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SHORT COMMUNICATION

Increases in drug overdose deaths in Norway and the United States during the COVID-19 pandemic

JOSEPH FRIEDMAN[1,2] & LINN GJERSING[3]

[1]*Center for Social Medicine and Humanities, University of California, USA,* [2]*Medical Informatics Home Area, University of California, USA, and* [3]*Norwegian Institute for Public Health, Norway*

Abstract
Introduction: Little international comparative work exists describing pandemic-related spikes in overdose and related implications for drug and public health policy. We compared increases in overdose deaths during the pandemic in Norway and the United States, two countries in the top 10 for per-capita overdose mortality, yet with very different approaches to the pandemic, healthcare and drug policy. *Methods:* We examined monthly overdoses in 2020 versus baseline rates (the monthly average across 2017–2019). We compared excess overdose mortality to shifts in human mobility and social interaction, measured using cellphone-based mobility data, an indicator of the societal response to the pandemic. *Results:* Both the US and Norway saw large magnitude exacerbations in overdose mortality during the pandemic-related lockdowns, reaching 46.8% and 57.0% above baseline, respectively. Maximum increases occurred 2–3 months after peak reductions in mobility, suggesting lagged mechanisms. While overdose mortality returned to baseline relatively quickly in Norway, rates remained elevated in the US to the end of 2020. ***Conclusions:*** **Spikes in overdose mortality in both contexts may relate to disruptions in healthcare access and the drug supply becoming more potent. Norway's quicker return to baseline may reflect more robust access to harm reduction and addiction-related healthcare services. Nevertheless, it is notable that even in Norway – with universal access to high-quality services, low COVID-19 rates, and a highly effective public health infrastructure – a greater than 50% spike in overdose deaths was still seen at the onset of lockdown measures. This may have important implications for future pandemic and disaster planning.**

Keywords: *Drug overdose mortality, COVID-19 pandemic, Norway, United States, comparative, human mobility*

Introduction

At the outset of the COVID-19 pandemic, both Norway and the US were already among the 10 countries with the highest per capita overdose death rates in the world [1–3]. As the pandemic took grip of the world, there was ample concern that necessary measures to reduce the spread of SARS-Cov-2 would exacerbate rates of drug-related deaths [4]. It has since been confirmed that the pandemic induced numerous shifts in unregulated drug markets, healthcare access, and health outcomes for people who use drugs (PWUD), although perhaps in distinct ways across geographies [5, 6]. Yet, little international comparative work has been done to compare pandemic-related spikes in overdose and understand the implications for drug policy. With this aim, we assessed shifts in overdose mortality occurring during the pandemic in Norway and the US, two countries with high overdose death rates at baseline, yet substantially different pandemic responses, COVID-19 mortality rates, healthcare systems, and approaches to social welfare.

Methods

We compared overdose death rates per 100,000 population occurring during 2020, and the prior 3 years in the US and Norway. Data from the US were accessed from provisional records from the Centers

Correspondence: Joseph Friedman, Semel Institute, UCLA, B7-435, 760 Westwood Plaza, Los Angeles, CA 90095, USA.
E-mail: joseph.robert.friedman@gmail.com

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for Disease Control and Prevention, processed to provide monthly trends [6]. Data from Norway were obtained from the Norwegian Institute for Public Health [7]. We assessed monthly rates, which were annualised to improve interpretability. Three-month, centered, rolling averages were employed for all data, to smooth out the slightly more stochastic trends observed in Norway (which reflect a smaller population size and lower background rate of overdose death relative to the US). In line with prior work on this topic, we calculated excess overdose mortality as a percentage change from baseline, which was defined as the month-specific average across 2017–2019 (therefore controlling for seasonality) [8]. We compared each time series of overdose mortality to a measure of human mobility, calculated from aggregated anonymised cellphone data provide by Google, and processed by the Institute for Health Metrics and Evaluation [9]. This serves as a proxy for the societal response to the pandemic, and related disruptions to travel, health services and human interaction [10].

Results and discussion

Both the US and Norway saw sharp increases in overdose mortality at the onset of the COVID-19 pandemic, reaching similar peak magnitudes in relative space of 46.8% and 57.0% above baseline, respectively (Figure 1). For both countries, 2020 saw the highest overdose-related mortality in recent history. In total, overall overdose mortality in 2020 was elevated by 33.6% in the US and 16.5% in Norway, relative to baseline. Nevertheless, it is important to consider that absolute overdose rates were far higher in the US compared to Norway, both before and during the COVID-19 pandemic.

The pattern of decreases in mobility and human interaction were also similar for both countries. Both reached a maximum of a 50% reduction in April, and asymptotically decreased towards a reduction of approximately 20% for the remainder of the year. In both cases, the peak of increases in overdose mortality were seen 2–3 months following the peak of reductions in mobility (when maximum pandemic-related disruptions occurred). This is likely to reflect the inherent lagged nature of the underlying mechanisms at play. For example, 2–3 months may be the time needed for enough of the stockpiled drug supply to be exhausted, and for pandemic-related shifts in drug supply (i.e. replacement with stronger formulations) to take effect. Alternatively, or in concert, 2–3 months may represent a psychological window after which the extra stress of lockdowns and the increased uncertainty of life during a pandemic increased the risk of chaotic drug use and overdose. Supporting this notion in Norway, evidence from the two largest cities – Oslo and Bergen – indicates that the number of exchanged syringes increased during the pandemic, which may suggest higher rates of injection drug use overall (Centre for Alcohol and Drug Research, unpublished data, Stavanger University Hospital). Nationally representative drug testing data in the US similarly showed an increase in the usage of illicit fentanyls, heroin, cocaine, and methamphetamine [11]. A third hypothesis is that 2–3 months was the period of time it took for health services to become maximally disrupted. Delays in overdose-preventing healthcare such as emergency medical services, or routine care for opioid use disorder (OUD), could be implicated in the observed overdose spikes. In Norway and the US, there were reports of patients discharged early from drug treatment programmes, medical staff were re-assigned, and accessing basic clinical care for OUD became more difficult [12]. In Norway, evidence from a published report from Oslo, and a personal communication with officials in Bergen, indicate that safe injection facilities were closed for several months, aligning with the peak in overdoses during the pandemic (T. Nguyen, personal communication, 24 February 2020) [13].

Until more nuanced research can be conducted – ideally of a mixed methods nature including qualitative interviews with survivors of overdose – these mechanisms should be considered as hypotheses. Nevertheless, based on certain contextual clues and similarities between the US and Norway, we can ascertain that disruptions to drug markets probably played a key role. This is evidenced by the increasing potency of street opioid supply in both contexts. Notably, reductions in access to illicit drugs was not ubiquitously reported in either the US or Norway by PWUD, although increases in the price of cannabis and tranquilizers were noted in Norway [14]. Furthermore, in both contexts more potent formulations were observed. In the US, the prevalence of highly potent illicitly manufactured fentanyls increased sharply during the pandemic [15]. Fentanyls have not been commonly used by PWUD in Norway [16, 17], but heroin of higher purity was noted during 2020 [5]. In both cases, this is likely to be an acute instance of the 'iron law' of prohibition and drug markets. This law describes how escalating efforts to reduce the supply of illicit drugs create economic and logistical incentives to produce more compact and potent drug formulations that are easier to transport and are more profitable [18]. Given the sharp reductions in travel capacities during the pandemic, it is logical that these dynamics may have been exacerbated, promoting the transport of even stronger formulations of illicit drugs. Although drug traffickers appear to have been

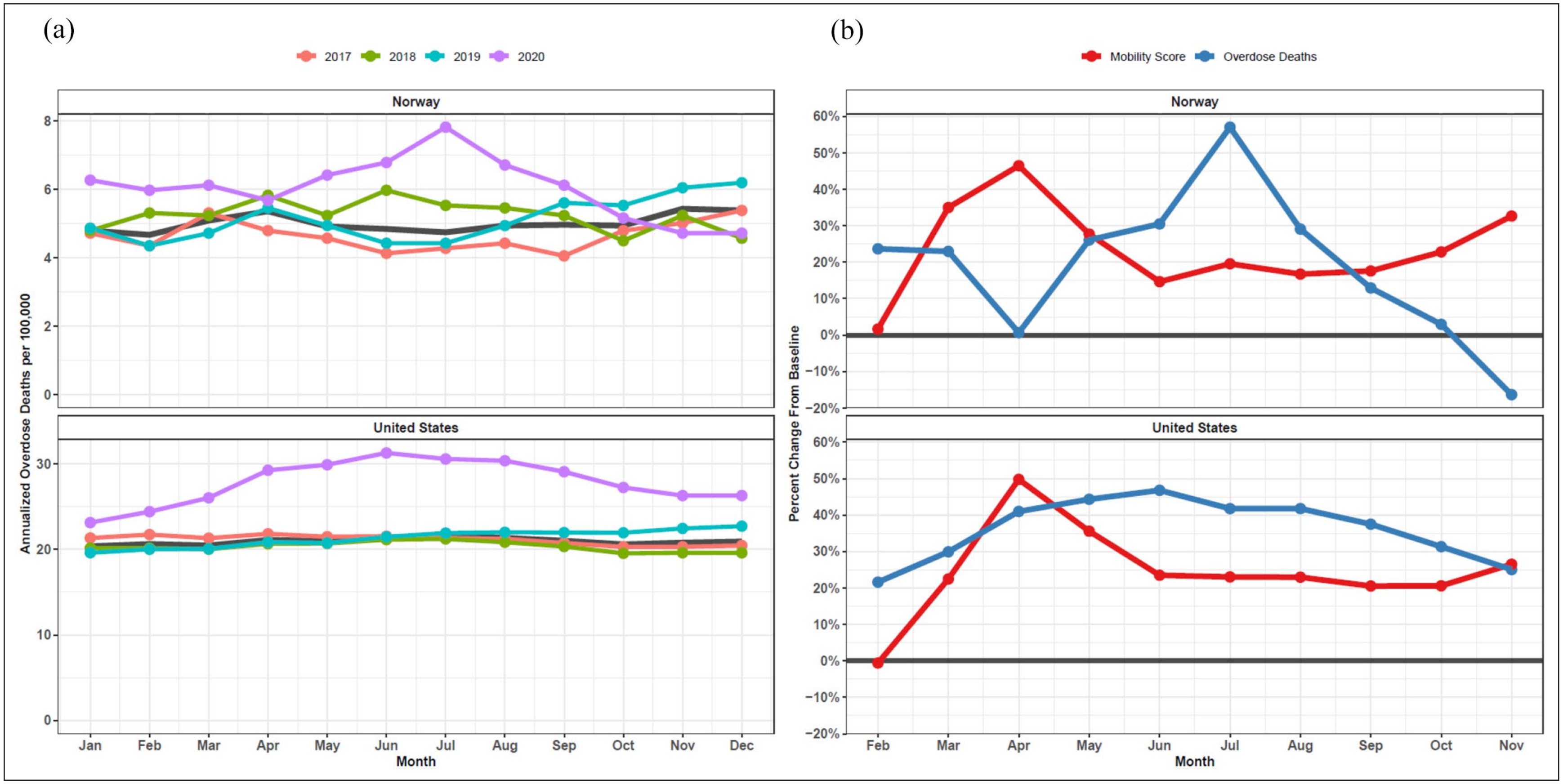

Figure 1. Shifts in drug-overdose mortality and mobility occurring during the COVID-19 pandemic. (a) Drug overdose mortality per 100,000 people by month and year. Rates are annualised. The black line represents the baseline, which is an average of monthly rates in 2017–2019. (b) Percentage increase in drug-related overdose deaths (in blue), defined as the percentage difference in rates in 2020 versus baseline. The percentage reduction in cellphone-based mobility is shown in red. Note that the scale is flipped for the mobility score, so reductions are shown as positive numbers, to facilitate comparison. Mobility score values were not available for January 2020, as the score is calculated as a relative metric from a 0% baseline in February 2020.

successful in continuing to transport despite travel bans, increasing potency may have been a part of the newly adopted strategies.

A key notable feature distinguishing the two profiles of overdose deaths is that rates in Norway returned to baseline relatively quickly, after being elevated for 4–5 months. However, in the US, they remined elevated to December 2020. This probably stems from numerous factors. Of note, Norway had a vastly superior pandemic containment, with an overall mortality rate of about one-tenth of that of the US [19]. This may have facilitated a quicker re-instatement of healthcare and other services. Furthermore, a more rapid return to baseline, and much lower overdose death numbers in Norway at baseline, may reflect a more evidence-based approach to minimising drug-related harms in general. Services that are available in Norway, such as safe consumptions sites, remain largely banned in the US [20]. Furthermore, universal access to healthcare ensures better access to medications for OUD, in which disparities in access remain very sharp in the US [21]. Also, a series of responsive actions were taken by Norwegian governmental organisations during spring and summer 2020, including weekly meetings with user organisations representing PWUD. These led to an awareness of concerns in the PWUD community and the ability for swift actions. Organisations such as low threshold services run by non-governmental organisations or municipalities also quickly adapted to the situation with accommodations, for example by meeting PWUD in street-based locations. The US did provide some relaxation of medications for OUDs prescribing barriers [22], yet efforts to prevent overdose deaths were scattered and underfunded compared to what occurred in the Norwegian context. Extreme rates of incarceration in the US have also been linked to a higher risk of overdose, especially in the context of the entrance of fentanyl to the street drug supply [23]. Norway's lower rates of incarceration may have been beneficial in this regard [24]. In sum, although overdose-preventing services were disrupted in both contexts, the stronger baseline access to these services in Norway, and a more effective pandemic response providing a quicker return to normalcy, probably accounted for the more rapid return to baseline in Norway.

Nevertheless, it is notable that even in Norway – a country with universal access to high-quality services, among the lowest COVID-19 mortality rates of high-income nations, and a highly effective public health infrastructure – a greater than 50% spike in overdose deaths was still seen at the onset of lockdown measures. This has important implications for future pandemic and disaster planning. These findings indicate that further contingency plans for maintaining the safety of PWUD are needed during chaotic and systems-disrupting events.

The main limitations of this work stem from its observational nature. Further causal modelling is needed to parse apart the complicated factors underpinning pandemic-related spikes. In addition, given limited space, data limitations and low numbers of the main study outcome when further stratifying, we were not able to assess the specific profile of drugs implicated in overdose deaths before and during the pandemic. This remains an important area for future study.

Conclusions

Both the US and Norway saw nearly equivalent magnitude relative exacerbations in overdose mortality during the pandemic-related lockdowns. However, the trend returned to baseline quickly in Norway, whereas in the US overdose death rates remained elevated to the end of 2020. It is notable that even Norway – with a highly effective pandemic response, and universal access to healthcare and much stronger social welfare systems – was unable to prevent an increase in drug-related harms during the pandemic. Nevertheless, a quicker return to baseline implies more success in managing pandemic-related fallout. We hypothesise that increases in drug potency, psychological distress during lockdowns and especially disruptions to health services played a role in both contexts. This may have implications for future pandemics, and additional research on these topics may be able to guide decreases in drug-related mortality during future disaster situations.

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ORCID iD

Joseph Friedman https://orcid.org/0000-0002-5225-3267

References

[1] GBD Compare | IHME Viz Hub. http://vizhub.healthdata.org/gbd-compare (accessed 12 June 2019).

[2] Gjersing L, Jonassen KV, Biong S, et al. Diversity in causes and characteristics of drug-induced deaths in an urban setting. *Scand J Public Health* 2013;41:119–125.

[3] Jalal H, Buchanich JM, Roberts MS, et al. Changing dynamics of the drug overdose epidemic in the United States from 1979 through 2016. *Science* 2018;361:eaau1184.

[4] Wakeman SE, Green TC and Rich J. An overdose surge will compound the COVID-19 pandemic if urgent action is not taken. *Nat Med* 2020;26:819–820.

[5] KRIPOS. *Narcotic and doping statistics 2020*. Oslo, Norway: The Norwegian National Criminal Investigation Service. 2021

[6] Friedman J and Akre S. COVID-19 and the drug overdose crisis: uncovering the deadliest months in the United States, January–July 2020. *Am J Public Health* 2021; 111:1284–1291.

[7] Folkehelseinstituttet. *Drug Induced Deaths in 2020 (Norway)*. https://www.fhi.no/nettpub/narkotikainorge/konsekvenser-av-narkotikabruk/narkotikautloste-dodsfall-2020/ (accessed 21 September 2021).

[8] Friedman J, Mann NC, Hansen H, et al. Racial/ethnic, social, and geographic trends in overdose-associated cardiac arrests observed by US emergency medical services during the COVID-19 pandemic. *JAMA Psychiatry*. Epub ahead of print 26 May 2021. DOI: 10.1001/jamapsychiatry.2021.0967

[9] Reiner RC, Barber RM, Collins JK, et al. Modeling COVID-19 scenarios for the United States. *Nat Med* 2020; 27:94–105.

[10] Friedman J, Beletsky L and Schriger DL. Overdose-related cardiac arrests observed by emergency medical services during the US COVID-19 epidemic. *JAMA Psychiatry*. Epub ahead of print 3 December 2020. DOI: 10.1001/jamapsychiatry.2020.4218

[11] Wainwright JJ, Mikre M, Whitley P, et al. Analysis of drug test results before and after the US declaration of a national emergency concerning the COVID-19 outbreak. *JAMA* 2020;324:1674–1677.

[12] Henderson R, McInnes A, Mackey L, et al. Opioid use disorder treatment disruptions during the early COVID-19 pandemic and other emergent disasters: a scoping review addressing dual public health emergencies. *BMC Public Health* 2021;21:1471.

[13] Oslo Municipality Welfare Administration. *Annual report 2020 – User room and infection control. City of Oslo*. https://www.ohchr.org/Documents/HRBodies/OPCAT/NPM/Norway2020.pdf (accessed 27 September 2021).

[14] 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.

[15] Centers for Disease Control and Prevention. *Products – Vital Statistics Rapid Release – Provisional Drug Overdose Data*. https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm (2020, accessed 25 December 2020).

[16] Gjerde H, Bretteville-Jensen AL, Bache-Andreassen L, et al. Which illicit drugs are injected in Oslo? A study based on analysis of drug residues in used injection equipment and self-reported information. *Scand J Public Health* 2021;14034948211043984.

[17] Oslo University. *Opioid related deaths 2000–2017*. https://oslo-universitetssykehus.no/seksjon/avdeling-for-rettsmedisinske-fag/Documents/Opioidrelaterte%20d%c3%b8dsfall%202000-2017.pdf (accessed 27 September 2021).

[18] Beletsky L and Davis CS. Today's fentanyl crisis: prohibition's iron law, revisited. *Int J Drug Policy* 2017;46:156–159.

[19] Team IC-19 Health Service Utilization Forecasting and Murray CJ. Forecasting COVID-19 impact on hospital bed-days, ICU-days, ventilator-days and deaths by US state in the next 4 months. *medRxiv* 2020;2020.03.27.20043752.

[20] Beletsky L, Baker P, Arredondo J, et al. The global health and equity imperative for safe consumption facilities. *Lancet* 2018;392:553–554.

[21] Lagisetty PA, Ross R, Bohnert A, et al. Buprenorphine treatment divide by race/ethnicity and payment. *JAMA Psychiatry* 2019;76:979–981.

[22] Davis CS and Samuels EA. Continuing increased access to buprenorphine in the United States via telemedicine after COVID-19. *Intl J Drug Policy* 2020; 93: 102905.

[23] Brinkley-Rubinstein L, Macmadu A, Marshall BDL, et al. Risk of fentanyl-involved overdose among those with past year incarceration: findings from a recent outbreak in 2014 and 2015. *Drug Alcohol Depend* 2018;185:189–191.

[24] Gjersing L and Bretteville-Jensen AL Characteristics and risk of incarceration among "hard-to-reach" people who use drugs: A five-year prospective cohort study combining self-reports and registry data. *International Journal of Drug Policy* 2021;95:103288. https://doi.org/10.1016/j.drugpo.2021.103288