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Short communication

## Impacts of the COVID-19 pandemic on healthcare access among patients receiving medication for opioid use disorder

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### ABSTRACT

**Background:** The COVID-19 pandemic significantly altered treatment delivery for opioid treatment programs (OTPs) dispensing medications for opioid use disorder (MOUD). We aimed to identify patterns of substance use among MOUD patients and examine whether COVID-19-related impacts on access to healthcare varied across subgroups.

**Methods:** This analysis was embedded within a type 3 hybrid trial that enrolled patients across eight OTPs at the start of the pandemic. Enrolled patients reported on past-30 day use of multiple substances during their baseline assessment. Participants re-contacted in May–July 2020 completed a survey about COVID-19-related impacts on various life domains. Using latent class analysis we identified patient subgroups, and then examined group differences on a set of negative and positive COVID-19 impacts related to healthcare access.

**Results:** Of the 188 trial participants, 135 (72 %) completed the survey. Latent class analysis identified three MOUD patient subgroups: minimal use (class probability: 0.25); opioid use (class probability: 0.34); and polysubstance use (class probability: 0.41). Compared to the minimal use group, the polysubstance use group reported increased substance use and difficulty accessing sterile needles, naloxone, and preferred substance. The opioid use group reported increased substance use and difficulty accessing their preferred substance. There were no significant group differences related to accessing routine or specialized healthcare or medication; or paying attention to their health.

**Conclusions:** During COVID-19, many MOUD patients reported challenges accessing care, particularly harm reduction services for patients with polysubstance use. Additional efforts, like providing wraparound support, may be necessary to serve the needs of MOUD patients.

### 1. Introduction

The COVID-19 pandemic has rapidly altered service provision in opioid treatment programs (OTPs) that dispense FDA-approved medications for opioid use disorder (MOUD) such as methadone and buprenorphine (Davis and Samuels, 2020). In March 2020, OTP guidance was released in which “less stable” patients who previously required daily, in-clinic dosing could receive up to 14-days of take-home doses, whereas “stable” patients who required in-clinic dosing 5–6 days weekly were allowed up to 28-days of take-homes (SAMSHA, 2020).

OTPs provide a range of services beyond MOUD, including counseling, toxicology screens, periodic assessments, and case management (Federal Opioid Treatment Standards, 2001). Case managers in OTPs serve a vital function by offering supports such as vocational counseling; referral to mental health, physical health, and smoking cessation services; and linkage to harm reduction services such as sterile syringes and naloxone distribution (Abbott, 2010). The impacts of COVID-19 and associated changes in OTP service provision on MOUD patients are not yet well understood. While service disruptions might be expected to negatively affect access to care and harm reduction services (Volkow,

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2020), increased access to take-home doses could improve patient well-being and afford patients more time for other positive health behaviors (Davis and Samuels, 2020).

It is also important to consider that MOUD patients have heterogeneous patterns of substance use (Elliott et al., 2019; Cicero et al., 2020), and that COVID-19 impacts on MOUD might differ by patient. In particular, there are extensive data suggesting that MOUD patients with polysubstance use, especially when involving stimulants and sedatives (DeMaria et al., 2000; Enos, 2019), have worse treatment outcomes and higher risk of lethal overdose (Pearce et al., 2020). To effectively characterize COVID-19 impacts on MOUD patients, analytical approaches such as latent class analysis can be applied to first examine whether there are different subgroups of MOUD patients, and then examining whether such subgroups experience differential effects of COVID-19 (Lanza et al., 2013).

The current analysis advances knowledge of how COVID-19 affected MOUD patients in two steps. First, we applied latent class analysis to identify subgroups of MOUD patients based on substances patients reported using upon program admission. Second, we assessed whether COVID-19 affected these patient subgroups differently, based on a cross-sectional survey that assessed both positive and negative COVID-19 impacts. Due to the lack of extant data, analyses were exploratory though we generally expected to find (a) multiple MOUD patient subgroups and (b) a polysubstance-using patient group that experienced more negative COVID-related impacts and fewer positive impacts.

## 2. Methods

### 2.1. Recruitment

Data were collected as part of an on-going cluster-randomized type 3 hybrid trial called Project MIMIC, where OTPs were randomized to one of two implementation strategies designed to advance implementation of contingency management (CM). OTP patients were eligible if they were aged  $\geq 18$  years; and newly inducted on MOUD within the past 30 days. Of note, patients were not required to have an OUD: patients recently released from incarceration or in early recovery were eligible for MOUD induction. When the COVID-19 pandemic first affected OTP regulations (March 2020), 188 MOUD patients across eight OTPs were enrolled in the parent study. All of the OTPs required newly inducted patients to present for medication daily, attend weekly group and/or individual counseling, and attend periodic case management sessions (see (Becker et al., 2020) for further discussion of the partner OTPs).

All 188 patients had completed a baseline survey containing the Timeline Follow-Back Interview (Sobell and Sobell, 1996), which assessed past-30 day use of alcohol; marijuana; powder cocaine; crack cocaine; amphetamines; prescription opioids; heroin; sedatives and hypnotics; benzodiazepines; cigarettes; and e-cigarettes. An IRB amendment from Brown University (protocol #1811002260) was approved to invite participants to complete a brief cross-sectional survey assessing COVID-19 impacts on multiple domains of their functioning. Survey completers received a \$20 rechargeable gift card.

### 2.2. Study population

Between May–July 2020, 135 (72 %) participants completed the cross-sectional survey. Respondents predominantly identified as female (60 %), Non-Hispanic White (83 %), with high school education (60 %), and median age of 34 years. The most common racial and ethnic minorities were Black (5%) and Hispanic (10 %). Methadone was the most commonly received medication (88 %), followed by buprenorphine (11 %): one participant received naltrexone. Respondents were representative of the full sample, with the exception that non-responders were less likely to identify as female (38 %). There were no other differences in socio-demographics or types of substances used. Polysubstance use was common in survey respondents, with marijuana (52 %), prescription

opioid (53 %), heroin (69 %), and cigarettes (83 %) reported in the 30 days prior to study enrollment.

### 2.3. Survey

The cross-sectional survey contained the Epidemic-Pandemic Impact Inventory (EPII) (Grasso et al., 2020), a measure assessing effects of the COVID-19 pandemic across multiple domains. Items were scored in a binary (yes/no) manner. Because our primary research questions were whether COVID-19 affected MOUD access to care, we focused on four items that assessed negative impacts on access to care (i.e., increased substance use; reduced access to routine medical care; reduced access to medication; and reduced access to medical procedures for acute conditions) as well as two items that assessed positive impacts (i.e., decreased substance use; more attention to personal health). To account for population-specific experiences, we added three questions about COVID-19-related negative impacts on access to harm reduction services (i.e., access to naloxone, sterile needles, recovery support services), one about access to their preferred substance, and one about access to take-home medication.

### 2.4. Statistical analysis

Preliminary analyses examined whether assessment timing (i.e., time difference between baseline substance use assessment and the survey), condition assignment (i.e., assignment to implementation strategy) or treatment dosage (i.e., number of CM sessions received) were associated with any of the items of interest. No evidence was found of any associations. Thus, data were pooled across conditions and neither timing nor number of CM sessions were controlled for in analyses.

As a first step, different typologies among MOUD patients were identified using latent class analysis based on binary indicators of past 30-day use reported during the baseline assessment (Lanza et al., 2013). Models were estimated for 1–6 class sizes, and the optimal class size was determined using model fit statistics and bootstrap likelihood ratio test comparing  $k$ -class with  $K-1$  class models. Subsequently, associations between latent class membership and focal items were assessed by including each outcome as a covariate in the final model. This method produces class-specific probabilities of each outcome while accounting for classification error and avoids contamination of the classification model (Lanza et al., 2013).

## 3. Results

Overall, MOUD patients reported numerous positive and negative COVID-19-related impacts (Table 2). A substantial proportion of MOUD patients experienced disruption to routine medical care (52 %); while disruptions in accessing medical care for a serious condition (8%), preferred substance (19 %), and medication access (19 %) were less common. Fewer participants reported reduced access to harm reduction materials, such as sterile needles (8%), naloxone (7%), and recovery support (27 %). Comparable proportions of MOUD patients reported increasing (38 %) and decreasing (42 %) their substance use during the COVID-19 pandemic, and 42 % reported increased access to take-home medication.

Model fit statistics from the latent class analysis of substance use suggested that either a 3-class or 4-class solution was the most suitable (Supplementary Table 1). The 3-class solution was selected given the small size (class probability: 0.04) of the additional class limited interpretability. Based on conditional probabilities, the three classes appeared to describe patients with minimal substance use, patients using predominantly opioids, and patients with polysubstance use (Table 1). The *minimal use class* (class probability: 0.25) was characterized by low probability ( $p < 0.5$ ) of reporting recent heroin and zero-probability for prescription opioid, powder cocaine, crack cocaine, and amphetamine use, a pattern consistent with MOUD patients in early recovery. In the

**Table 1**  
Three-class solution for latent class analysis of baseline substance use among Project MIMIC participants that completed EPII questionnaire.

Indicator variable	Minimal use	Prescription opioids	Polysubstance
Opioids	0.00	<b>0.92</b>	<b>0.53</b>
Heroin	0.18	<b>0.72</b>	<b>0.98</b>
Cocaine powder	0.00	0.00	<b>0.74</b>
Cocaine crack	0.00	0.13	<b>0.64</b>
Amphetamines	0.00	0.14	0.20
Alcohol	0.14	0.32	0.24
Marijuana	0.28	0.48	<b>0.69</b>
Sedative/hypnotics	0.03	0.10	0.14
Benzodiazepines	0.11	0.23	0.43
Cigarettes	<b>0.74</b>	<b>0.77</b>	<b>0.93</b>
e-cig	0.20	0.25	0.22
Class probability	0.25	0.34	0.41

Note: Highlighted probability greater than 0.5.

*opioid use class* (class probability: 0.34), the highest probabilities of recent use were for prescription opioids and heroin, with low probabilities of powder cocaine, crack cocaine, and amphetamine. The largest subgroup, *polysubstance use class* (class probability: 0.41), was characterized by high probability of recent heroin, prescription opioid, powder cocaine, crack cocaine, and marijuana. High probability of recent cigarette use was observed in all three classes.

As shown in [Table 2](#), significant differences in the probability of negative COVID-19-related impacts were found in four areas: increased use of alcohol or substances; difficulty accessing sterile needles; difficulty accessing naloxone; and difficulty accessing preferred substance. Specifically, the probability of reporting increased substance use and of reporting difficulty accessing their preferred substance were both greater among those in the polysubstance and opioid classes than in the minimal use class. In addition, the probability of reporting difficulty accessing sterile needles and naloxone differed between the polysubstance class and the minimal use class. Due to high standard error in

**Table 2**  
Changes in substance use, harm reduction, health service and self-care access by substance use latent class among Project MIMIC Cohort 1 participants that completed the EPII questionnaire during COVID-19 pandemic.

	Overall probability	Baseline past 30 day substance use [mean (S.E.)]			Equality test of means			
		Minimal use	Opioid use	Polysubstance use	Overall	Class 1 vs 2	Class 1 vs 3	Class 2 vs 3
<b>Negative effects: Items added to assess access to substance use services</b>								
Difficulty accessing sterile needles	0.08	0.00 (0.00)	0.06 (0.05)	0.16 (0.06)	<b>0.002</b>	0.269	<b>0.005</b>	0.265
Difficulty accessing naloxone	0.07	0.00 (0.00)	0.07 (0.08)	0.11 (0.07)	<b>0.007</b>	0.396	<b>0.095</b>	0.737
Difficulty accessing preferred substance	0.19	0.00 (0.00)	0.19 (0.07)	0.30 (0.07)	<b>&lt;0.001</b>	<b>0.007</b>	<b>&lt;0.001</b>	0.308
Difficulty accessing recovery support	0.27	0.18 (0.09)	0.32 (0.08)	0.28 (0.07)	0.527	0.275	0.359	0.736
<b>Negative effects: EPII items on substance use and medical care access</b>								
Increase in use of alcohol or substances	0.38	0.10 (0.08)	0.46 (0.08)	0.41 (0.08)	<b>0.003</b>	<b>0.002</b>	<b>0.006</b>	0.669
Unable to get needed medications	0.19	0.16 (0.07)	0.20 (0.07)	0.20 (0.06)	0.884	0.705	0.655	0.975
Got less routine medical care than usual	0.52	0.40 (0.09)	0.53 (0.09)	0.59 (0.08)	0.279	0.328	0.114	0.650
Unable to access medical care for a serious condition	0.08	0.13 (0.09)	0.04 (0.06)	0.07 (0.05)	0.806	0.543	0.554	0.777
<b>Positive effects: Item added about take-home doses and EPII items on substance use and personal health</b>								
Greater access to take-home doses of MOUD	0.42	0.71 (0.75)	0.38 (0.14)	0.34 (0.08)	0.556	0.707	0.610	0.808
Less use of alcohol or substances	0.42	0.45 (0.12)	0.35 (0.08)	0.47 (0.08)	0.611	0.531	0.923	0.325
Paid more attention to personal health	0.65	0.56 (0.09)	0.76 (0.08)	0.64 (0.07)	0.211	0.080	0.493	0.281

the minimal use class, a large effect observed when evaluating access to take-home MOUD was rendered non-significant, suggesting a larger sample may more reliably show this effect. There were no significant differences between the opioid use and polysubstance use classes. The relationship between latent class membership and other negative (e.g., disrupted access to medication, and routine or specialist medical care) and positive (e.g., increased attention to health) outcomes did not significantly differ across latent classes.

#### 4. Discussion

The current study suggests both negative and positive impacts of the COVID-19 pandemic among MOUD patients. Three distinct profiles of MOUD patients were identified: minimal substance use; opioid use; and polysubstance use. MOUD patients with higher levels of polysubstance use at baseline experienced more negative COVID-19-related impacts. Patients in the polysubstance use class experienced more disruptions in access to harm reduction services (e.g., sterile needles, naloxone) and increased alcohol or substance use, and those in the opioid class experienced more difficulty accessing sterile needles and increased alcohol or substance use relative to the minimal substance use class. Put simply, those who presented to treatment with minimal use were less likely to experience negative COVID-19-related impacts than those with more active and varied patterns of use. Our findings that patients with polysubstance use experienced more negative COVID-19-related impacts are consistent with extant literature documenting associations between polysubstance use and poor MOUD treatment retention and outcomes ([Lin et al., 2020](#); [Wang et al., 2017](#)). This work suggests patients with polysubstance use might benefit from targeted outreach during the COVID-19 pandemic.

This study advances knowledge by documenting that a substantial proportion of MOUD patients experienced negative COVID-19-related impacts on access to routine medical care and increased substance use. Results provided encouraging data that harm reduction services

were not disrupted for most respondents; less encouraging was the finding that most patients did not have greater access to take-homes, suggesting that OTPs were not taking advantage of the increased flexibility afforded by federal guidelines. Moreover, a substantial proportion of patients reported positive impacts—including those attributable to personal health enhancement and decreased substance use. To what extent the trajectories for such negative and positive impacts persist amidst continuance of the COVID-19 pandemic remains to be seen.

#### 4.1. Limitations

Results should be considered in the context of limitations. First, the current sample was drawn from eight OTPs in the New England region of the United States and should not be considered representative of OTPs throughout the United States. Second, although we did not detect systematic differences between survey respondents and non-respondents, it is possible that participants who were not able to complete the survey due to limited telephone or internet access might reflect a subgroup of individuals with greater difficulty accessing healthcare. Third, it is not possible to determine how COVID-19-related impacts among MOUD patients compare to other populations. Future work should seek to aggregate findings across studies using the EPII and determine which populations experience the greatest COVID-19-related impacts.

#### 4.2. Conclusion

In summary, this study assessed negative and positive impacts of COVID-19 among a vulnerable MOUD patient population. Patients with higher levels of polysubstance use experienced greater disruptions in essential harm reduction services (e.g., sterile needles and naloxone). These results highlight the multidimensional support systems required by people accessing MOUD services in general, and those with polysubstance use in particular. Novel interventions that address disruptions in healthcare access while maximizing recovery are urgently needed to reduce morbidity and mortality in the community. The COVID-19 pandemic may provide the impetus needed to bring systematic change to modernize MOUD delivery, including access to telehealth, reduced drug screening, and increased patient decision-making (Krawczyk et al., 2020). Such efforts should consider the unique needs of patients with polysubstance use to effectively identify and address barriers to healthcare delivery.

#### Declaration of Competing Interest

No conflict declared

#### Contributors

BPJ, TJ, and SB conceived of this analysis. SB and BG conceptualized the parent study and obtained funding. SB and BG supervised study conduction including data collection, data management, data analysis, and quality control. JY and KRY collected survey data. ELB and BH are study co-investigators and contributed to study oversight and management. BPJ and TJ conducted data cleaning, preparation, and analysis. BPJ completed the first draft of the manuscript with support from TJ and SB. All authors contributed substantially to multiple rounds of review and revision, and approved final submission.

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#### Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.drugalcdep.2021.108617>.

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