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ORIGINAL RESEARCH

Monthly Trends of Substance Use Among Mainers Receiving Buprenorphine Treatment During the COVID-19 Pandemic

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- Introduction:** Drug-related deaths in Maine increased by 23% in the first quarter of 2020 compared to the last quarter of 2019. Most of these deaths were accidental overdoses involving at least one opioid, and 65% of these deaths were caused by fentanyl, according to the Maine Center for Disease Control and Prevention.
- Methods:** This research explored substance use in Maine during 2020. Among the sample of individuals, 46% were homeless and receiving recovery services at a buprenorphine-assisted treatment program at a federally qualified health center in Maine. Charts of 35 patients were reviewed for emergency room visits and urine drug screens.
- Results:** In the sample, 20% of individuals screened positive for fentanyl, 22% screened positive for methamphetamines, and 20% screened positive for cocaine. In the first month after lockdown, the presence of fentanyl and methamphetamines in urine drug screens doubled compared to before the lockdown. In the months after lockdown, the amounts of fentanyl and methamphetamines in drug screens and the number of emergency room visits increased.
- Discussion:** Examples of Maine's harm-reduction strategies are discussed. These results highlight the urgency to implement more drastic measures statewide, especially among individuals who are homeless and have an opioid and/or a stimulant use disorder.
- Conclusion:** Greater recovery services are required for individuals who are homeless and have a substance use disorder in the aftermath of the pandemic.
- Keywords:** opioid use disorder, stimulant use disorder, overdose-related fatalities, addiction, harm reduction
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Drug-related deaths in Maine increased by 23% in the first quarter of 2020 compared to the last quarter of 2019. Most of these deaths were accidental overdoses involving at least one opioid.¹ This alarming rise in overdose-related fatalities, also seen nationwide, is due, in part, to the increased use of non-pharmaceutical fentanyl and its analogs, as well as the additional burden of psychosocial stress related to COVID-19.¹⁻³ According to the Maine Center for Disease Control and Prevention, almost 83% of drug-related deaths in 2020 were caused by an overdose of an opioid.¹ Of these deaths, 65% were caused by fentanyl, and the remaining were caused by pharmaceutical

opioids, cocaine, methamphetamines, and heroin. The combinations of fentanyl with cocaine or with methamphetamines were particularly fatal.^{1,2} Statewide, the number of opioid overdoses that presented to emergency rooms increased by 17% in 2020 compared to 2019.^{4,5}

Nationally, a record number of over 81,000 individuals died of a drug overdose between June 2019 and May 2020.³ In an analysis of 190 million emergency room visits from 48 states, emergency room visits for mental health conditions, suicidal ideation, drug and opioid overdoses, intimate partner violence, and child abuse and neglect were higher between March and October 2020 compared to the same period in 2019. Despite an overall decrease in emergency room visits due to lockdown restrictions, drug and opioid overdoses

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increased by 16% (drug) and 32% (opioid) in 2020 compared to 2019.⁶

Psychosocial stressors related to COVID-19 disproportionately affect people with substance use disorders.⁷⁻⁹ The distress associated with the pandemic may increase the risk of recurrence of use, overuse, and drug-related fatalities.^{8,10,11} Individuals with a substance use disorder are also more likely to face food and housing insecurity, reduced access to health care, an increased risk of contracting respiratory infections, and worse outcomes from COVID-19.^{7,12-14}

Due to the nationally rising prevalence of opioid use disorder, medication-assisted treatment programs in the primary care setting encourage treatment adherence and access to care.¹⁵ The therapeutic model for such programs with buprenorphine maintenance therapy uses buprenorphine's property as a partial opioid agonist with high affinity at the mu opioid receptor. Buprenorphine also has a safety profile due to its ceiling effect, limiting its misuse and overdose potential. Medication-assisted treatment with buprenorphine and methadone are highly efficacious in promoting patient survival, retention in treatment, and improved psychosocial outcomes among people with an opioid use disorder.¹⁶⁻¹⁸

This retrospective chart review was conducted during the pandemic at a medication-assisted treatment program with a low barrier and a focus on harm reduction. This manuscript presents a preliminary exploration of monthly substance use and emergency room visits among a cohort of individuals who were in recovery for an opioid use disorder.

Figure 1 shows a brief timeline of some of the social distancing and public health measures enacted by the state of Maine during the COVID-19 pandemic in 2020.¹⁹

METHODS

Sample and procedure

I reviewed charts from patients receiving buprenorphine maintenance treatment for opioid use disorder at Penobscot Community Health Center, a federally qualified health center in Maine's Penobscot County. This opioid treatment program is office-based and uses a collaborative care model that includes counseling, individual and group therapy, medication management, and psychiatric evaluations in a primary care setting. A retrospective chart review was conducted on patients enrolled in a buprenorphine-naloxone or extended-release buprenorphine treatment program. Institutional review board approval and Health Insurance Portability and Accountability Act exemption was obtained.

Charts were included if patients (1) were adults at least 18 years old, (2) were receiving sublingual buprenorphine-naloxone (Suboxone) weekly or every two weeks in January 2020 to December 2020, and (3) had a urine drug screen available for each month of 2020.

I reviewed 50 charts of all patients enrolled in the medication-assisted treatment program. Among these charts, 15 were excluded because they did not meet the inclusion criteria, yielding a study sample of 35 charts.

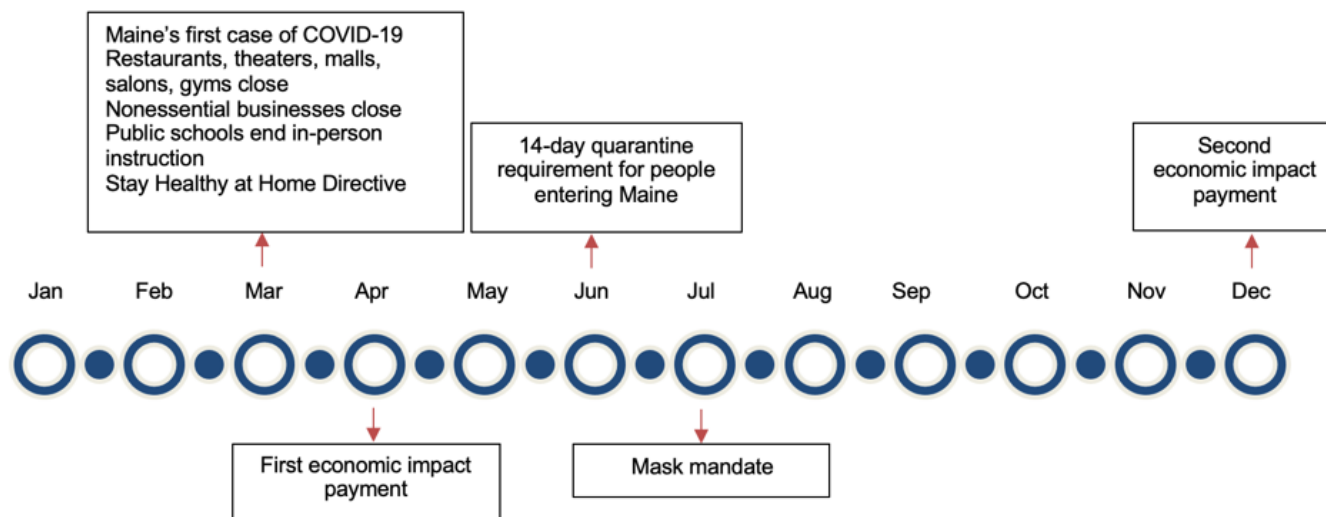


Figure 1. Timeline of Maine's response to the COVID-19 Pandemic

Among the study sample, almost half of individuals (N = 16; 46%) were homeless and living in a homeless shelter or transitional housing. Patients were seen on a weekly, every two weeks, or monthly basis based on clinical evaluation. Doses of Suboxone ranged from 8 to 20 mg.

During every visit, the Patient Health Questionnaire-9 (PHQ-9), a self-reported 9-item scale used to screen for depression,²⁰ was administered. For each month of 2020, I analyzed a urine drug screen, which included a qualitative and quantitative summary of buprenorphine, naloxone, heroin, oxycodone, methadone, cocaine, benzodiazepines, marijuana, methamphetamines, tobacco, alcohol, and fentanyl breakdown products. Charts were also reviewed for the number of emergency room visits per month. Demographic information, housing status, and depression severity scores were obtained.

Data was analyzed using Microsoft Excel, Version 16.52. The percentage of individuals who screened positive for nicotine, marijuana, cocaine, methamphetamines, and fentanyl, and the amounts of each substance, were analyzed by month.

RESULTS

Characteristics of the sample: demographics, substance use, and housing status

Among the sample (N = 35), 60% of individuals identified as male, and 40% identified as female. All individuals identified as White, Non-Hispanic. The average age of individuals was 44 years. Among the cohort, 46% of individuals were homeless, living either in transitional housing or in a homeless shelter. Based on urine drug screens averaged across the 12 months of 2020, 92% of individuals screened positive for nicotine breakdown products, 60% screened positive for marijuana, 22% screened positive for methamphetamines, 20% screened positive for fentanyl, and 20% screened positive for cocaine. Also, 77% of individuals had an average PHQ-9 score that corresponded with moderate-severe depression. (Table 1)

Table 1. Demographic Characteristics, Housing Status, Drug Screen Results, and Depression Among the Sample (N = 35)

Characteristic	No. (%)
Sex	
Female	14 (40)
Male	21 (60)
Non-binary	0 (0)
Age, y	
18-25	0 (0)
25-44	19 (54)
45-64	16 (46)
Race/Ethnicity	
White, Non-Hispanic	35 (100)
Depression severity*	
None (1-4)	4 (11)
Mild (5-9)	4 (11)
Moderate (10-14)	8 (22)
Moderately severe (15-19)	17 (48)
Severe (20-27)	2 (5)
Homeless	
Yes	16 (46)
No	19 (54)
Overall results of urine drug screen†	
Nicotine	32 (92)
Marijuana	21 (60)
Fentanyl	7 (20)
Methamphetamines	8 (22)
Cocaine	7 (20)

*Assessed with the Patient Health Questionnaire-9.

†Averaged over 12 months.

Positive trends in the number of emergency room visits, as well as screenings for fentanyl and methamphetamine, were observed, especially after lockdown. Emergency room visits doubled after March, when lockdown started. The presence of fentanyl in urine drug screens doubled after lockdown and continued to increase in the remaining months of the year. The overall presence of fentanyl increased by 28% between January and December. The presence of methamphetamines in drug screens remained stable following lockdown but dramatically increased in the later part of the

year. Overall, the presence of methamphetamines increased by 200% between January and December. Drug screen results for marijuana, nicotine, and cocaine remained relatively stable during the year without any dramatic changes after lockdown (Figure 2).

Figure 3 outlines the presence of fentanyl in urine drug screens during each month of 2020. Overall, the presence of fentanyl in urine drug screens showed a positive trend. The highest rate was 33% of individuals screening positive for fentanyl in November. Across the 12-month period, 20% of individuals screened positive for fentanyl. The cumulative amount of fentanyl also increased in drug screens over the 12-month period.

Figure 4 outlines the presence of methamphetamine in urine drug screens during each month in 2020. Overall, the presence of methamphetamines in urine drug screens showed a positive trend. The highest rate was 33% of individuals screening positive

for methamphetamines in December. Across the 12-month period, 20% of individuals screened positive for methamphetamines. The cumulative amount of methamphetamine also increased in drug screens over the 12-month period.

DISCUSSION

This study was a preliminary exploration of drug-screen results and emergency room visits among a cohort of individuals in recovery for an opioid use disorder when the social distancing measures related to COVID-19 went into effect. Among this sample, 46% of individuals were homeless, and 77% had a PHQ-9 score²⁰ that corresponded with moderate-severe depression. The psychosocial stress and severity of opioid use disorder puts this group of individuals at high risk for an overdose-related fatality. Because this medication-assisted treatment program is low barrier, focused on harm reduction, and targets the most acute patients, the results should be interpreted with caution.

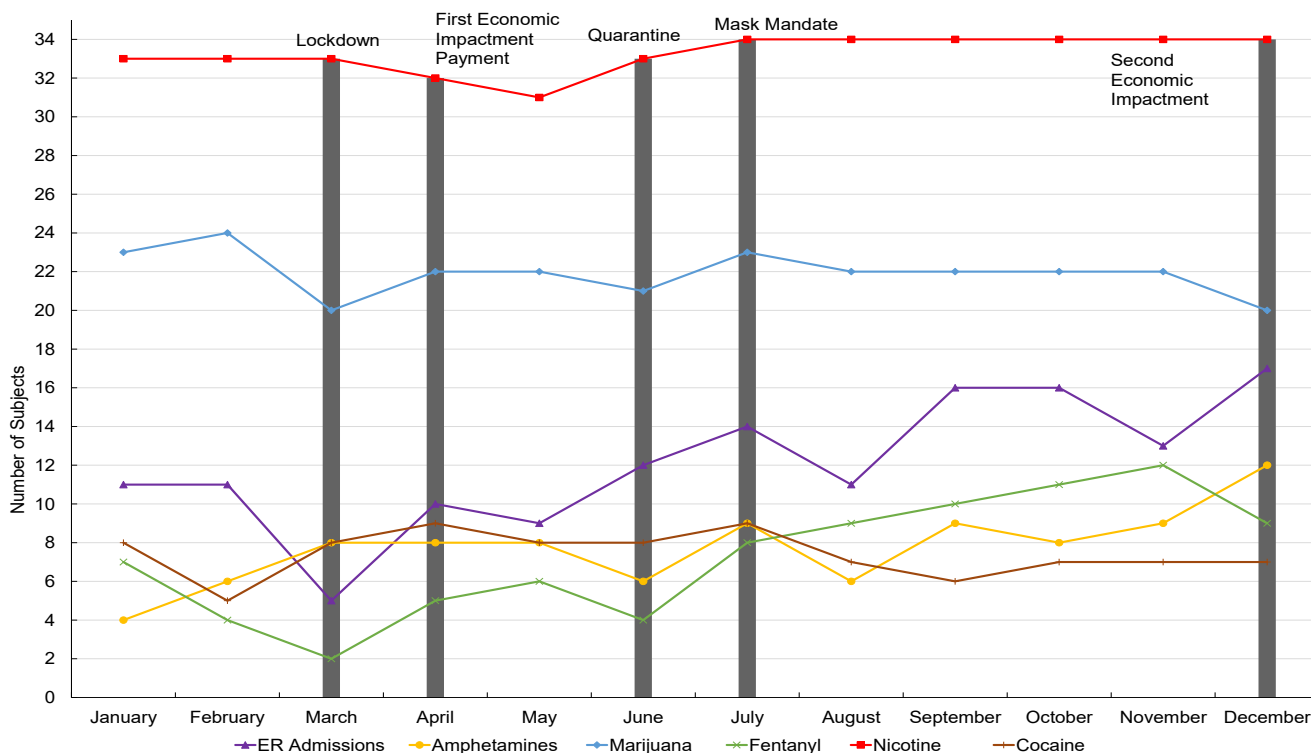


Figure 2. Overall Patterns of Drug Screens and Emergency Room Admissions by Month in 2020. Notable state mandated regulations are indicated with gray lines.

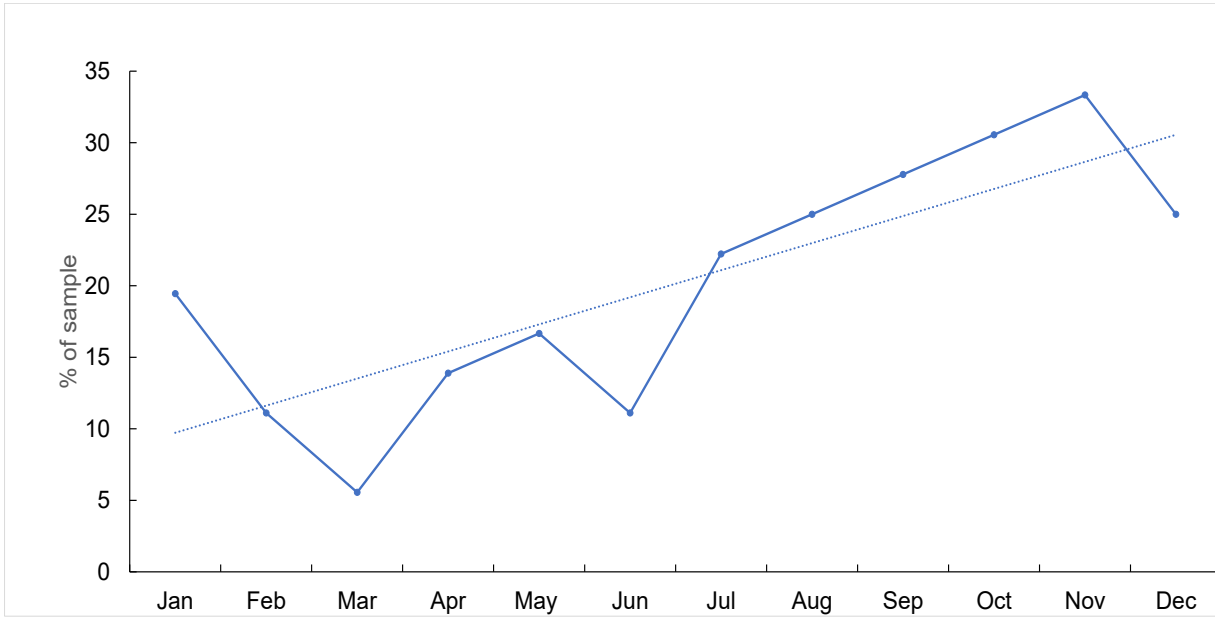


Figure 3. Presence of Fentanyl in Urine Drug Screens by Month

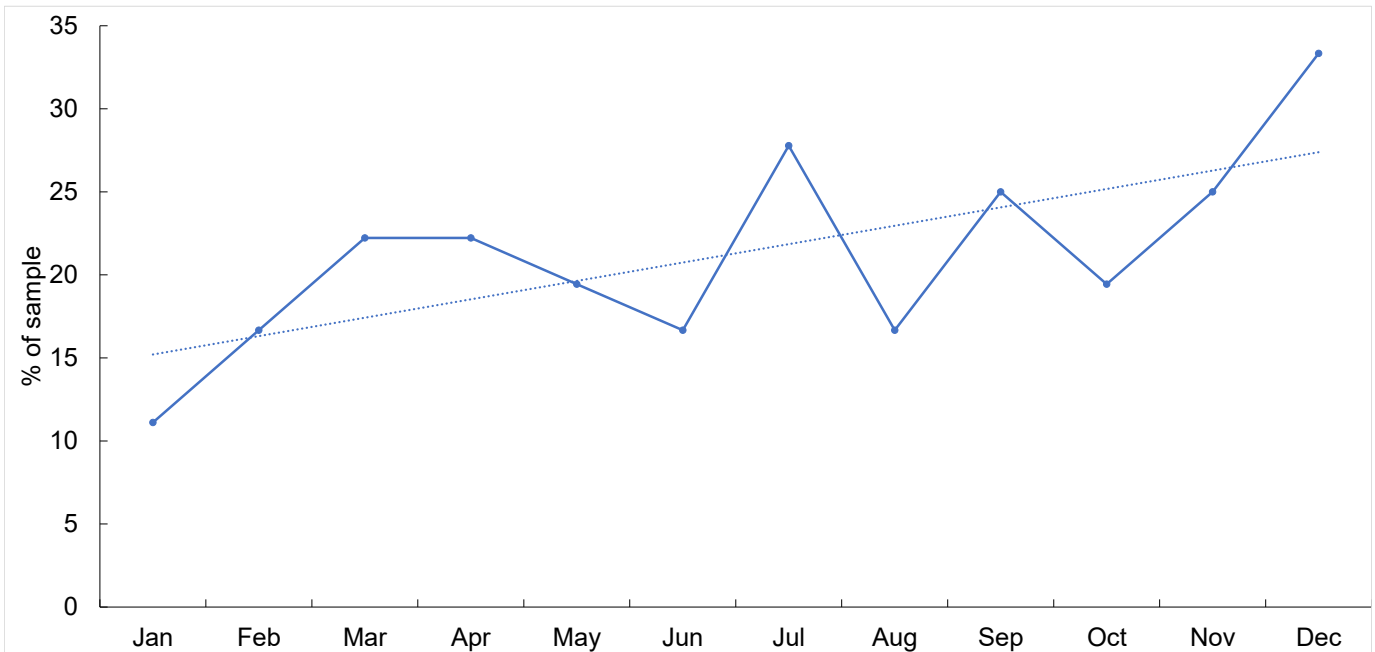


Figure 4. Presence of Methamphetamine in Urine Drug Screens by Month

The following hypotheses may explain, in part, the rising presence and amounts of fentanyl and methamphetamines in urine drug screens following lockdown. First, social support is integral to recovery and treatment of substance use disorders.^{21,22} By playing a protective role in recovery, peer support groups (ie, group-based cognitive behavioral therapy and psychotherapy) promote self-efficacy (ie, one's perception of control over their substance use behaviors).²³ Increased self-efficacy also predicts recovery and reduced substance use.^{23,24} During the pandemic, public health agencies needed to limit group sizes and enact social distancing measures for patient safety. As a result, many recovery services at the clinic were quickly transitioned to telehealth or disrupted. For example, the peer navigator support network, which assists individuals in recovery with housing and transportation to appointments, was disrupted. In addition, using telehealth was a barrier to care for some individuals, especially in Penobscot County's rural areas.^{25,26}

The Maine Center for Disease Control and Prevention reported that the supply of non-pharmaceutical fentanyl and its analogs peaked in 2017 and then gradually declined. However, COVID-19 led to instability in drug supply and unpredictable patterns of substance use.²⁷ Among this cohort of individuals, the presence and amount of fentanyl and methamphetamines in drug screens increased after lockdown, but the presence and amounts of nicotine, marijuana, and cocaine did not change.

Emergency room visits also increased after lockdown. Although the nature of these visits was not characterized, this finding may signal the overall declining health and well-being of this cohort.

Given the substantial risk of overdose-related fatalities associated with fentanyl and methamphetamine use, the results of this study highlight the emergent need for more drastic harm-reduction services statewide and nationwide to protect individuals at risk for drug-related overdoses and fatalities.

Current and future strategies for harm reduction

Overdose-related deaths are a public health emergency in Maine, and the state's Department of Health and Human Services has mandated several harm-reduction strategies. These strategies include

distributing naloxone at opioid treatment programs to minimize the risk of death from an overdose and expanding telehealth to include medication-assisted treatment and counseling. According to Maine's Annual Strategic Action Plan report by the Governor's Office of Policy Innovation and the Future, 55,788 doses of naloxone reversed 1136 opioid overdoses in 2020. Other agenda items include training more recovery coaches and providing medication-assisted treatment within the Department of Corrections to expand treatment to individuals in the state's prison and jail systems.²⁸ Another important initiative undertaken by the state is supporting emergency departments to oversee medication-assisted treatment.²⁸ Individuals who have a substance use disorder and use intravenously are more likely to have hospital admissions for bacteremia, osteomyelitis, soft-tissue infections, endocarditis, and cellulitis.²⁹ Individuals with substance use disorders are up to 3 times more likely to be discharged against medical advice due to undertreated withdrawal syndromes, symptoms of substance use disorder (eg, cravings), and hospital staff having stigma associated with substance use.³⁰ Therefore, more resources should be allocated in Maine for inpatient addiction treatment. In Maine, at the time this manuscript was prepared, 79.94% of the population was fully vaccinated against COVID-19³¹. I urge providers to prioritize administering the vaccine to people who have a substance use disorder, especially those who are also homeless.

Limitations

This study is limited by its small sample size. Only charts that met the inclusion criteria could be analyzed, although a broad inclusion criterion was established to capture more data. No protocol was developed to ensure adherence to buprenorphine maintenance therapy, and the analysis did not consider the amounts of buprenorphine breakdown products present in urine drug screens. Therefore, individuals who did not strictly adhere to maintenance therapy with Suboxone were still included in the results. In addition, this study explored the prevalence of substance use in this highly at-risk group of individuals during the pandemic. In the future, more advanced analysis focusing on polysubstance use and the associated risk of overdose-related death would be informative. Finally, a urine drug screen has limited diagnostic value and does not accurately measure monthly substance use. Instead, the screen can only detect

the presence and quantity of a substance at a given moment in time.

Overall, this cohort is unique. These individuals face a significant burden of psychosocial stress, as almost half of them were homeless, all of them are in recovery for an opioid use disorder, and many of them have a co-occurring stimulant use disorder.

Conflicts of interest: None

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