



Converging public health crises: substance use during the coronavirus disease 2019 pandemic

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Purpose of review

The international, public health crisis caused by the rapid spread of SARS-CoV-2 has resulted in unforeseen medical and psychiatric consequences. We reviewed publications from January 2020 to January 2021, given that earlier documents were not relevant, to review findings on changes in substance use and overdoses during the pandemic. Additionally, this review of the literature also documents advocacy efforts, health service modification and challenges, as well as COVID-related health complications associated with substance use.

Recent findings

Recent work focused on identifying changes in the distribution and use of substances as well as the unique challenges to promoting the health of persons who use substances in the current pandemic. Although COVID-19 has triggered unprecedented innovations in the organizational and public policy, the use of certain substances (alcohol, cannabis, cigarettes, fentanyl, heroin, and opiates) is increasing internationally. Unique associations between substance use and pandemic-related adverse health outcomes were identified. In addition, the pandemic precipitated significant barriers and disruptions to care.

Summary

Given increased overdose rates and infections among people who use drugs, continued surveillance and vigilance are needed to assess changes and reduce use and adverse consequences during the continuing COVID-19 crisis. Changes are urgently needed to reduce adverse health outcomes because of treatment barriers and lack of adequate treatment options. Additionally, integrative approaches are necessary to promote the public health of persons who use substances.

Keywords

barriers to care, coronavirus disease 2019, opioids, overdose, substance use

INTRODUCTION

Coronavirus disease 2019 (COVID-19) has affected all aspects of our lives. Worldwide efforts to reduce the risk of drug overdoses and other adverse health outcomes among persons who use substances have been stopped, blocked and/or impeded. Unfortunately, the time lag in catching drug signals and their reporting makes it difficult to estimate the extent of the problem. Given our review of literature published during the first year of the pandemic, here we report on findings regarding the use of substances during the international spread of severe acute respiratory syndrome coronavirus 2.

Approximately 67 000 individuals in the United States died because of an overdose in 2018 [1]. Overdose fatality rates associated with heroin, methadone, and certain opioids experienced a reduction compared with the year prior [1]. However, rates of overdose fatalities associated with synthetic opioids sans methadone, cocaine, and

stimulants, which may be used in a way, which could cause harm increased from 2017 to 2018 [1]. Thus, prompt action may be needed to ensure that fatal overdose rates continue to decline during the pandemic. However, implementation of public health interventions to reduce incidence of COVID-19 may have unintended health consequences for persons who use substances. For instance, South Africa's initiative placing individuals who are homeless in temporary housing may reduce their risk for

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KEY POINTS

- The current COVID-19 pandemic may be associated with increased use of alcohol, cannabis, cigarettes, fentanyl, heroin and opiates, although not every study found an increase in use.
- Persons who use substances may be at an increased risk for mortality or for hospitalization for adverse COVID-related events.
- Implementations of government-mandated policies, specifically stay-at-home orders, may be associated with increases in overdoses.
- Despite efforts to increase accessibility to substance use treatment options, several treatment barriers (e.g. closure or reduction of services) remain, which may negatively impact the health and wellbeing of persons who use substances during the COVID-19 pandemic.

coronavirus exposure as well as their ability to obtain substances [2[■]]. Temporary abstinence could result in tolerance reversal; these individuals may be at an increased risk for drug overdose if they resume their prior dosage [2[■]]. Other adverse COVID-related health outcomes may be because of sociodemographic disparities, homelessness or housing insecurity, poverty or limited financial resources, social isolation, worsening mental or physiological health, reduced access to care, and unemployment or unstable employment. Persons who use substances may also be susceptible to changes in drug supply, accessibility, or cost. Thus, these dual epidemics require intensive and continuous monitoring to examine the impact of the COVID-19 pandemic on persons who use substances. The current review will describe changes in the use of substances during the pandemic, and specifically, the increase in overdose risks during the pandemic. We will highlight pandemic-caused health service modifications and COVID-related outcomes associated with substance use. Moreover, advocacy efforts in response to the pandemic will be elucidated.

CHANGES IN SUBSTANCE USE DURING CORONAVIRUS DISEASE

In response to COVID-19, changes in substance use and use disorder have been observed worldwide. Among many populations, an increased risk for substance use and use disorders was identified. In China, nearly a third (32.1%) of individuals who reported regular alcohol ingestion divulged an increase in use [3[■]]. Relapses of alcohol consumption and cigarette smoking behaviors were seen among some persons who disclosed prior,

pre-COVID-19 abstinence from these substances [3[■]]. For Russian and Israeli students who disclosed substance use before the pandemic, alcohol, cannabis, and cigarette use rose [4[■]]. The proportion of Czech adults who reported weekly binge drinking behaviors increased during the COVID-19 pandemic [5[■]]. Among an Italian sample of adults with a history or current substance use disorder and/or gambling disorder, Martinotti *et al.* [6[■]] found that patients who resided in their homes during the lockdown reported a significantly higher mean craving level than patients in residential programs.

COVID-19 may also have directly or indirectly impacted substance use patterns in other countries. An upsurge in the frequency of days in which alcohol was consumed by Canadian adolescents was observed [7[■]]. However, use of cannabis, vaping, and binge drinking declined [7[■]]. A cross-sectional study in the United States revealed that a majority (60%) of participants reported a rise in alcohol consumption during the pandemic vs. prior to COVID-19 [8[■]]. These findings were supported by Boschuetz *et al.* [9[■]] who found that, among persons who consume alcoholic beverages, frequency and daily amount of use significantly rose after establishment of social distancing measures compared with preimplementation of social distancing guidelines. In an Italian city, a significant jump was observed in the number of emergency department visits for individuals between 13 and 24 years of age who used alcohol in a way, which may cause harm [10[■]]. This increase was seen when comparing emergency department visit frequencies during the COVID-related lockdown vs. after reopening [10[■]]. Changes in substance availability could offer insight into substance use and use disorders during the pandemic [11[■]]. In the United States, one study found that increased availability of alcohol, boredom, and elevated stress may contribute to increased alcohol consumption [8[■]]. However, a decline in binge drinking behaviors was observed [9[■]], perhaps because of less opportunity to socialize. Additionally, Niles *et al.* [12[■]] revealed that the positivity rate of drug tests significantly rose for nonprescribed use of heroin, marijuana, fentanyl, and opiates during the pandemic vs. pre-COVID-19.

Substance use and use disorders during the COVID-19 pandemic are particularly concerning for populations, which may experience marginalization. McKnight-Eily *et al.* [13[■]] postulated that nearly a fifth (18.2%) of adults were estimated to increase or begin using substances in April to May 2020 [13[■]]. Approximately a third (36.9%) of Hispanic or Latino adults in the United States were estimated to begin or increase substance use [13[■]]. This was more than twice the weighted prevalence

estimate for non-Hispanic White adults [13[¶]]. Additionally, individuals with a substance use disorder and HIV were significantly more likely to be surrounded by other persons who use substances as well as miss at least two doses of HIV antiretroviral therapy per week during the pandemic vs. prior to COVID-19 [14[¶]]. Moreover, mean confidence scores regarding maintenance of sobriety significantly dropped during the pandemic [14[¶]]. This suggests that certain populations may be at a greater risk for increased substance use or negative health outcomes during the pandemic.

Given the importance of these findings that substance use increased during COVID-19 for some, the provocative finding of an increase in craving among residential patients, which is strongly predictive of both misuse and relapse, and the increase in poisoning/overdose, surveillance of trends in substance use is critical. Whether or not such surveillance will continue to be necessary postpandemic is almost a moot point. With authorities changing regulations and laws, and with suppliers creating new formulations, ongoing, real-time surveillance is always required.

OVERDOSE RISK

COVID-19 may influence the methods in which individuals use substances and their risk for fatal and nonfatal overdoses. When contrasting median emergency department rates from 2019 and 2020, data from the Centers for Disease Control and Prevention's National Syndromic Surveillance Program revealed a significant increase in overdoses for opioids and for all substances in 2020 compared with 2019 [15[¶]]. Additionally, National Emergency Medical Services Information System (NEMSIS) data found that rates of overdose-related cardiac arrests

per emergency medical services activations were elevated in 2020 compared with 2019 and 2018 [16^{¶¶}]. A spike in emergency department visits for nonfatal opioid overdoses was observed when comparing data from March to June of 2019 vs. 2020 [17[¶]]. However, Rosenbaum *et al.* [18[¶]] found a reduction in opioid overdoses after Philadelphia's shelter in place order was put into effect vs. prior to its implementation.

Prior work also examined differences in overdoses prior to and after the implementation of stay-at-home orders (SAHOs) and other government-mandated lockdowns. When comparing emergency medical service data prior to and after Indianapolis's SAHO, service calls related to overdoses and deaths because of overdoses both increased [19[¶]]. Opioid overdose-related runs by emergency medical services also rose in Kentucky after the SAHO was implemented [20[¶]]. The SAHO in Philadelphia was associated with an increase in the mean number of unintentional fatal opioid overdoses per month for non-Hispanic Black people [21[¶]]. In New Zealand, a significant increase was observed in the percentage of patients arriving to one emergency department with an overdose in the mandated lockdown compared with before the lockdown [22^{¶¶}]. The proportion of individuals presenting with self-harm behaviors also significantly rose [22^{¶¶}]. These findings supported simulations, which Linas *et al.* [23] performed, investigating overdose mortality among individuals with opioid use disorder in Massachusetts. When comparing simulated scenarios with various durations of physical distancing protocols to a simulation without the pandemic, overdose rates were predicted to be greater in all scenarios with COVID-19 [23]. Examples of substance use patterns at differing stages of the pandemic as reported in the United States are detailed in Table 1.

Table 1. Examples of substance use patterns during differing phases of the coronavirus disease 2019 pandemic as reported in the United States

Phase of COVID-19 pandemic	Examples of substance use during the pandemic
Mid-March 2020 to April 2020 (social distancing guideline initiation to survey distribution)	Compared with presocial distance guideline initiation, prevalence of persons who endorsed binge-drinking decreased, and percentage of individuals who disclosed alcohol abstinence increased [9 [¶]].
Mid-March 2020 to mid-May 2020	Positivity rates in drug tests rose for opiates, heroin, fentanyl, and marijuana and declined for benzodiazepines and gabapentin compared with pre-COVID-19 [12 [¶]].
April 2020 to May 2020	Nearly a fifth of adults were estimated to begin or increase use of substance(s) [13 [¶]].
April 2020 to June 2020	Compared with a year prior, mean number of nonfatal and fatal opioid overdoses decreased for non-Hispanic whites and increased for non-Hispanic blacks in Philadelphia [21 [¶]].
May 2020	Approximately 6 out of 10 adults disclosed increased alcohol consumption in comparison to pre-COVID-19 [8 [¶]].

COVID-19, coronavirus disease 2019.

Overdoses may also influence development and progression of COVID-19. In New York, a prior nonfatal overdose was significantly associated with a positive COVID-19 test, hospitalization, and mortality [24¹¹]. Individuals in Canada who had a history of an overdose had an increased likelihood of having a risk factor for developing serious COVID-related health issues [25¹²].

BARRIERS AND MODIFICATIONS TO HEALTH SERVICES

Some publications addressed the structural and individual-level barriers to care as well as the organizations' response to these challenges. Although individuals with a history of an overdose or any substance use disorder could be more likely to experience a COVID-related admission to an ICU [24¹¹], persons who use substances may be unfamiliar with available resources, which could mitigate risk for harmful health consequences because of substance use in the pandemic. In three Norwegian cities, only a fourth (24.3%) of interviewees who use substances endorsed knowledge of COVID-19 services for persons who use drugs [26]. This lack of knowledge is compounded by the decline of services and programs for substance use treatment and management during the pandemic. North American Syringe Exchange Network (NASEN) data revealed that syringe service programs reported a reduction in medication and treatment services [27¹³]. Closures of syringe service programs sites during COVID-19 were also reported [27¹³]. Layoffs and reductions in hours were disclosed by staff of primary care clinics with the capability to treat opioid use disorder [28¹⁴]. Additionally, Niles *et al.* [12¹⁵] observed a reduction in the weekly quantity of drug tests performed on urine specimens after mid-March 2020.

In addition to structural challenges, other barriers to providing adequate and timely substance use treatment may include patient-level factors. A cohort study identified an increase in the proportion of patients seen by the Tucson Fire Department who refused transport to emergency departments during COVID-19 vs. pre-COVID-19 [29¹⁶]. Among patients who received naloxone, the refusal rate more than doubled from before vs. during the pandemic [29¹⁶]. This suggests that a myriad of challenges may be present, limiting the ability for persons who use substances to be able to receive appropriate treatment and management resources for their substance use.

To combat these challenges, some policy changes have already been established and implemented at an organizational level to provide necessary treatment and services to persons who use

substances. For instance, several syringe services programs in the United States offered information on how they pivoted to continue to provide harm reduction during the pandemic by offering delivery or mail services for persons who inject drugs [27¹³]. Some harm reduction centers increased their operating hours per week during Spain's state of alarm [30¹⁷]. Other COVID-related adaptations may include offering virtual appointments, modifying outreach efforts, and lengthening prescription durations [28¹⁴]. Reducing or eliminating toxicology screenings were also discussed [28¹⁴,31].

CORONAVIRUS DISEASE-RELATED OUTCOMES

Despite these changes in substance use patterns internationally, conflicting evidence is present regarding associations between COVID-19 positivity and substance use. A retrospective study of emergency department admissions who underwent COVID-19 testing found that the odds of a patient testing positive for coronavirus was lower if they had a history of using alcohol or other substances in a way, which may cause harm [32¹⁸]. However, electronic health record data gathered from more than 350 hospitals in the United States suggested that a past-year substance use disorder diagnosis significantly increased the likelihood that a patient would be diagnosed with COVID-19 [33¹⁹]. Among individuals with a past-year substance use disorder diagnosis, the risk for receipt of a COVID-19 diagnosis was highest among patients who disclosed an opioid use disorder [33¹⁹]. These risk levels were greater for patients who identified as African American than for those who identified as white [33¹⁹].

Additionally, associations were seen between substance use disorders and negative health outcomes for individuals with COVID-19 [24¹¹,33¹⁹]. The mortality rate for patients who were diagnosed with coronavirus and reported a substance use disorder in their lifetime was higher than the mortality rate for all patients with COVID-19 [33¹⁹]. Significant differences in these mortality rates were observed when comparing people reporting African American 'race' to white 'race' [33¹⁹]. These findings supported the work of Allen *et al.* [24¹¹] who found that the unadjusted odds of death were 57% higher if the patient reported a history of any substance use disorder but, after adjusting for the patient's age, comorbid conditions, sex, and racial identity [24¹¹], this association was no longer statistically significant. However, people were significantly more likely to be admitted to the hospital when COVID-19-positive if they disclosed a history of any substance

use disorder, alcohol use disorder, cannabis use disorder, or opioid use disorder [24[■]].

ADVOCACY

COVID-19 resulted in detrimental health implications for populations worldwide. Early in the pandemic, authors attempted to forecast problems from the pandemic among people who use drugs. These authors wrote to support efforts to empower people who use drugs to receive adequate treatment to revise substance management services for challenges related to mitigation, or to suggest ways to reduce risk of COVID exposure. Guidance was provided to people who use substances through the International Network of People who Use Drugs [34]. This organization offered advice on techniques to lessen the risk of coronavirus transmission during substance procurement and use [34] and advocated for policy changes to reduce harm related to substance use [35[■]].

Health professionals and organizations were also urged to change their practice during COVID-19. Mackolil and Mackolil [36] advised mental health providers to consider COVID-related stress and frustration, feelings of hopelessness, maladaptive-coping strategies, and changes in drug availability when planning treatment for mental health and substance use disorders. Stowe *et al.* [2[■]] encouraged implementation of overdose prevention programs and increased naloxone provision, especially to community members dependent on opioids. In addition to increased community access to harm-reduction strategies, structural changes to foster greater methadone and buprenorphine utilization were proposed [37]. Modifying regulations for buprenorphine-prescribing practices, distributing federal funds to promote treatment accessibility, and facilitating methadone provision through pharmacies were promoted [37]. To limit in-person contact and increase access to care during the pandemic, modifications to the treatment and management of substance use and use disorders were suggested to minimize risk of SARS-COV-2 transmission [37]. These authors anticipated problems caused by the pandemic that might affect people who use drugs and advocated for changes to reduce negative effects.

CONCLUSION

Although the COVID-19 pandemic has prompted innovations in the care and treatment of persons who use substances [31], continued surveillance is urgently needed to examine trends in substance use patterns during the pandemic. Published research in

the past year discussed the rising prevalence of substance use around the world [3[■],4[■],6[■],7[■],8[■]] and suggested that individuals who use substances may be at an increased risk for COVID-19 [32[■],33[■]]. Implementation of stay-at-home orders were associated with increased overdose rates [19[■]–21[■]]. In addition to differences in substance use and overdose rates, systematic and individual barriers to care increased because of pandemic mitigation efforts [11[■]] including closures/reductions in treatment or management services [12[■],27[■]] and difficulty finding out about/unfamiliarity with available resources [26]. Treatment disruptions related to COVID-19 may have profound effects on the physiological and psychiatric wellbeing of persons who use substances [36]. Thus, a timely and increasing need is present to assess international trends in substance use and overdoses among these marginalized populations during the pandemic. This work could be critical in guiding policy development to ensure identification and implementation of integrative and evidence-based strategies to promote public health in the shadow of these converging epidemics.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES AND RECOMMENDED READING

Papers of particular interest, published within the annual period of review, have been highlighted as:

- of special interest
- of outstanding interest

1. Hedegaard H, Miniño AM, Warner M. Drug overdose deaths in the United States, 1999–2018. *NCHS Data Brief* 2020; (356):1–8.

2. Stowe MJ, Scheibe A, Shelly S, Marks M. COVID-19 restrictions and increased risk of overdose for street-based people with opioid dependence in South Africa. *S Afr Med J* 2020; 110:12939.

This letter to the editor cautions on the potential unintended impacts of the COVID-19 pandemic on overdose rates.

3. Sun Y, Li Y, Bao Y, *et al*. Brief report: increased addictive internet and substance use behavior during the COVID-19 pandemic in China. *Am J Addict* 2020; 29:268–270.

This study suggested that alcohol drinking or cigarette smoking behaviors increased among some persons who regularly drink alcohol or smoke cigarettes, respectively.

4. Yehudai M, Bender S, Gritsenko V, *et al*. COVID-19 fear, mental health, and substance misuse conditions among university social work students in Israel and Russia. *Int J Ment Health Addict* 2020; 1–8; <https://doi.org/10.1007/s11469-020-00360-7>.

Researchers found that some students who used alcohol, cannabis, or cigarettes before the pandemic disclosed an increase in use during COVID-19.

5. Winkler P, Formanek T, Mlada K, *et al*. Increase in prevalence of current mental disorders in the context of COVID-19: analysis of repeated nationwide cross-sectional surveys. *Epidemiol Psychiatr Sci* 2020; 29:e173.

Adults from the Czech Republic participated in computer-assisted interviews via the web or telephone to examine the percentage of individuals with a mental health or substance use disorder. When comparing 2017 to 2020 data, the prevalence of any type of mental health disorder, anxiety disorder, and suicidality rose whereas alcohol use disorders declined.

6. Martinotti G, Alessi MC, Di Natale C, *et al*. Psychopathological burden and quality of life in substance users during the COVID-19 lockdown period in Italy. *Front Psychiatry* 2020; 11:572245.

Researchers found that, although mean substance craving levels were relatively low, residents of an inpatient facility reported lower levels of craving than individuals who sought treatment on an outpatient basis and were isolated in their homes.

7. Dumas TM, Ellis W, Litt DM. What does adolescent substance use look like during the COVID-19 pandemic? Examining changes in frequency, social contexts, and pandemic-related predictors. *J Adolesc Health* 2020; 67:354–361.

This study utilized a survey to examine changes in the use of alcohol, cannabis, and vaping products among a sample of Canadian adolescents after implementation of social distancing guidelines. The results suggested that although the proportion of adolescents who disclosed cannabis use, binge drinking practices, and vaping behaviors declined, nearly a fourth (23.6%) of participants endorsed in-person substance use with peers during the pandemic.
- 8. Grossman ER, Benjamin-Neelon SE, Sonnenschein S. Alcohol consumption during the COVID-19 pandemic: a cross-sectional survey of US adults. *Int J Environ Res Public Health* 2020; 17. <https://doi.org/10.3390/ijerph17249189>.

Through examining alcohol use behaviors in the COVID-19 pandemic, the researchers found that nearly half (45.7%) of adults (21+ years of age) reported increasing alcohol use after COVID because of increased feelings of stress.

- 9. Boschuetz N, Cheng S, Mei L, Loy VM. Changes in alcohol use patterns in the United States during COVID-19 pandemic. *Wmj* 2020; 119:171–176.

This work found that the percentage of individuals who disclosed any binge drinking behavior decreased after the implementation of social distancing practices.

- 10. Grigoletto V, Cognigni M, Occhipinti AA, *et al*. Rebound of severe alcoholic intoxications in adolescents and young adults after COVID-19 lockdown. *J Adolesc Health* 2020; 67:727–729.

This retrospective study revealed an increase in emergency department visits associated with alcohol abuse when comparing Italy's re-opening period to a year prior in a sample of adolescents and young adults.

- 11. Arya S, Gupta R. COVID-19 outbreak: challenges for addiction services in India. *Asian J Psychiatr* 2020; 51:102086.

This letter to the editor discussed some barriers to providing effective substance use treatment services to residents of India, including limited public transport, changes in alcohol availability, and uncertain telehealth service acceptability.

- 12. Niles JK, Gudín J, Radcliff J, Kaufman HW. The opioid epidemic within the COVID-19 pandemic: drug testing in 2020. *Popul Health Manag* 2021; 24(S1):S43–s51.

The findings of this study indicated that compared with before the pandemic, significant increases were observed in positivity rates for heroin, fentanyl, and opiates during the pandemic.

- 13. McKnight-Eily LR, Okoro CA, Strine TW, *et al*. Racial and ethnic disparities in the prevalence of stress and worry, mental health conditions, and increased substance use among adults during the COVID-19 pandemic - United States, April and May. *MMWR Morb Mortal Wkly Rep* 2021; 70:162–166.

Researchers observed that nearly a fifth (18.2%) of adults endorsed beginning or increasing substance use in April to May 2020; however, this prevalence rate varies by racial/ethnic identity.

- 14. Hochstatter KR, Akhtar WZ, Dietz S, *et al*. Potential influences of the COVID-19 pandemic on drug use and HIV care among people living with HIV and substance use disorders: experience from a Pilot mHealth intervention. *AIDS Behav* 2021; 25:354–359.

This study suggested that participants were twice as likely to use illicit drugs, such as cocaine, heroin, prescription opioids, and so forth, during the COVID-19 pandemic in comparison with prior to the pandemic.

- 15. Holland KM, Jones C, Vivolo-Kantor AM, *et al*. Trends in US emergency department visits for mental health, overdose, and violence outcomes before and during the COVID-19 pandemic. *JAMA Psychiatry* 2021; 78:372–379.

Researchers described trends in emergency department visits for opioid overdoses from December 2018 through September 2020.

- 16. Friedman J, Beletsky L, Schriger DL. Overdose-related cardiac arrests observed by emergency medical services during the US COVID-19 epidemic. *JAMA Psychiatry* 2020; 78:562–564.

National Emergency Medical Services Information System data was utilized to examine cardiac arrests attributed to overdoses in the United States. A rise in cardiac arrests attributed to overdoses was observed during the pandemic.

- 17. Ochalek TA, Cumpston KL, Wills BK, *et al*. Nonfatal opioid overdoses at an urban emergency department during the COVID-19 pandemic. *JAMA* 2020; 324:1673–1674.

This research letter described an increase in nonfatal overdoses related to opioids in an emergency department when comparing March to June 2019 vs. March to June 2020 data.

- 18. Rosenbaum J, Lucas N, Zandrow G, *et al*. Impact of a shelter-in-place order during the COVID-19 pandemic on the incidence of opioid overdoses. *Am J Emerg Med* 2021; 41:51–54.

The researchers observed that the proportion of opioid overdoses related to the number of emergency department visits rose after implementation of the shelter in place order.

- 19. Globor N, Mohler G, Huynh P, *et al*. Impact of COVID-19 pandemic on drug overdoses in Indianapolis. *J Urban Health* 2020; 97:802–807.

This study found a 47% rise in fatal overdoses after implementation of a stay-at-home order vs. prior to its implementation.

- 20. Slavova S, Rock P, Bush HM, *et al*. Signal of increased opioid overdose during COVID-19 from emergency medical services data. *Drug Alcohol Depend* 2020; 214:108176.

This study found that the mean daily emergency medical services runs related to an opioid overdose with the patient refusing transportation to an emergency department increased from January–March 2020 to March–April 2020.

- 21. Khatri UG, Pizzicato LN, Viner K, *et al*. Racial/ethnic disparities in unintentional fatal and nonfatal emergency medical services-attended opioid overdoses during the COVID-19 pandemic in Philadelphia. *JAMA Netw Open* 2021; 4:e2034878.

In this study, an association was observed between the current pandemic and the rising number of opioid-related fatal overdoses for persons who identify as non-Hispanic black.

- 22. Joyce LR, Richardson SK, McCombie A, *et al*. Mental health presentations to Christchurch Hospital Emergency Department during COVID-19 lockdown. *Emerg Med Australas* 2020; 33:324–330.

This retrospective study examined a cohort of patients from a hospital emergency department in New Zealand. Significant increases were seen in the percentage of individuals who presented for an overdose or because of self-harming behavior after the lockdown in comparison to prior to its implementation.

- 23. Linas BP, Savinkina A, Barbosa C, *et al*. A clash of epidemics: impact of the COVID-19 pandemic response on opioid overdose. *J Subst Abuse Treat* 2021; 120:108158.
- 24. Allen B, El Shahawy O, Rogers ES, *et al*. Association of substance use disorders and drug overdose with adverse COVID-19 outcomes in New York City: January-October 2020. *J Public Health (Oxf)* 2020; fdaa241; <https://doi.org/10.1093/pubmed/fdaa241>.

This retrospective review examined COVID-19 positivity and adverse health outcomes of patients in New York City. This study may have important implications in the clinical decision-making process when attempting to identify, which patients with a history of substance use may be most at-risk for negative COVID-related health outcomes.

- 25. Slaunwhite AK, Gan WQ, Xavier C, *et al*. Overdose and risk factors for coronavirus disease 2019. *Drug Alcohol Depend* 2020; 212:108047.

Individuals with a history of a nonfatal drug overdose had higher odds for having certain risk factors for COVID-19 (e.g. coronary heart disease or chronic pulmonary disease) than people who have not had an overdose.

- 26. Welle-Strand GK, Skurtveit S, Clausen T, *et al*. COVID-19 survey among people who use drugs in three cities in Norway. *Drug Alcohol Depend* 2020; 217:108302.
- 27. Glick SN, Prohaska SM, LaKosky PA, *et al*. The impact of COVID-19 on syringe services programs in the United States. *AIDS Behav* 2020; 24:2466–2468.

Data gathered through the North American Syringe Exchange Network suggested that syringe services programs have modified naloxone distribution protocols to promote social-distanced distribution despite reductions in service availability in some programs.

- 28. Caton L, Cheng H, Garneau HC, *et al*. COVID-19 adaptations in the care of patients with opioid use disorder: a survey of California primary care clinics. *J Gen Intern Med* 2021; 36:998–1005.

Using a survey to assess how the current pandemic impacted the delivery of substance use treatment and management services, this study found that nearly half (48.1%) of clinics offered both remote and in-person options for follow-up appointments regarding medications for persons with opioid use disorder.

- 29.** Glenn MJ, Rice AD, Primeau K, *et al.* Refusals after prehospital administration of naloxone during the COVID-19 pandemic. *Prehosp Emerg Care* 2021; 25:46–54.

This study found that patients who were provided naloxone by Emergency Medical Services personnel during the pandemic were 2.45 times as likely to refuse transport as those before COVID-19 occurred.

- 30.** Picchio CA, Valencia J, Doran J, *et al.* The impact of the COVID-19 pandemic on harm reduction services in Spain. *Harm Reduct J* 2020; 17:87.

Twenty harm reduction centers in Spain were assessed for changes in treatment services because of the pandemic. The distribution of methadone rose when comparing 2019 with 2020; however, distribution of direct acting antiviral therapy declined by 82%.

- 31.** Joseph G, Torres-Lockhart K, Stein MR, *et al.* Reimagining patient-centered care in opioid treatment programs: lessons from the Bronx during COVID-19. *J Subst Abuse Treat* 2021; 122:108219.

- 32.** Haimovich A, Warner F, Young HP, *et al.* Patient factors associated with SARS-CoV-2 in an admitted emergency department population. *J Am Coll Emerg Physicians Open* 2020; 1:569–577.

Among individuals admitted to the emergency department with a possible SARS-CoV-2 infection, the researchers found that persons who misused substances were 0.39 times as likely to receive a positive COVID test.

- 33.** Wang QQ, Kaelber DC, Xu R, Volkow ND. COVID-19 risk and outcomes in patients with substance use disorders: analyses from electronic health records in the United States. *Mol Psychiatry* 2021; 26:30–39.

This case-control study found that the mortality rate among persons with COVID-19 positivity and a lifetime substance use disorder diagnosis was significantly higher for blacks than whites.

- 34.** International Network of People who Use Drugs. COVID-19 crisis: harm reduction resources for people who use drugs [Internet]. 2020 Mar 11 [cited 21 February 2021]. Available at: <https://www.inpud.net/en/covid-19-crisis-harm-reduction-resources-people-who-use-drugs>. [Accessed 21 February 2021]

- 35.** Chang J, Agliata J, Guarinieri M. COVID-19 - enacting a 'new normal' for people who use drugs. *Int J Drug Policy* 2020; 83:102832.

This commentary discussed COVID-related challenges for persons who use substances and provided detailed recommendations proposed by the International Network of People who use Drugs.

- 36.** Mackolil J, Mackolil J. Addressing psychosocial problems associated with the COVID-19 lockdown. *Asian J Psychiatr* 2020; 51:102156.

- 37.** Wakeman SE, Green TC, Rich J. An overdose surge will compound the COVID-19 pandemic if urgent action is not taken. *Nature Medicine* 2020; 26:814–821.