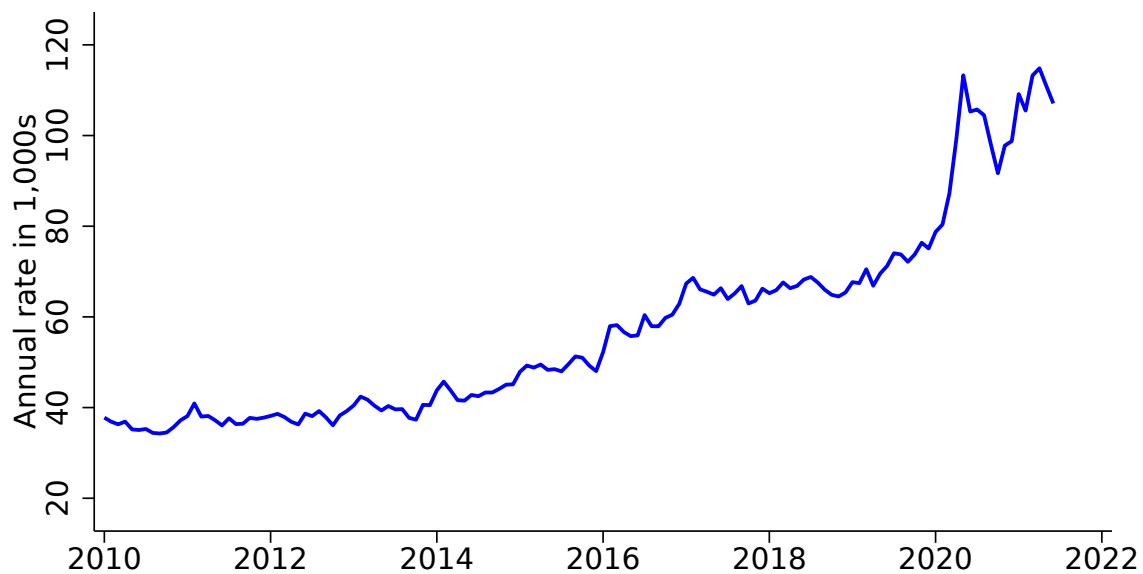
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Comments to the authors are welcome at karen.kopecky@atl.frb.org.

1 Introduction

The COVID-19 pandemic hit the United States during the middle of another major health crisis: the opioid epidemic.¹ The number of overdose deaths from opioids, but also other substances like alcohol and methamphetamine (meth), increased dramatically with COVID-19, leading the *New York Times* to refer to the COVID-19 epidemic as a “national relapse trigger” (Hoffman, 26 March 2020). Figure 1 shows the annual rate of overdose deaths from narcotics, psychostimulants, and alcohol for 25- to 54-year-olds going back to 2010. The increasing trend of overdose deaths jumped substantially in March 2020, the start of the pandemic. Although no data directly measure the increase in substance abuse per se, the increased deaths suggest that substance abuse may have also increased significantly at the start of the pandemic.²

Figure 1: Annual Rate of Substance Abuse Deaths, ages 25–54, January 2010 to June 2021



Note: Substances include narcotics (primarily opioids), psychostimulants (primarily methamphetamine) and alcohol.

Source: Mulligan (2022), Centers for Disease Control database of death certificates

Substance abuse is associated with lower labor force participation and employment. During the 2015–18 period, the labor force participation rate (LFPR) of prime-age workers with an opioid-use disorder is estimated to be 70 percent, 13 percentage points lower than that of those without a substance-use disorder.³ Meth use is associated with an even larger reduction in

¹ Since 2000, more than 500,000 deaths have occurred from opioid overdose. Cutler and Glaeser (2021) provides a review of the extensive empirical literature on the opioid crisis. Greenwood, Guner and Kopecky (2022a) developed a model of opioid abuse to study its driving forces.

² The latest data from the National Survey of Drug Use and Health (NSDUH) was published in October 2021 and covers drug use during 2019.

³ Krueger (2017), Aliprantis, Fee and Schweitzer (2019), Harris et al. (2020) and Powell (2021) exploit

labor force participation. Meth users' LFPR during 2015–18 is estimated to be 67 percent, 16 percentage points lower than that of those without a substance-use disorder.⁴

Taken together, these empirical observations raise the question of whether increased substance abuse during the pandemic might be contributing to the decline in labor force participation.⁵ As figure 2 shows, the LFPR of prime-age workers between ages 25 and 54 declined substantially at the start of the COVID-19 pandemic, and recovery from that decline has been slow. Early in the pandemic, the LFPR dropped by about 3 percentage points, and although two-thirds of that decline has recovered, as of January 2022 the rate is still about 1 percentage point below its prepandemic level.⁶ The straight dashed line in figure 2 shows the trend in labor force participation during the January 2015 to February 2020 period. Assuming the prime-age LFPR would have increased at the same rate absent the COVID-19 pandemic, the LFPR is about 1.6 percentage points below trend. In what follows, we use simple calculations to derive approximate bounds on the magnitude of the increase in substance abuse during the pandemic. We then use these bounds to determine the contribution of higher substance abuse rates to the reduction in labor force participation shown in figure 2.

2 Higher Drug Use during the Epidemic

The rise in overdose deaths during the pandemic is not driven by one particular substance but is the result of a combination of increased death rates from narcotics, psychostimulants, and alcohol. Figure 3 shows the deaths rates associated with overdoses for each type of substance.⁷ The solid blue line in the figure displays monthly deaths from narcotics, which covers various types of opioids such as opium, heroin, fentanyl, and other natural and synthetic opioids, as well as deaths from cocaine. The blue dashed line shows the trend and seasonal narcotic deaths based on the prepandemic period.⁸ The red solid and dashed lines show the death rates, actual

geographic variation in opioid exposure to study its impact on labor market outcomes.

⁴ Estimated LFPRs of people who abuse opioids and meth are based on NSDUH data. See section 3 for details.

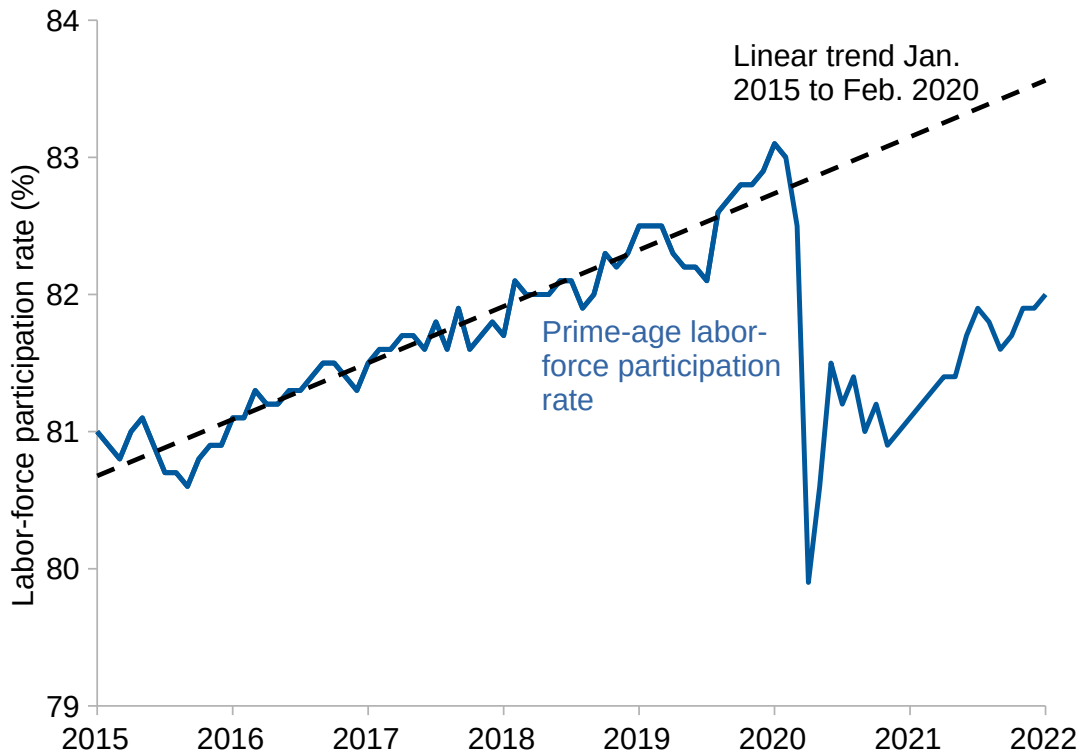
⁵ Another potential source of sluggish labor force recovery is lower responsiveness of the participation rates of younger generations to wage growth, as documented by Hotchkiss (2022).

⁶ After its steady decline since the late 1990s, the LFPR of prime-age workers was trending upward before the pandemic. See Binder and Bound (2019) and Abraham and Kearney (2020) for recent reviews on the decline in labor force participation in the United States.

⁷ Deaths involving multiple substances are double-counted in the figure. However, this double-counting is largely offset by deaths from undetermined substances (not shown in the figure).

⁸ Following Mulligan (2022), the dashed trend plus seasonal lines are determined by regressing the log of deaths from January 1999 to December 2019 on a quartic in time at the monthly frequency and month-of-year dummies. The narcotics regressions also include indicator variables for dates \geq January 2006 and dates \geq January 2016. We see large jumps in narcotics deaths at these dates, which may be due to the increased coverage of prescription drugs, including prescription opioids, through the

Figure 2: Labor Force Participation Rate, Ages 25–54, January 2015 to January 2022



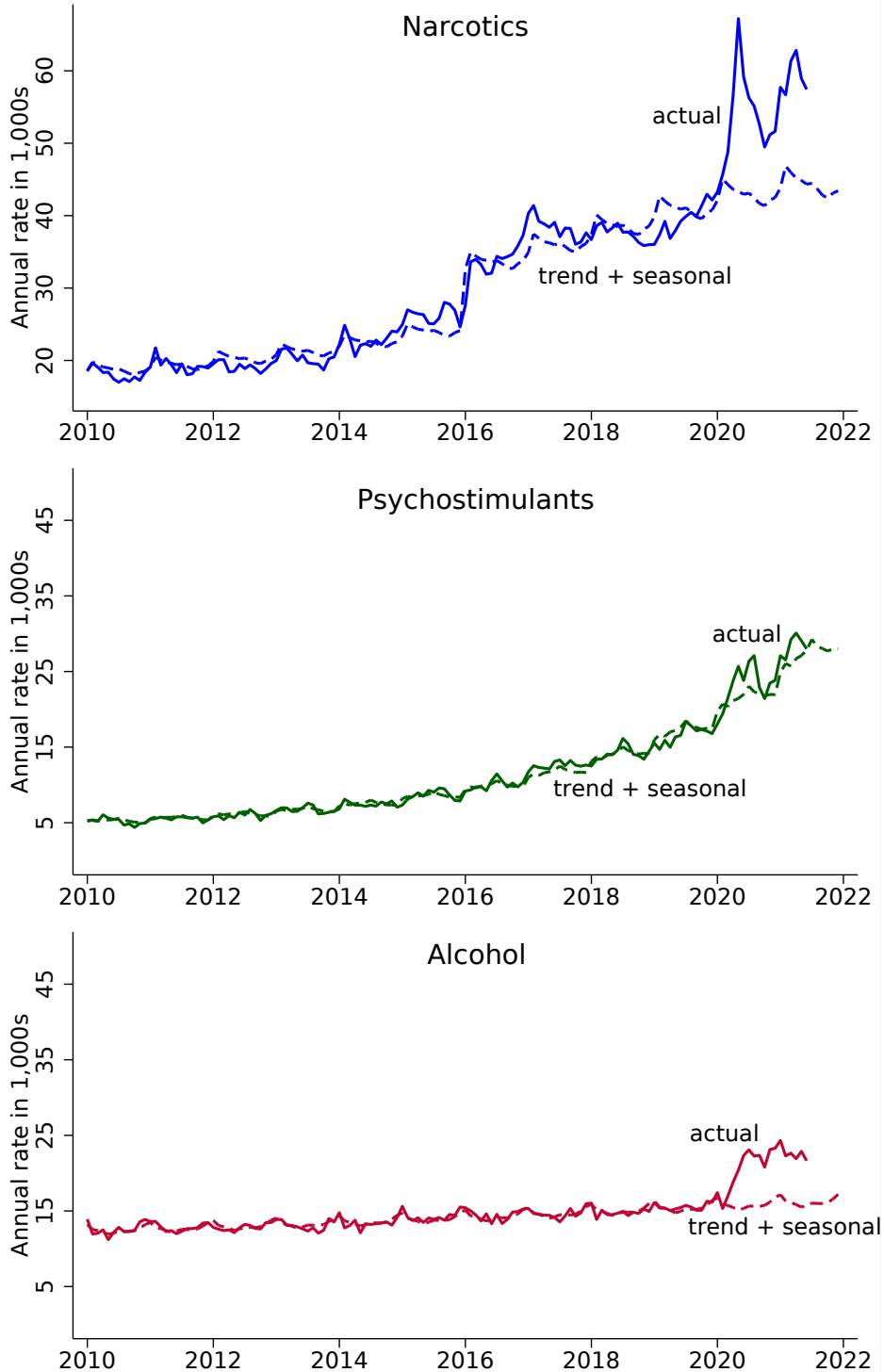
Source: US Bureau of Labor Statistics

and predicted, from alcohol (excluding those associated with drunk driving). Finally, the black lines are deaths from psychostimulants, primarily crystal methamphetamine (meth). Meth deaths have also been higher during the pandemic, although they have not been as elevated relative to their exponentially increasing trend as narcotic and alcohol deaths.

The increase in substance abuse deaths during the COVID-19 pandemic could be the result of an increase in the death rate of people abusing substances, an increase in the number of people with a substance-use disorder, or some combination of the two. Suppose that the death rate of abusers did not change during the pandemic and that an increase in the number of abusers is driving the entire increase in deaths. Why might the number of people abusing substances have increased? There are several potential reasons. Increased anxiety, isolation, joblessness, and other factors caused by the pandemic could have led to an increased desire to abuse drugs, alcohol, or both (Weiner, 2020). For alcohol, the shift to drinking at home from drinking in restaurants and bars reduced the cost per ounce, which might have led to the

introduction of Medicare Part D and the increased availability of fentanyl in the US illicit drug market, respectively. See Mulligan (2022) and Council of Economic Advisers (US).

Figure 3: Annual Rate of Drug and Alcohol Deaths, Ages 25–54, January 2010 to June 2021



Note: Narcotics and psychostimulants are primarily opioids and methamphetamine, respectively. They are selected on MCD codes. Alcohol-induced deaths are selected on UCD codes. Trends use 1999–2019 data and include seasonal factors.

Source: Mulligan (2022), CDC database of death certificates

consumption of greater quantities.^{9,10} During the pandemic, there were also fewer options for spending both time and money. Moreover, like many leisure goods, using drugs and alcohol requires time.¹¹ This factor is especially true when accounting for both the time spent using the substances and the time spent recovering from their use. Given this complementarity between time and the use of drugs and alcohol, declines in the value of time might have effectively led to decreases in the total cost of substance use and, consequently, an increase in use and, ultimately, in the number of people with a substance-use disorder. For many people, once started, drug and alcohol abuse is difficult to stop. For this reason, an increase in substance abuse during the pandemic would lead to higher substance abuse rates even after the pandemic has ended.¹²

The first empirical challenge is to estimate the additional number of people abusing opioids, meth, and alcohol. The number of people abusing a substance can be imputed by dividing the number of deaths by the death rate, which we assume to be constant before and during the pandemic.

The first row of table 1 reports the cumulative number of deaths from opioids, meth, and alcohol between April 2020 and June 2021 for individuals ages 25 to 54.¹³ The second row reports the number of deaths predicted using the statistical model of the prepandemic trend and seasonal components in figure 3. Subtracting the second row from the first row yields an estimate of the additional number of deaths that occurred due to the COVID-19 pandemic. These are reported in the third row. There were 69,342 opioid deaths between April 2020 and June 2021, 14,820 more than prepandemic trends would have predicted. Similarly, there were 2,702 excess meth-related deaths and 7,835 excess alcohol-related deaths. In total during this period, an estimated additional 25,356 drug and alcohol deaths occurred.

⁹ According to the research firm Nielsen, sales of alcohol in stores increased by 27 percent in the United States between mid-March and mid-May 2020 (Valinsky, 26 May 2020).

¹⁰ Mulligan (2022) argues that the shift away from heroin and prescription opioids to fentanyl during the epidemic (discussed below) led to a reduction in the price per morphine milligram equivalent of opioids, which similarly might have led to higher levels of consumption.

¹¹ The notion that the consumption of leisure goods is time intensive is not new. It was used, for instance, by Kopecky (2011) to understand the rise in retirement in the United States in the 20th century.

¹² There is some evidence that additional users drove the increase in opioid deaths during the pandemic. The Center for Disease Control and Prevention (2020), for example, shows that the rise in deaths associated with fentanyl was mainly in Western states, while historically, fentanyl-related deaths were concentrated in the East. Kim et al. (2021), focusing on opioid-related deaths in Illinois, document that during the pandemic a larger fraction of opioid-overdose deaths had no prior opioid use disorder treatment.

¹³ June 2021 is the last month of available data on deaths. The analysis uses opioid overdose deaths, since deaths from cocaine overdose—the remaining part of narcotics—have not experienced a jump during the epidemic.

Table 1: Total Deaths and Imputed Abusers Ages 25–54 by Substance Assuming No Change in the Death Rate Conditional on Abuse, April 2020–June 2021

	Opioids	Meth	Alcohol	Total
<i>Number of deaths</i>				
Actual	69,342	32,363	27,683	129,389
<u>Predicted from trend + seasonals</u>	<u>54,522</u>	<u>29,662</u>	<u>19,848</u>	<u>104,032</u>
Additional deaths	14,820	2,702	7,835	25,356
Prepandemic annual death rate	0.605%	0.266%	0.260%	
<i>Alive with substance-use disorder (1000s)</i>				
Actual	9,166	9,735	8,503	27,404
<u>Predicted from trend + seasonals</u>	<u>7,207</u>	<u>8,922</u>	<u>6,096</u>	<u>22,226</u>
Additional number of abusers	1,959	813	2,406	5,178

Source: Number of deaths: Mulligan (2022), CDC database of death certificates.

Prepandemic death rates: See appendix A.

Given the estimated additional number of substance abuse deaths, we can use the death rate of people with a substance-use disorder to infer the excess change in the number of abusers due to COVID-19. (Recall that we are assuming that, during the pandemic, the death rate of people abusing substances remains unchanged from its prepandemic level.) These death rates, taken from Mulligan (2022), are reported in the fourth row of table 1. The death rate for opioids, about 0.6 percent, is much higher than those for meth and alcohol, about 0.26–0.27 percent. Further details are provided in appendix A.

For each substance, we can infer the number of individuals with a substance-use disorder by simply dividing the number of deaths by prepandemic death rates.¹⁴ As the bottom three rows of table 1 report, more than 27 million prime-age individuals are estimated to have a substance-use disorder, with more than 5 million of these individuals—23 percent of the total—being additional substance abusers above the expected level based on past trend and seasonal effects.¹⁵

¹⁴ Since total deaths are for a 15-month period (April 2020 through June 2021), the annual death rates are multiplied by 15/12.

¹⁵ For alcohol, using deaths of individuals ages 25–54 to impute the number of people with a substance-use disorder likely undercounts the total number of people who abuse alcohol, since many alcohol deaths are not acute. Alternatively, one could use alcohol deaths for all ages assuming they are proportional to the rise in the number of prime-age people who abuse alcohol. Under this assumption, the number of additional prime-age alcohol abusers increases by 4.2 million instead of the 2.4 million reported in table 1.

Table 2: Impacts of Substance Abuse on Labor Force Participation

	Opioids	Meth	Alcohol	Total
LFPR of nonabusers - LFPR of abusers (percentage points)	13.2	16.3	0.0	7.6
<i>Out of labor force due to substance abuse disorder (1,000s)</i>				
Actual	1,211	1,585	0	2,796
<u>Predicted from trend + seasonals</u>	<u>952</u>	<u>1,453</u>	<u>0</u>	<u>2,405</u>
Additional number out of labor force	259	132	0	391

Source for relative LFPRs: NSDUH

3 Substance Abuse and the Decline in LFP

Next we turn to how much substance abuse might lower labor force participation. The first row of table 2 shows the difference between the LFPRs of people who abuse opioids, meth, and alcohol and those who don't. The LFPR differences are simple estimates of the effects of substance abuse on labor force participation calculated from the 2015–18 NSDUH for prime-age individuals who either exhibit a disorder from using a particular substance or do not have a substance-use disorder.¹⁶¹⁷ The NSDUH classifies individuals as misusers of opioids if they use any opioids without a prescription, use them for reasons other than directed by a physician, or use them in greater amounts or more often than prescribed during the past 12 months. Individuals consuming alcohol, heroin, or meth are classified as misusers by default.¹⁸ Misusers are then asked follow-up questions to determine whether they have a disorder. To be labeled as someone with a disorder, substance abuse must interfere with a person's daily life. People with a disorder and abusers are used interchangeably below.

The LFPR of individuals with an opioid-use disorder is 69.7 percent, which is 13.2 percentage points below the prime-age rate of 82.9 percent for individuals who do not have a substance-use disorder. Similarly, the LFPR for individuals with meth-use disorder is 66.7 percent, which is 16.3 percentage points below the rate for individuals without a substance-use disorder. By contrast, there is no difference in LFPRs between those who abuse alcohol and

¹⁶ The National Survey on Drug Use and Health (NSDUH) is an annual nationwide survey that provides national and state-level data on the use of tobacco, alcohol, and illicit drugs (including the nonmedical use of prescription drugs) and the state of mental health in the United States. The survey represents the civilian, noninstitutionalized population of the United States age 12 and over for each state and the District of Columbia (DC). The NSDUH is directed by the Substance Abuse and Mental Health Services Administration (SAMHSA), an agency in the US Department of Health and Human Services (HHS).

¹⁷ The age of respondents in the public-use version of the NSDUH is reported in age ranges. The numbers in table 2 for prime-age, 25–54, individuals are averages of the ratios for age groups 26–49 and 24–64.

¹⁸ This reflects the fact that—in contrast to prescription opioids—a reference, or accepted, level of consumption does not exist.

Table 3: Number of Prime-Age Labor-Force Participants in February 2020 and the Predicted Number in June 2021

	Feb. 2020	June 2021
Population aged 25–54 (millions)	125.95	126.10
LFP 25-54	83.0%	81.7%
Number of 25–54 in LF (millions)	104.54	103.02
Decline in LF from Feb. 2020 (millions)		1.51
Predicted LFP 25–54		83.3%
Predicted number of 25–54 (millions)		105.04
Decline in LF from predicted (millions)		2.02

Source: Population: U.S. Census Bureau. LFPRs: US Bureau of Labor Statistics.

those who don't. Since the data show no impact of alcohol abuse on LFP, the increase in people who abuse alcohol will not have any impact on the number of additional individuals out of the labor force (LF). For each substance, multiplying the estimated number of abusers in table 1 by the difference between the LFPR of alcohol abusers and nonabusers gives an estimate of the number of prime-age individuals who are out of the labor force due to substance abuse. For example, multiplying the 1.96 million additional people with an opioid addiction reported in table 1 by 13.2 percent implies that about 259,000 additional people are not in the labor force due to elevated levels of opioid abuse. The estimates indicate that, collectively, there might be more than 2.4 million prime-age individuals not participating in the labor market due to substance abuse, 391,000 of whom are estimated to be additional nonparticipants due to the elevated levels of substance abuse during the COVID-19 pandemic.

Table 3 summarizes the impact of the COVID-19 epidemic on labor force participation of prime-age workers. There were 1.51 million fewer prime-age individuals in the labor force in June 2021 than in February 2020. The sixth row of the table reports the number of individuals predicted to be in the labor force in June 2021 using the prepandemic trend. Relative to the predicted number of 105.04 million, there were 2.02 million fewer participants.¹⁹ How many of these missing workers might be attributed to drug abuse?

Under the assumption of no change in the death rate of people who abuse substances, the increase in opioid and meth usage during the pandemic might account for a sizable fraction

¹⁹ Labor-force participation levels did not fully recover after June 2021, as figure 2 shows. As of January 2022, the most recent date for which LFPRs are available, the number of prime-age individuals in the labor force is still 0.26 million below the February 2020 level and 2.03 million below levels predicted by the prepandemic trend.

Table 4: Estimated Share of the Decline in the Size of the Labor Force between February 2020 and June 2021 Due to Increased Substance Abuse

	Upper bound	Lower bound
Share of decline from February 2020 level	25.8%	8.7%
Share of decline from predicted June 2021 level	19.4%	6.6%

Source: Authors' calculations.

of the decline in LFPRs. The results are reported as the upper bound estimates in table 4. These shares are determined by taking the estimated 391,000 additional individuals not participating due to a substance-use disorder reported in table 2 and dividing it by the declines in the size of the labor force reported in table 3. The estimates imply that nonparticipants due to elevated substance abuse might account for 25.8 percent of the 1.51 million person decline in the labor force between February 2020 and June 2021, and 19.4 percent of the decline from the predicted June 2021 levels based on the prepandemic trend. Next, we provide a lower-bound estimate assuming that the rise in opioid deaths during the pandemic was the result of increased opioid use of existing people with a substance-use disorder rather than a surge in the number of people with a substance-use disorder.

4 Were Death Rates Constant during the Epidemic?

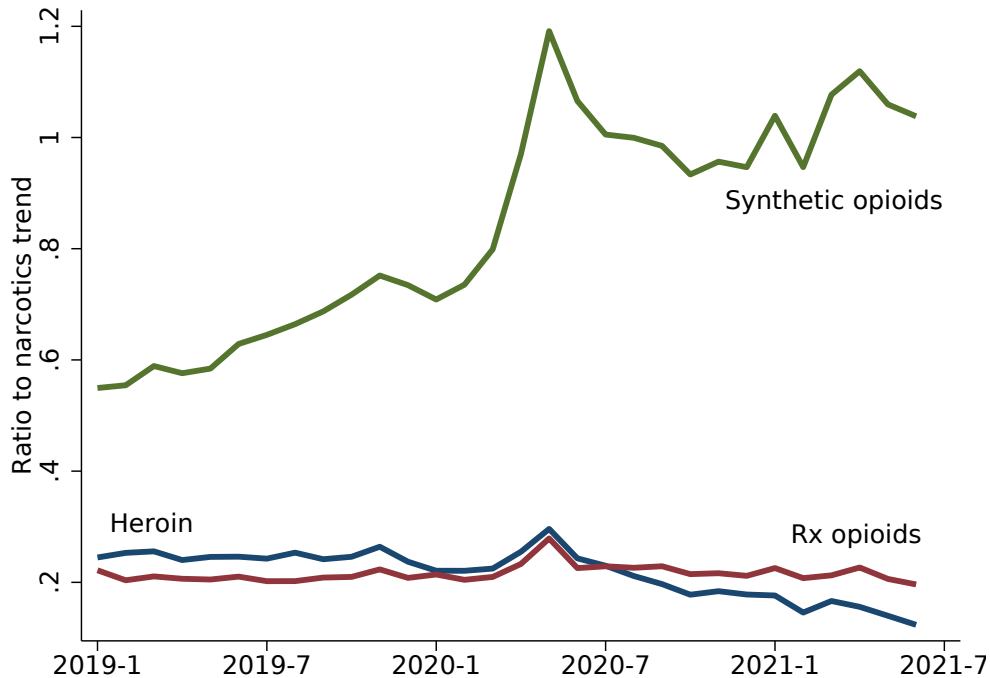
The calculations have so far assumed that the death rate of people with a substance-use disorder was constant during the epidemic. This, of course, is a strong assumption. One concern, for example, might be that medical services for people with substance disorders were less available or effective during the pandemic, which would lower m_t and increase the death rate. Yet, there is no clear evidence that this was the case, at least not for those who had a disorder before the pandemic. In a survey of centers prescribing medication for opioid use disorder (OUD), [Uscher-Pines et al. \(2020\)](#) find that there was a quick move to telemedicine.²⁰ Focusing on patients, [Huskamp et al. \(2020\)](#) also documents that patients with an OUD did not have any trouble with medication refills or clinical visits.

On the other hand, there might be reason to believe that death rates increased during the pandemic as a result of increased fentanyl usage. Figure 4 shows the ratio of heroin, illicit prescription (Rx) opioid, and synthetic opioid (primarily fentanyl) deaths to the overall narcotics death trend for individuals ages 18 to 69. The figure shows that the increase in narcotics deaths was driven by increased fentanyl usage relative to heroin and prescription opioid abuse. Consistently, based on an analysis of a large number of urine samples before and during the epidemic, [Niles et al. \(2021\)](#) find that fentanyl positivity rates increased by more than 50 percent during the pandemic. Since fentanyl usage is associated with a higher death rate than that of heroin and other organic forms of opioids, the rapid increase in fentanyl usage might have led to

²⁰ For a discussion on COVID-19 related measures that waived in-person assessment for the OUD prescriptions, see [Wakeman, Green and Rich \(2020\)](#).

a higher death rate among people with a narcotic addiction.

Figure 4: Deaths Involving Heroin (T40.1), Rx Opioids (T40.2), and Synthetic Opioids (T40.4) Relative to Trend and Seasonal Narcotic Deaths, Ages 18–69



Note: Trend and seasonal (monthly) narcotic deaths are estimated using 1999–2019 data. Source: Mulligan (2022), CDC database of death certificates

Imagine that the number of opioid users did not change and that, instead, all of the additional opioid deaths during the pandemic were driven by a higher death rate of abusers due to a shift in usage from organic opioids to fentanyl. Although this is clearly a very strong assumption, it provides a lower bound on the estimated impact of the increase in substance abuse on LFPRs. If the number of people abusing narcotics did not increase (and synthetic opioids do not inhibit labor supply more than organic ones), then the only impact on LFPRs is from the increase in the number of meth users. According to table 2, the number of additional individuals out of the labor force due to additional meth use during the pandemic is 132,000, which accounts for 8.7 percent of the decline in labor force participation between February 2020 and June 2021 and 6.6 percent of the decline in labor force participation relative to the pre-pandemic trend. The second column of table 4 reports these lower-bound estimates of the effect of increased substance abuse during the pandemic on labor force participation.

5 Conclusion

Using data on substance abuse deaths, we estimate that increased substance abuse during the COVID-19 pandemic accounts for between 9 percent and 26 percent of the decline in prime-age labor force participation between February 2020 and June 2021—a decline that, as of January

2022, has still not fully recovered. Relative to LFPR levels predicted using the prepandemic trend, we estimate that increased substance abuse accounts for from 7 percent to 19 percent of the decline.

These findings indicate that a significant fraction of the decline in labor force participation during the pandemic might be due to an increase in the number of people with a substance-use disorder, a rise likely to have long-lasting effects on the LFPR for two reasons. First, addiction is a very persistent state. For instance, estimates using data from the NSDUH indicate that, conditional on surviving, 96 percent of people abusing opioids will still be abusing them one year later.²¹ Second, labor force participation, if anything, declines with years of substance abuse. Rough estimates using 2015–18 NSDUH data indicate that the LFPR of opioid and meth abusers in their first year of abuse is 5 to 10 percentage points higher than the LFPR of people who have been abusing opioids or meth for more than one year. For both these reasons, it is unlikely that declines in labor force participation due to an increase in the number of individuals with a substance-use disorder will recover any time soon.

²¹ See [Greenwood, Guner and Kopecky \(2022a\)](#) for details on estimated transition rates into and out of opioid addiction.

A Appendix: Prepandemic Death Rates

The death rates reported in table 1 are calculated as follows. Starting with alcohol, in the NSDUH, there were 14.818 million individuals above age 18 with alcohol use disorder in 2018 and 14.504 million in 2019 (Center for Behavioral Health Statistics and Quality (2020), table 5.2.A). In the same years, 37,329 and 39,043 individuals in the same age group died due to alcohol-induced causes. Dividing the average number of deaths in 2018 and 2019 (38,186) by the average number of users (14.661 million) gives an annual death rate from alcohol abuse of 0.26 percent. For the death rate from opioids, Barocas (2018) estimates that 254,127 individuals of all ages experienced opioid disorder in Massachusetts between 2014 and 2015.²² The number of opioid-related overdose deaths for the same years was 1,538. Again, dividing the average number of deaths by the average number of users gives an annual death rate of 0.605 percent. Finally, following Mulligan (2022), deaths from opioid disorder are assumed to be 2.3 times more deadly than meth use disorder; i.e., the death rate for meth is assumed to be 0.605/2.3 percent.

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²² Barocas (2018) uses administrative data to estimate the number of individuals with opioid use disorder, which overcomes potential underreporting of opioid use disorder in the NSDUH.

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