

East Tennessee State University

## Digital Commons @ East Tennessee State University

---

Undergraduate Honors Theses

Student Works

---

5-2022

### The Impact of COVID-19 on the Opioid Epidemic

Hailey Stewart

Follow this and additional works at: <https://dc.etsu.edu/honors>



Part of the [Other Mental and Social Health Commons](#), and the [Substance Abuse and Addiction Commons](#)

---

#### Recommended Citation

Stewart, Hailey, "The Impact of COVID-19 on the Opioid Epidemic" (2022). *Undergraduate Honors Theses*. Paper 678. <https://dc.etsu.edu/honors/678>

This Honors Thesis - Open Access is brought to you for free and open access by the Student Works at Digital Commons @ East Tennessee State University. It has been accepted for inclusion in Undergraduate Honors Theses by an authorized administrator of Digital Commons @ East Tennessee State University. For more information, please contact [digilib@etsu.edu](mailto:digilib@etsu.edu).

The Impact of COVID-19 on the Opioid Epidemic

An Undergraduate Thesis Submitted in Partial Fulfillment of the Requirements for the University

Honors Scholars Program

Honors College

East Tennessee State University

By Hailey S. Stewart

---

Ms. Hailey S. Stewart

Date



04/29/2022

Dr. Robert Pack, Thesis Mentor

Date

[Sean James Fox, PhD](#)

---

Dr. Sean Fox, Reader

Date

Table of Contents

ABSTRACT .....3

INTRODUCTION .....4

LITERATURE REVIEW .....6

METHODS .....12

RESULTS: ANALYSIS OF EMPIRICAL STUDIES .....12

DISCUSSION .....15

CONCLUSION .....17

REFERENCES .....18

**ABSTRACT**

The COVID-19 pandemic adversely affected the lives of most Americans. People with Substance Use Disorder (SUD) were particularly vulnerable to the negative effects brought on by the pandemic. This study explored the increase in deaths due to opioid overdose during the pandemic exacerbated by factors such as increased stress, decrease in treatment options due to social distancing requirements and facility closures, social isolation, and an increase in spare time. Access to treatment for opioid use disorder (OUD) was interrupted by the measures meant to mitigate the spread of COVID-19. Through a systematic review of current literature, it was demonstrated that existing patients were able to maintain access to care, while few new patients were able to initiate treatment. Telehealth proved to be a vital means of assuring PWUD were able to access life-saving treatment amid a pandemic. Further research is needed to determine whether SUD treatment measures during the COVID-19 pandemic warrants changing the policies long term.

## INTRODUCTION

Since the late 1990s, over 500,000 Americans have died from an opioid overdose (CDC, 2021). The National Center for Drug Abuse Statistics estimates an average of 136 Americans die every day from overdose deaths related to prescription opioids (NCDAS, 2022). The opioid epidemic was set in motion when pharmaceutical companies began to manufacture substantial amounts of opioid-based pain killers. Healthcare professionals were assured that these pain killers would not cause their patients to become addicted (U.S. Dept HHS, 2017). There have been four waves of overdoses due to three categories of opioids: prescription opioid pills, heroin, and synthetic opioids such as fentanyl (Ciccarone, 2019). Overdoses related to prescription opioids, such as hydrocodone and oxycodone, began rising in 1999 and have steadily increased. The rise of heroin overdose deaths started the second wave of the opioid epidemic in 2007 (Ciccarone, 2019). In 2015, heroin overdose deaths exceeded the total number of deaths from prescription opioid overdose (Ciccarone, 2019). The third wave of opioid overdose commenced in 2013 when fentanyl mixed with substances such as prescription pills, heroin, and cocaine emerged (CDC, 2021). Recent data suggest that we are currently in the midst of a fourth wave characterized by overdoses due to fentanyl-contaminated products and psychostimulants (Jenkins, 2021). The fourth wave of the opioid epidemic is largely contributed to an increase in the production of synthetic drugs by the Mexican drug cartel (Press, 2021). Evidence in the United States suggests that 64,000 overdose deaths in 2021 were due to the cartels adding fentanyl into counterfeit opioids (Press, 2021). The data presented in “Trends and Geographic Patterns in Drug and Synthetic Opioid Overdose Deaths” illustrates the rates of overdose in the United States from 2013 to 2019, along with the steady increase in overdoses associated with

psychostimulants (Mattson et al., 2021). However, the emergence of a global pandemic in 2020 has worsened the opioid epidemic and changed the current methods of treating addiction.

COVID-19, a disease caused by a strain of coronavirus known as SARS-CoV-2, emerged in December 2019. Almost 6 million people have perished from COVID-19 worldwide. Over 951,000 people have died in the U.S. alone. Officials at the local, state, and federal levels introduced a variety of policies attempting to mitigate the spread of COVID-19 in March of 2020. Stay-at-home orders were put in place, encouraging only essential workers to leave their homes (Rosenbaum et al., 2021). Social distancing was implemented which required those who do not live in the same household to maintain a distance of six feet between them. Individuals were also required to wear a mask when not social distancing as another method of reducing COVID-19 transmission. Unintended consequences of these mitigation measures included economic distress, social isolation, and fear of virus transmission.

COVID-19 has adversely affected the lives of Americans in many ways. Economic distress can lead to feelings of loneliness, anxiety, and depression under *normal* circumstances. These feelings of hopelessness coupled with the social isolation brought on by the pandemic have created the perfect storm for many with substance use disorder (SUD). In addition, the social restrictions of the pandemic (e.g., stay-at-home orders and lockdowns) and fear of virus transmission have resulted in the disruption of treatment for many people who have SUD. COVID-19 exacerbated the ongoing national epidemic of opioid-driven overdose. This paper will examine how the opioid epidemic was affected overall, measures used to treat opioid addiction, and how they evolved throughout the COVID-19 pandemic.

## LITERATURE REVIEW

According to the American Society of Addiction Medicine (ASAM), addiction is defined as “a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual’s life experiences” (ASAM Board of Directors, *Definition of Addiction* 2011). Opioids are a class of drugs that bind to the central nervous system receptors (SAMHSA, 2020). Opioids prescribed for pain include morphine, codeine, oxycodone, hydrocodone, etc., while the illegal opioids include heroin, fentanyl, and fentanyl analogs (SAMHSA, 2020). Repeated use of opioids can lead the brain to depend on the substance to function normally and can lead to serious consequences, including death. At the beginning of 2020, it was hypothesized that individuals with SUD would have an elevated risk of opioid overdose during the COVID-19 pandemic (Imtiaz et al., 2021).

The measures implemented to reduce the spread of COVID-19 have created economic distress, social isolation, and fear of virus transmission, especially for those with substance use disorder (SUD). Before the pandemic, people who use drugs (PWUD) were especially vulnerable to financial insecurity and economic distress. During the pandemic, these situations worsened as many people lost their jobs. Participants of a study conducted in late 2020 “indicated that time at home due to job loss or stay-at-home orders resulted in more free time and left them feeling bored” (Bolinski et al., 2022). Many admitted to using drugs more frequently due to spare time. In addition, COVID-19 mitigation methods required anonymous meetings and other support groups to be eliminated (Iacono, 2022). The social isolation brought on by the pandemic was especially detrimental to people with SUD as it cut them off from family, friends, and those in their support groups. Social distancing measures have allowed PWUD to do so alone, with limited opportunities for others to respond in the event of an overdose (Imtiaz et al., 2021).

Social isolation is known to be a trigger for relapse (Rosenbaum et al., 2021). To avoid the risk of exposure to COVID-19, many people avoided seeking medical treatment for opioid addiction and overdose (Holland et al., 2021). Individuals with SUD may have experienced increased mental distress due to unemployment, quarantine, and fear of susceptibility to COVID-19.

Mental distress caused by the disruption to all aspects of life is a leading concern for people who use drugs (Warfield et al., 2021). Disasters of a large scale are often followed by an increase in mental health-related illnesses like depression and substance use disorder (Galea et al., 2021). For instance, “5% of the population affected by Hurricane Ike in 2008 met the criteria for major depressive disorder in the month after the hurricane; 1 out of 10 adults in New York City showed signs of the disorder in the month following the 9/11 attacks. And almost 25% of New Yorkers reported increased alcohol use after the attacks,” (Galea et al., 2021). Feelings of loneliness, anxiety, and depression are factors that can lead to overdose as PWUD search for a way to ease their pain. Individuals with substance use disorder require a support system, which many did not have access to throughout the pandemic due to stay-at-home orders/lockdowns (Rosenbaum et al., 2021). These feelings, “coupled with a lack of resources for social distancing and hygiene,” leave this population more susceptible to contract COVID-19 (Rosenbaum et al., 2021).

According to current literature, public health resources are inadequate to deal with the increased demand for mental health services (Anjum et al., 2020). The United States has an average of 16.6 psychiatrists per 100,000 people, with even less access in rural areas (KFF, 2021). This inadequate number of mental health professionals is of particular concern because a survey conducted in April 2020 found that 1-in-7 U.S. adults reported serious psychological distress (Jones et al., 2021). During peak COVID-19 transmission, there were also reports of

increased substance use to cope with stress or emotions associated with the pandemic (Jones et al., 2021).

Along with mental health comorbidities, PWUD often have underlying health conditions, such as cardiovascular and respiratory diseases, HIV, Hepatitis C, etc. that make them especially vulnerable to COVID-19 (Becker & Fiellin, 2020). Those with respiratory challenges from substance use disorder face an increased risk of infection by the virus because COVID-19 is a highly infectious respiratory disease. People are also more likely to die from COVID-19 if they have chronic health conditions like high blood pressure, asthma, or COPD (chronic obstructive pulmonary disease) that are commonly associated with opioid or substance use disorder (CDC, 2020). Since people with SUD are often homeless or live in congregate living arrangements where it is difficult to maintain physical distance, it was suggested that these individuals would be more likely to contract COVID-19 (King et al., 2021). Living in places with large groups of people such as shelters, sober living homes, and detention facilities is another factor that can increase the risk of dying from COVID-19 for people who use drugs.

Access to care for Opioid Use Disorder (OUD) and SUD was disrupted due to stay-at-home orders, health care office closures, and the cessation of in-person treatment (Jones et al., 2021). Studies suggest that small inconsistencies in access to medication can significantly impact a patient's outcome (Currie et al., 2021). Treatment options have conventionally required in-person counseling, examination, and dispensing of medication (Leppa & Gross, 2020). Changes in policy at the onset of the pandemic allowed providers to prescribe medications used for the treatment of opioid use disorder (MOUD) including methadone, buprenorphine, and naltrexone through telemedicine (Cales et al., 2022). These drugs have been shown to decrease illicit drug use and risk of overdose (Pearce et al., 2020). Rates of opioid overdose were expected to

increase based on reduced access to these medications in addition to naloxone, which reverses opioid overdose (Jones et al., 2021).

Methadone is an opioid agonist and acts to reduce the cravings and symptoms associated with opioid withdrawal maintenance (SAMHSA, 2022a). Prior to the COVID-19 pandemic, strict regulations were in place regarding methadone dispensing. Patients undergoing methadone treatment were required to go to a Substance Abuse and Mental Health Service Administration (SAMHSA) certified opioid treatment program (OTP) to have their medication administered (Joudrey et al., 2021). Following the introduction of social distancing guidelines, SAMHSA and the U.S. Drug Enforcement Agency (DEA) took steps to ease the restrictions surrounding MOUD (Iacono, 2022). New guidelines were established allowing OTPs to dispense a 28-day supply of methadone to take home for all patients deemed stable and a 14 day supply for “less” stable patients (Henry et al., 2022). Before these new guidelines, for a dosage of this size to be dispensed, patients would have been required to be enrolled in an OTP for 2 years (Iacono, 2022). Although methadone treatment still requires an initial in-person visit, these changes were expected to increase access to life-saving treatment during social isolation.

Buprenorphine, unlike methadone, can be prescribed by a variety of clinicians in different settings. It is a partial agonist that lessens withdrawal symptoms and dependency on opioids (Cremer et al., 2022). The Ryan Haight Online Pharmacy Consumer Protection Act of 2008 regulates online prescriptions and the use of telehealth for prescribing controlled substances (Shore, 2022). The act requires a clinician prescribing a controlled substance to first complete an in-person exam which limits the utilization of telehealth to initiate buprenorphine treatment (Shore, 2022). After COVID-19 was declared a pandemic in March 2020, SAMHSA loosened the restrictions regarding initiation of buprenorphine treatment (Livingston et al., 2021).

Treatment programs were permitted to dispense buprenorphine without the initial in-person evaluation. These changes in regulation were hypothesized to favor new patients on buprenorphine and provide an advantage over other treatments in terms of social distancing (Leppla & Gross, 2020).

To prevent relapse following medically supervised withdrawal from opioids, naltrexone is used for treatment (SAMHSA, 2022b). Naltrexone is an opioid antagonist and can be prescribed by any licensed practitioner as an extended-release intramuscular injectable or as a pill (SAMHSA, 2022b). The naltrexone injection must be injected monthly by a practitioner in an OTP or substance abuse treatment facility (Krawczyk et al., 2021). Due to the social distancing guidelines, office closures and limited staff required many treatment providers to offer the naltrexone injection once every 45 days instead of every 30 days (Cremer et al., 2022). This likely left patients more susceptible to relapse and overdose (Cremer et al., 2022).

Syringe service programs (SSPs) and harm reduction services are essential services that help PWUD lessen infectious disease transmission and risky drug-using behaviors (Wenger et al., 2021). SSPs provide safe disposal and access to sterile syringes or other equipment, as well as providing connections to SUD treatment and access to naloxone (Wenger et al., 2021). The majority of SSPs in the United States offer naloxone education to friends, family, and other laypersons (Wenger et al., 2021). There is substantial evidence that SSPs are effective in preventing overdose deaths (Wenger et al., 2021). The COVID-19 mitigation measures resulted in a lack of funding and created staffing shortages at many harm reduction service facilities. Facilities that temporarily closed or remained open employed evidence-based strategies to continue providing care to those with SUD. One study of 18 SSPs, qualitatively analyzed the methods that SSPs used during the COVID-19 pandemic to ensure patients still had access to

care. Following the stay-at-home orders, many of the 18 SSPs reported the number of people they were helping significantly decreased (Wenger et al., 2021). Some of the innovative approaches the participating SSPs adopted included setting up outdoor sites, creating handwashing stations, prepackaging supplies, delivering naloxone and other supplies, and distributing supplies via mail order (Wenger et al., 2021). These delivery methods not only allowed more naloxone to be distributed to vulnerable populations, but they also allowed individuals to receive treatment/supplies that previously would not have been obtained due to the stigma associated with being a person who uses drugs.

## METHODS

A systematic search of articles in electronic databases was conducted beginning in April 2021 and concluding in March 2022. Studies were eligible for inclusion if they assessed opioid overdose deaths during the COVID-19 pandemic in a quantitative or qualitative manner. Search terms included, but were not limited to, the impact of COVID-19 pandemic, substance use disorder, opioid overdoses, the opioid epidemic and COVID-19, methadone access, syringe service programs, addiction treatment, and COVID-19.

## RESULTS: ANALYSIS OF EMPIRICAL STUDIES

At the beginning of the COVID-19 pandemic, it was predicted that people with SUD would face a greater risk of opioid overdose (Imtiaz et al., 2021). According to a systematic review of nine studies regarding overdose rates, deaths from overdose “were 9 to 50% higher between the periods of March 2020 to July 2020 compared with between the periods of December 2019 to March 2020...” (Imtiaz et al., 2021). This data indicates an increase in the average rate of overdoses from 680 deaths per month in the twelve months prior to the pandemic, to 2348 overdose deaths per month in the twelve months following the outbreak of COVID-19 (Imtiaz et al., 2021). It is clear that opioid overdose deaths were increasing prior to the arrival of COVID-19 and continued to climb after the global pandemic was declared (Imtiaz et al., 2021).

Trends in mental health and opioid overdose were assessed using studies related to emergency services data. These trends allow the impact of COVID-19 on rates of overdose to be determined. The data presented by Slavova et al. compared EMS (emergency medical services) runs in the periods before and after the onset of the pandemic in Kentucky. As evident in this study, “EMS runs for opioid overdose have increased both in the rate of transportation to ED [emergency department] and, critically, in the number of those who were treated on the scene

and refused transportation to ED” (Slavova et al., 2020). In the same period, EMS runs for all causes other than overdose decreased by over twenty percent, giving an early indication of the increase in overdoses during the pandemic (Slavova et al., 2020). On the other hand, a study conducted in Philadelphia, observed a 6.8% decrease in overdoses from the period before stay-at-home orders, to the period during the stay-at-home orders (Rosenbaum et al., 2021). While the Philadelphia study shows a decrease in opioid overdoses presented in emergency departments, COVID-19 likely decreased the rate of presentations rather than an actual decrease in overdose deaths (Rosenbaum et al., 2021). To further assess the change in opioid overdoses throughout the pandemic, EMS calls for service (CFS) in which naloxone was dispensed for suspected overdose were analyzed. This study in Marion County, Indiana used data from before and after stay-at-home orders were put in place (Glober et al., 2020). After the stay-at-home order, there was a 61% increase rate in the administration of naloxone and a 43% increase rate of CFS for suspected overdose (Glober et al., 2020). Overall, this study found that opioid overdoses increased by 47% even after the reopening of Indiana, suggesting the increase was due to factors other than social distancing, like mental health (Glober et al., 2020).

A cross-sectional study conducted by Holland et al. utilized data from the CDC’s National Syndromic Surveillance Program to broaden what is known about COVID-19’s impact on ED visits, particularly those related to opioid overdose (Holland et al., 2021). The data used in the study represent regions of 48 states in America. Trends in ED visits prior to and during the COVID-19 pandemic, per 100,000 visits were analyzed in this study. Across the United States, total visits to the emergency department decreased after mitigation measures were introduced in early March 2020 (Holland et al., 2021). “All drug ODs had a slight decrease from March 29 to April 11 compared with the same weeks in 2019, but otherwise weekly counts of all drug and

opioid ODs ranged from 1% to 45% higher in 2020 compared with the same week in 2019” (Holland et al., 2021). Opioid overdose ED visits did not decrease in the same way that all other ED visits did when the pandemic began, suggesting an increase in the burden of overdose during the pandemic (Holland et al., 2021). This study suggests the rise in opioid overdoses can likely be attributed to persons using drugs alone because of social isolation and limited access to naloxone or other harm reduction services, in conjunction with other possible effects of the COVID-19 mitigation measures (Holland et al., 2021).

The policy changes brought on by COVID-19 regarding substance use disorder treatment, permitted patients to receive treatment while following the CDC’s guidelines. According to the study by Cales, patient visits for MOUD treatment increased throughout the pandemic, signifying that people with SUD were able to maintain access to treatment. The study found that those who relapsed reported “challenges with each of the surveyed obstacles (housing, nutrition, transportation, employment, and depression) at statistically significant frequencies, ranging from two to six times, compared to their nonusing counterparts” (Cales et al., 2022). Another study analyzed changes in dispensing patterns of substance use and mental health medications in the United States from January 2019 to May 2020 (Jones et al., 2021). Patients receiving buprenorphine for OUD “increased from 713,778 in January 2019 to 814,019 in May 2020,” while an “estimated 1,039 fewer patients were dispensed ER intramuscular naltrexone” (Jones et al., 2021). Patients dispensed naloxone increased from 67,294 to 81,019 (Jones et al., 2021). An additional study found that the number of existing patients filling buprenorphine prescriptions changed very little (Currie et al., 2021). New patients entering buprenorphine treatment remained below the comparative period in 2019 until September 1, 2020 (Currie et al., 2021). The studies by Cales and Currie indicate that opioid-naïve patients were less likely to receive a prescription

for opioids during the period from March to May 2020 and patients prescribed buprenorphine experienced little change to their supply during the pandemic (Cales et al., 2022; Currie et al., 2021). It is evident that barriers to buprenorphine treatment for existing patients have been reduced using telemedicine and by increasing the number of doses a patient was allowed to take home. To assess how the pandemic affected methadone dispensing, a cross-sectional study of the District of Columbia, thirteen U.S. states, and three Canadian provinces was conducted (Joudrey et al., 2021). “More than 1 in 10 clinics were not accepting new patients. More than one-third of clinics not accepting new patients reported that this was due to COVID-19 (Joudrey et al., 2021). The evidence from this study suggests that COVID-19 made access to methadone more challenging for new patients seeking treatment.

The trends in dispensing of buprenorphine, naloxone, and methadone demonstrate that the pandemic limited access to these medications, specifically for new patients. More data on OUD treatment during the pandemic is needed to advance and maintain access to treatment.

## DISCUSSION

The COVID-19 pandemic has significantly impacted the lives of all Americans in many ways. However, for people with SUD, the effects of the pandemic have proven to be life altering, and often, life threatening. People with SUD often respond to stress by using drugs. For many of them, the restrictions during the pandemic and the fear of contracting COVID-19 exacerbated their normal stress and heightened it to astronomical levels. As pointed out by Warfield et al. (2021), mental distress that disrupts all aspects of life is a huge concern for PWUD. The COVID-19 pandemic disrupted all aspects of life. Galea et al. (2021) discussed the increase in substance use disorder following disasters of a large scale. The COVID-19 pandemic proved to be a situation that could be categorized as a large-scale disaster.

People with SUD depend upon their support groups and treatment programs to remain clean and avoid overdose. The social distancing requirements and closures/limited hours of many treatment programs created circumstances that were difficult for many people suffering from SUD to navigate. In addition, some treatment facilities did not accept new patients due to complications from the pandemic. Those who lost their jobs found themselves with an increased amount of spare time, in addition to a decrease in income, which enhanced stress levels and often resulted in increased drug use. Social distancing requirements often led to isolation which often provided opportunities for PWUD to use alone, increasing the chance of overdose.

Moving forward, some strategies that were discovered during the pandemic should continue to be explored to prepare for other possible health crises such as the COVID-19 pandemic in the future. As Cremer et al. (2022) found, during the pandemic, many providers only offered naltrexone injections once every 45 days instead of every 30 days as was recommended before the pandemic, a situation that likely left patients more susceptible to relapse and overdose. It seems it would be beneficial to find ways to provide these injections at the 30-day mark regardless of social distancing requirements.

As a result of the pandemic, other unprecedented situations arose such as the increased need for telehealth due to restrictions regarding social distancing and facility closures. Leppla and Gross (2020) pointed out that the reduction of in-person evaluations for patients needing buprenorphine treatment provided an advantage over other treatment options. Having such exceptions in place in the future would be beneficial to those who seek OUD treatment irrespective of a crisis such as the COVID-19 pandemic.

As stated by Wenger et al. (2021), syringe service programs (SSPs) and harm reduction services are vital services that help PWUD lessen infectious disease transmission and risky drug-

using behaviors. To prepare for future crises such as the pandemic, these facilities should receive access to the funding and staffing resources they need to continue providing the necessary care to people with SUD.

Lastly, since social isolation has proven to be so detrimental to PWUD, it seems wise to explore alternative ways to communicate actively during periods of reduced social interactions such as the establishment of social networks that can function via Zoom or other electronic means to provide the social support systems that are so vital to people with SUD. Proactive measures such as these will be crucial to this population especially.

## CONCLUSION

Since the late 1990s, over 500,000 people have died from an opioid overdose (CDC, 2021). Felter (2021) reports that opioid overdoses killed nearly 50,000 people in 2019. The CDC estimates the number of opioid-related overdose deaths to be 69,710 in 2020, an increase of nearly 19,000 from the previous year (Felter, 2021).

The COVID-19 pandemic adversely affected the lives of most Americans. However, those with SUD were especially vulnerable due to the increased stress caused by social isolation and loss of employment, restrictions of social distancing, and decreased treatment options. These factors exacerbated the ongoing opioid epidemic.

It is evident that existing patients benefitted from the changes in SUD treatment policies, while new patients found it difficult to initiate treatment. Overall, opioid overdoses were approximately 38% higher in 2020 than in 2019 (CDC, 2021). Further research is needed to assess whether the effectiveness of SUD treatment measures during the COVID-19 pandemic warrants changing the policies long term.

## REFERENCES

- American Society of Addiction Medicine. (2011, August 15). Definition of addiction. Default. Retrieved March 2, 2022, from <https://www.asam.org/quality-care/definition-of-addiction>
- Anjum, S., Ullah, R., Rana, M. S., Khan, H. A., Memon, F. S., Ahmed, Y., . . . Faryal, R. (2020). COVID-19 Pandemic: A Serious Threat for Public Mental Health Globally. *Psychiatria Danubina*, 32(2), 245.
- Becker, W. C., & Fiellin, D. A. (2020). When Epidemics Collide: Coronavirus Disease 2019 (COVID-19) and the Opioid Crisis. *Annals of internal medicine*, 173(1), 59-60. <https://doi.org/10.7326/M20-1210>
- Bolinski, R. S., Walters, S., Salisbury-Afshar, E., Ouellet, L. J., Jenkins, W. D., Almirol, E., . . . Pho, M. T. (2022). The Impact of the COVID-19 Pandemic on Drug Use Behaviors, Fentanyl Exposure, and Harm Reduction Service Support among People Who Use Drugs in Rural Settings. *International Journal of Environmental Research and Public Health*, 19(4), 2230. <https://doi.org/10.3390/ijerph19042230>
- Cales, R. H., Cales, S. C., Shreffler, J., & Huecker, M. R. (2022). The COVID-19 pandemic and opioid use disorder: Expanding treatment with buprenorphine, and combining safety precautions with telehealth. *Journal of Substance Abuse Treatment*, 133, 108543. <https://doi.org/10.1016/j.jsat.2021.108543>
- CDC. (2020). Preliminary Estimates of the Prevalence of Selected Underlying Health Conditions Among Patients with Coronavirus Disease 2019 — United States, February 12–March 28, 2020 | MMWR.
- CDC, C. f. D. C. a. P. (2021). Opioid Data Analysis and Resources | CDC's Response to the Opioid Overdose Epidemic | CDC.
- CDC, C. f. D. C. a. P. (2022). Coronavirus Disease 2019 (COVID-19) | CDC.
- Ciccarone, D. (2019). The triple wave epidemic: Supply and demand drivers of the US opioid overdose crisis. *The International journal of drug policy*, 71, 183-188. <https://doi.org/10.1016/j.drugpo.2019.01.010>
- Cremer, L. J., Board, A., Guy, G. P., Schieber, L., Asher, A., & Parker, E. M. (2022). Trends in pharmacy-based dispensing of buprenorphine, extended-release naltrexone, and naloxone during the COVID-19 pandemic by age and sex – United States, March 2019 – December 2020. *Drug and Alcohol Dependence*, 232, 109192. <https://doi.org/10.1016/j.drugalcdep.2021.109192>
- Currie, J. M., Schnell, M. K., Schwandt, H., & Zhang, J. (2021). Prescribing of Opioid Analgesics and Buprenorphine for Opioid Use Disorder During the COVID-19 Pandemic. *JAMA Network Open*, 4(4), e216147. <https://doi.org/10.1001/jamanetworkopen.2021.6147>
- Felter, C. (2021, September). *The U.S. Opioid epidemic*. Council on Foreign Relations. Retrieved April 20, 2022, from <https://www.cfr.org/backgrounders/us-opioid-epidemic>
- Galea, S., Boston University School of Public Health, B., Massachusetts, Merchant, R. M., Emergency Medicine, P. S. o. M., Philadelphia, Pennsylvania, Lurie, N., & Coalition for Epidemic Preparedness Innovations. Oslo, N. (2021). The Mental Health Consequences of COVID-19 and Physical Distancing: The Need for Prevention and Early Intervention. *JAMA Internal Medicine*, 180(6), 817-818. <https://doi.org/10.1001/jamainternmed.2020.1562>

- Glober, N., Mohler, G., Huynh, P., Arkins, T., O'Donnell, D., Carter, J., & Ray, B. (2020). Impact of COVID-19 Pandemic on Drug Overdoses in Indianapolis. *Journal of urban health*, 97(6), 802-807. <https://doi.org/10.1007/s11524-020-00484-0>
- Henry, B. F., Campbell, A., Hunt, T., Johnson, J. K., Mandavia, A. D., Chaple, M., . . . El-Bassel, N. (2022). COVID-19 related substance use services policy changes: Policymaker perspectives on policy development & implementation. *Journal of Substance Abuse Treatment*, 133, 108550. <https://doi.org/10.1016/j.jsat.2021.108550>
- Holland, K. M., Jones, C., Vivolo-Kantor, A. M., Idaikkadar, N., Zwald, M., Hoots, B., . . . Houry, D. (2021). Trends in US Emergency Department Visits for Mental Health, Overdose, and Violence Outcomes Before and During the COVID-19 Pandemic. *JAMA psychiatry (Chicago, Ill.)*, 78(4), 372-379. <https://doi.org/10.1001/jamapsychiatry.2020.4402>
- Iacono, T. M. (2022). Modernizing regulations for treating opioid use disorder during the COVID-19 pandemic. *JAAPA : official journal of the American Academy of Physician Assistants.*, 35(2), 57-59. <https://doi.org/10.1097/01.jaa.0000805844.19200.b3>
- Imtiaz, S., Nafeh, F., Russell, C., Ali, F., Elton-Marshall, T., & Rehm, J. (2021). The impact of the novel coronavirus disease (COVID-19) pandemic on drug overdose-related deaths in the United States and Canada: a systematic review of observational studies and analysis of public health surveillance data. *Substance Abuse Treatment, Prevention, and Policy*, 16(1). <https://doi.org/10.1186/s13011-021-00423-5>
- Jenkins, R. A. (2021). The fourth wave of the US opioid epidemic and its implications for the rural US: A federal perspective. *Preventive Medicine*, 152, 106541. <https://doi.org/10.1016/j.ypmed.2021.106541>
- Jones, C. M., Guy, G. P., & Board, A. (2021). Comparing actual and forecasted numbers of unique patients dispensed select medications for opioid use disorder, opioid overdose reversal, and mental health, during the COVID-19 pandemic, United States, January 2019 to May 2020. *Drug and alcohol dependence*, 219, 108486-108486. <https://doi.org/10.1016/j.drugalcdep.2020.108486>
- Joudrey, P. J., Department of Internal Medicine, Y. S. o. M., New Haven, Connecticut, Adams, Z. M., Department of Internal Medicine, Y. S. o. M., New Haven, Connecticut, Bach, P., British Columbia Center on Substance Use, D. o. M., University of British Columbia, Vancouver, British Columbia, Canada, . . . Center for Interdisciplinary Research on AIDS, Y. S. o. P. H., New Haven, Connecticut. (2021). Methadone Access for Opioid Use Disorder During the COVID-19 Pandemic Within the United States and Canada. *JAMA Network Open*, 4(7). <https://doi.org/10.1001/jamanetworkopen.2021.18223>
- KFF. (2021). Mental Health Care Health Professional Shortage Areas (HPSAs). In: Kaiser Family Foundation.
- King, B., Patel, R., & Rishworth, A. (2021). Assessing the Relationships Between COVID-19 Stay-at-Home Orders and Opioid Overdoses in the State of Pennsylvania. *Journal of Drug Issues*, 51(4), 648-660. <https://doi.org/10.1177/00220426211006362>
- Krawczyk, N., Fawole, A., Yang, J., & Tofighi, B. (2021). Early innovations in opioid use disorder treatment and harm reduction during the COVID-19 pandemic: a scoping review. *Addiction Science & Clinical Practice*, 16(1). <https://doi.org/10.1186/s13722-021-00275-1>

- Leppa, I. E., & Gross, M. S. (2020). Optimizing Medication Treatment of Opioid Use Disorder During COVID-19 (SARS-CoV-2). *Journal of addiction medicine, 14*(4), e1-e3. <https://doi.org/10.1097/ADM.0000000000000678>
- Livingston, N. A., Ameral, V., Banducci, A. N., & Weisberg, R. B. (2021). Unprecedented need and recommendations for harnessing data to guide future policy and practice for opioid use disorder treatment following COVID-19. *Journal of Substance Abuse Treatment, 122*, 108222. <https://doi.org/10.1016/j.jsat.2020.108222>
- Mattson, C. L., Tanz, L. J., Quinn, K., Kariisa, M., Patel, P., & Davis, N. L. (2021). Trends and Geographic Patterns in Drug and Synthetic Opioid Overdose Deaths - United States, 2013-2019. *MMWR. Morbidity and mortality weekly report, 70*(6), 202-207. <https://doi.org/10.15585/mmwr.mm7006a4>
- NCDAS, N. C. f. D. A. S. (2022). Drug Overdose Death Statistics [2022]: Opioids, Fentanyl & More.
- Pearce, L. A., Min, J. E., Piske, M., Zhou, H., Homayra, F., Slaunwhite, A., . . . Nosyk, B. (2020). Opioid agonist treatment and risk of mortality during opioid overdose public health emergency: population based retrospective cohort study. *BMJ, m772*. <https://doi.org/10.1136/bmj.m772>
- Press, T. A. (2021). Mexican Cartels are Turning to Meth and Fentanyl Production. In: NPR.
- Rosenbaum, J., Lucas, N., Zandrow, G., Satz, W. A., Isenberg, D., D'Orazio, J., . . . Schreyer, K. E. (2021). Impact of a shelter-in-place order during the COVID-19 pandemic on the incidence of opioid overdoses. *The American journal of emergency medicine, 41*, 51-54. <https://doi.org/10.1016/j.ajem.2020.12.047>
- SAMHSA, S. A. a. M. H. S. A. (2020). *Opioid Overdose*. SAMHSA. <https://www.samhsa.gov/medication-assisted-treatment/medications-counseling-related-conditions/opioid-overdose>
- SAMHSA, S. A. a. M. H. S. A. (2022a). Methadone.
- SAMHSA, S. A. a. M. H. S. A. (2022b). Naltrexone.
- Shore, J. (2022). *Ryan Haight Act*. American Psychiatric Association. <https://www.psychiatry.org/psychiatrists/practice/telepsychiatry/toolkit/ryan-haight-act>
- Slavova, S., Rock, P., Bush, H. M., Quesinberry, D., & Walsh, S. L. (2020). Signal of increased opioid overdose during COVID-19 from emergency medical services data. *Drug and alcohol dependence, 214*, 108176-108176. <https://doi.org/10.1016/j.drugalcdep.2020.108176>
- U.S. Dept HHS, U. S. D. o. H. a. H. S. (2017). About the Epidemic | HHS.gov [What is the U.S. Opioid Epidemic].
- Warfield, S. C., Pack, R. P., Degenhardt, L., Larney, S., Bharat, C., Ashrafioun, L., . . . Bossarte, R. M. (2021). The next wave? Mental health comorbidities and patients with substance use disorders in under-resourced and rural areas. *Journal of substance abuse treatment, 121*, 108189. <https://doi.org/10.1016/j.jsat.2020.108189>
- Wenger, L. D., Kral, A. H., Bluthenthal, R. N., Morris, T., Ongais, L., & Lambdin, B. H. (2021). Ingenuity and resiliency of syringe service programs on the front lines of the opioid overdose and COVID-19 crises. *Translational Research, 234*, 159-173. <https://doi.org/10.1016/j.trsl.2021.03.011>