



Use of non-prescribed buprenorphine in the criminal justice system: Perspectives of individuals recently released from incarceration

Jan Gryczynski ^{a,*}, Joshua D. Lee ^b, Kristi Dusek ^a, Ryan McDonald ^b, Anjalee Sharma ^a,
Mia Malone ^b, Laura B. Monico ^a, Anna Cheng ^b, Angela DeVeau-Geiss ^c, Howard D. Chilcoat ^{c,d}

^a Friends Research Institute, Baltimore, MD, USA

^b New York University School of Medicine, New York, NY, USA

^c Indivior, Inc., North Chesterfield, VA, USA

^d Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA



ARTICLE INFO

Keywords:

Buprenorphine

Diversion

Opioid use disorder

Criminal justice system

ABSTRACT

Buprenorphine, an effective treatment for opioid use disorder (OUD), remains underutilized in many U.S. jails and prisons. However, use of non-prescribed (i.e., diverted) buprenorphine has been reported in these settings. The current study examined non-prescribed buprenorphine use experiences in correctional and community contexts. The study conducted face-to-face interviews with 300 adults with OUD/opioid misuse and recent incarceration, recruited in Baltimore, MD, and New York, NY ($n = 150$ each). Illicit/non-prescribed opioid use during incarceration was reported by 63% of participants; 39% reported non-prescribed buprenorphine. Non-prescribed buprenorphine was considered the most widely available opioid in jails/prisons in both states (81% reported "very" or "somewhat" easy to get). The average price of non-prescribed buprenorphine in jail/prison was $\sim 10 \times$ higher than in the community ($p < 0.001$). Participants were more likely to endorse getting high/mood alteration as reasons for using non-prescribed buprenorphine during incarceration, but tended to ascribe therapeutic motives to use in the community (e.g., self-treatment; $p < 0.001$). Multivariable logistic regression analyses showed that different individual-level characteristics were associated with history of non-prescribed buprenorphine use during incarceration and in the community. Use of non-prescribed buprenorphine during incarceration was associated with younger age ($p = 0.006$) and longer incarceration history ($p < 0.001$), while use of non-prescribed buprenorphine in the community was associated with MD recruitment site ($p = 0.001$), not being married ($p < 0.001$), prior buprenorphine treatment experience ($p < 0.001$), and housing situation ($p = 0.01$). These findings suggest that different dynamics and demand characteristics underlie the use of non-prescribed buprenorphine in community and incarceration contexts, with implications for efforts to expand OUD treatment in correctional settings.

1. Introduction

The United States (US) has been facing an ongoing crisis of opioid use disorder (OUD) and overdose death (Cicero, Ellis, & Harney, 2015; Cicero, Ellis, Surratt, & Kurtz, 2014a; Dart et al., 2015; Gomes, Tadrous, Mamdani, Paterson, & Juurlink, 2018; Hedegaard, Minino, & Warner, 2018). In 2017, there were more than 70,000 drug overdose deaths in the United States, more than two-thirds of which involved opioids (Hedegaard et al., 2018; Scholl, Seth, Kariisa, Wilson, & Baldwin, 2019).

At a population level, opioid misuse and OUD are strongly associated with criminal justice system involvement (Winkelman, Chang, &

Binswanger, 2018). Deaths from opioids and other substances have been reported during incarceration (Fiscella et al., 2020). Upon release from incarceration, people with OUD are especially prone to relapse and face elevated risk of overdose death due to diminished tolerance (Binswanger, Blatchford, Mueller, & Stern, 2013; Joudrey et al., 2019; Krinsky, Lathrop, Brown, & Nolte, 2009; Merrall et al., 2010; Seaman, Brettle, & Gore, 1998). Thus, the criminal justice system can play a critical role in the national response to the OUD epidemic by identifying incarcerated people with OUD and initiating evidence-based treatment (Brinkley-Rubinstein et al., 2018; Csete, 2019; Farabee, 2018).

* Corresponding author at: Friends Research Institute, 1040 Park Avenue, Suite 103, Baltimore, MD 21201, USA.

E-mail address: jgryczynski@friendsresearch.org (J. Gryczynski).

1.1. Effectiveness of opioid agonist treatment in jails and prisons

A recent systematic review and meta-analysis found that initiating medications for opioid use disorder (MOUD) during incarceration increases treatment utilization and reduces illicit opioid use postrelease (Moore et al., 2019). Providing MOUD during incarceration is also associated with reduced postrelease overdose and mortality (Degenhardt et al., 2014; Green et al., 2018). Although most experimental and quasi-experimental studies of corrections-based MOUD have examined methadone (Moore et al., 2019), evidence from randomized trials also support initiating buprenorphine during incarceration. In one trial, participants who started buprenorphine treatment in prison had superior postrelease treatment engagement (Gordon et al., 2014) and longer-term retention in community treatment (Gordon et al., 2017) compared to those scheduled to start treatment postrelease. A randomized trial comparing buprenorphine and methadone initiation at Riker's Island jail in New York found that participants in the buprenorphine arm had significantly better treatment continuity postrelease compared to participants who initiated methadone (Magura et al., 2009).

Despite the high prevalence of OUD among criminal justice-involved populations and the effectiveness of treatment, few jails or prisons offer inmates the opportunity to either continue or initiate MOUD. The longstanding reticence to embrace MOUD in the criminal justice system (including in jails, prisons, drug courts, and other sentencing alternative programs) stems largely from prevailing negative attitudes and stigma related to MOUD and concerns about their diversion and misuse (Farabee, 2018; Fiscella, Moore, Engerman, & Meldrum, 2004; Matusow et al., 2013; Nunn et al., 2009; Sharma et al., 2017).

1.2. Use of non-prescribed buprenorphine in community and criminal justice settings

The abuse liability and diversion of opioid agonist and partial agonist MOUD within criminal justice settings may contribute to negative attitudes toward their adoption among corrections officials and administrators. Numerous reports have documented buprenorphine diversion and misuse in the United States and internationally (Cicero, Ellis, Suratt, & Kurtz, 2014b; Johanson, Arfken, di Menza, & Schuster, 2012; Lofwall & Walsh, 2014; Yokell, Zaller, Green, & Rich, 2011), including in correctional institutions (Bi-Mohammed, Wright, Hearty, King, & Gavin, 2017; Tompkins, Wright, Waterman, & Sheard, 2009; White et al., 2016; Wish et al., 2012). The availability of non-prescribed (i.e., diverted) buprenorphine in the criminal justice system could pose a barrier to treatment expansion in these settings, insofar as it could affect attitudes toward treatment among institutional leadership, correctional staff, and inmates.

Importantly, previous research demonstrates that many people who use non-prescribed buprenorphine in the community do so largely for self-therapeutic purposes, often in an attempt to alleviate acute withdrawal symptoms or as self-treatment of OUD (Allen & Harocopoulos, 2016; Chilcoat, Amick, Sherwood, & Dunn, 2019; Cicero et al., 2014b; Cicero, Ellis, & Chilcoat, 2018; Genberg et al., 2013; Lofwall & Walsh, 2014; Mitchell et al., 2009; Schuman-Olivier et al., 2010). In some cases, use of non-prescribed buprenorphine may be a response to limited treatment access in the community (Lofwall & Walsh, 2014). Moreover, experiences with non-prescribed buprenorphine can lead some people to seek buprenorphine treatment from a health care provider (Gryczynski et al., 2013; Monico et al., 2015). Nevertheless, non-prescribed buprenorphine can also be used for nontherapeutic reasons. Non-prescribed buprenorphine's function within the broader drug ecosystem could differ based on context, particularly in settings like jails and prisons where the availability of other opioids may be subject to special constraints.

1.3. Focus of the current study

There are considerable gaps in understanding the circumstances and dynamics of non-prescribed buprenorphine use in criminal justice settings, how it compares with other drug use, market factors regarding availability and cost, and motivations for using it. Concerns about diversion have undermined the expansion of effective MOUD treatment in the United States (Doernberg, Krawczyk, Agus, & Fingerhood, 2019). Thus, understanding buprenorphine diversion (including how common it is, why and how people use it) and other opioid use in the criminal justice system could be important for informing efforts to expand the availability of MOUD treatment in jails and prisons, where such treatment has been greatly underutilized relative to need. The current study examined buprenorphine diversion in the criminal justice system compared with a community setting, drawing on the perspectives of individuals with a recent history of incarceration and OUD/opioid misuse in two states.

2. Methods

2.1. Design, participants, and setting

The study conducted face-to-face interviews in March–July 2019 with adults with recent history of opioid misuse/OUD and incarceration in two communities ($N = 300$; 150 in Baltimore, MD [where buprenorphine treatment was generally not yet available in the criminal justice system] and 150 in New York, NY [where buprenorphine treatment was generally available in the New York City jail system, though not standard in New York or New Jersey state prisons]).

Inclusion criteria were: age 18 or older, past year OUD or opioid misuse (i.e., self-reported nonmedical use of illicit or non-prescribed opioids), and recently released from incarceration (within the 6 months prior to the interview date). The study excluded individuals if they were unable or unwilling to provide informed consent. Study staff verified incarceration experiences during eligibility screening using public judiciary databases, release paperwork that participants provided, and/or experienced interviewers probing about the incarceration experience.

The current study recruited individuals from the community who had a recent experience of incarceration coupled with opioid misuse/OUD (i.e., those in a position to know about the phenomenon of non-prescribed buprenorphine use during incarceration). We considered recruiting participants directly from correctional institutions but decided against it due to the added logistical challenges and concerns about participant candor if discussing the nuances of a contraband economy during a current incarceration episode (due to fear of consequences from the institution or other inmates). Due to the exploratory nature of the topic and in consideration that participants would likely have experiences in a variety of correctional facilities, we used a broad definition of recent incarceration to include jails (short-term facilities where inmates await trial or transfer, or serve sentences of short duration typically less than one year) as well as prisons (long-term facilities housing convicted inmates).

The study recruited participants using a multi-pronged strategy, including inviting eligible participants from existing studies in long-term follow-up that the host institutions conducted (Friends Research Institute and New York University), recruiting from new admissions at a community OUD treatment program, street-based outreach, referrals from participants, and fliers posted in accessible community locations.

Interviews were anonymous, such that the study did not record direct identifiers. The Western and the New York University Institutional Review Boards approved the study.

2.2. Measures

The research team developed and refined a structured interview specifically for this project. The full interview questions are available in

the appendix. Trained research interviewers administered face-to-face interviews (about 1 h in length); the interviewers then entered data into a secure web-based system. In addition to querying background characteristics, the interview asked about experiences and opinions regarding opioids (including but not limited to non-prescribed buprenorphine) in the context of (a) the community (i.e., while not incarcerated) and (b) the criminal justice system (i.e., while in jail or prison). The interview inquired about perceived availability, use behaviors, and motivations for using non-prescribed buprenorphine. The study also asked participants about market dynamics surrounding non-prescribed buprenorphine within the criminal justice system (e.g., cost, how people pay for it). The study conducted in-depth qualitative interviews with a subset of participants, which we report separately (Monico et al., 2021).

2.2.1. Opioid and other drug use

The study asked participants a series of questions about their use of specific substances in the past 12 months, including heroin/illicit street opioids (e.g., fentanyl), non-prescribed buprenorphine, methadone, amphetamines, benzodiazepines, and cocaine. If participants endorsed use of a substance in the past 12 months, the interviewer asked about its use during incarceration. The study also asked participants about lifetime use of non-prescribed buprenorphine in the community and during incarceration.

2.2.2. Availability of opioids in the criminal justice system and in the community

A series of questions asked about participants' perceived availability of different opioids in the community and the criminal justice system. The study asked participants to rate the perceived availability of (a) non-prescribed buprenorphine, (b) heroin (with or without fentanyl), (c) heroin alone (explicitly without fentanyl), and (d) other non-prescribed opioids on a 4-point ordinal response scale (very easy to get, somewhat easy to get, somewhat difficult to get, very difficult to get, with a fifth option of "don't know"). A separate item requested that participants specifically compare the availability of non-prescribed buprenorphine to other opioids during incarceration: "Which is easier to get in jail/prison, buprenorphine or other opioids?" (response options: buprenorphine, other opioids, no difference in availability, don't know). The interview also asked participants about the cost of non-prescribed buprenorphine for an 8-mg dose in the community and in jail/prison.

2.2.3. Motivations for using non-prescribed buprenorphine

The study assessed motivations for using non-prescribed buprenorphine using a uniform set of questions about participants' reasons for use while residing in the community (not during incarceration) and while incarcerated. The study asked participants to report their "main reason" for using non-prescribed buprenorphine in community and incarceration contexts, with response options of "to keep from getting sick/avoid opioid withdrawal", "to self-treat my opioid addiction", "to get high or alter my mood", and "other (specify)". To assess a range of potential motives, study staff also read participants a series of possible reasons for using non-prescribed buprenorphine and asked participants to indicate whether each reason applied to each setting (akin to "select all that apply").

2.2.4. Perspectives on treatment expansion

The study asked participants about the extent to which expanding MOUD in criminal justice settings might impact peoples' use of illicit opioids in these settings, including non-prescribed buprenorphine. Response options were "would reduce a lot", "would reduce moderately", "would reduce a little", and "would not reduce at all".

2.3. Data analysis

We tabulated participant responses descriptively for the full sample and by recruitment site (Maryland and New York), examining

participant background characteristics, past year substance use behaviors (overall, and specifically during incarceration), perceived availability and ease of access to various opioids in the criminal justice system, and cost of non-prescribed buprenorphine in the community and in correctional settings. We examined differences between MD and NY sites using likelihood ratio χ^2 tests (categorical variables) and *t*-tests (continuous variables). The study used multivariable logistic regression models to examine associations between participant characteristics and lifetime history of non-prescribed buprenorphine (a) in the community and (b) during incarceration. We used the same explanatory variables in both models: recruitment site (MD vs. NY); age (in years); sex (male vs. female); race; housing situation (stable housing vs. unstable housing [homeless, in a shelter] vs. temporary housing [e.g., halfway or recovery house]); marital status (not currently married vs. married); lifetime years of incarceration; prior methadone treatment experience (yes/no); prior buprenorphine treatment experience (yes/no); and age of first non-medical opioid use. The analytical sample for the logistic regression analyses was $n = 283$, due to missing data on predictors and excluding several cases with potential logical inconsistencies across interview questions for the dependent variables. The study compared motivations for using non-prescribed buprenorphine in the community and the criminal justice system among those who reported non-prescribed buprenorphine use in both settings ($n = 137$). Because the same participants rated motivations for use under community vs. criminal justice system contexts, we compared these responses using tests of symmetry and McNemar's χ^2 test for paired samples.

3. Results

3.1. Participant characteristics

Participant background characteristics, overall and by recruitment site, are shown in Table 1. Compared to participants recruited in New York, participants recruited in Maryland were younger and more likely to be female ($p = 0.01$), Black, non-Hispanic, and to report being on probation or parole ($p < 0.001$). Participants in Maryland were more likely to reside in temporary housing (e.g., recovery or halfway house), while participants in New York were more likely to report unstable housing (e.g., homelessness, living in a shelter; $p < 0.001$) or living in temporary housing. Although a similarly high proportion of participants at both sites had prior OUD treatment (94.0% overall), the study found differences in the mix of prior MOUD experience, with Maryland participants more likely to have been in treatment with buprenorphine ($p < 0.001$) and naltrexone ($p = 0.01$), and New York participants more likely to have experience with methadone treatment ($p = 0.001$).

Participants reported a mix of incarceration settings and release from many different facilities. The most commonly reported incarceration settings were jail units within the Baltimore City system (reported by 72.7% of MD participants) and the Riker's Island complex (reported by 72.0% of NY participants). In total, participants reported recent incarceration in 21 distinct facilities in NY and 19 facilities in MD (as well as several facilities in other states).

3.2. Substance use

Substance use among participants during incarceration was common (Table 2). Overall, 63.0% of participants reported illicit or non-medical opioid use during incarceration, while 38.7% of participants reported using non-prescribed buprenorphine while incarcerated. Use of opioids other than buprenorphine (all types combined) during incarceration was reported by 50.7% participants. Participants recruited in New York reported the highest rate of heroin or illicit street (e.g., fentanyl) opioid use while incarcerated (54.0%), while participants recruited in Maryland reported the highest rate of non-prescribed buprenorphine while incarcerated (46.7%). Notably, although 51.7% of participants used non-prescribed buprenorphine in the past year (either in the community

Table 1
Participant characteristics.

	Full sample (n = 300)	Maryland (n = 150)	New York (n = 150)
Age, in years, mean (SD)	42.4 (10.3)	39.7 (10.6)	45.1 (9.3)
Sex			
Male, %	82.0	78.0	86.0
Female, %	17.0	22.0	12.0
Non-binary/transgender, %	1.0	0.0	2.0
Race			
White, %	30.4	32.0	28.7
Black, %	52.4	62.7	42.0
Other/Multiple races, %	17.3	5.3	29.3
Ethnicity			
Hispanic, %	27.4	2.7	52.0
Education			
Less than high school, %	35.0	29.3	40.7
High school/GED, %	46.0	49.3	42.7
Some college, < 4y, %	16.0	17.3	14.7
College degree or higher, %	3.0	4.0	2.0
Current employment status			
Not employed, %	91.3	89.3	93.3
Part-time, %	6.4	6.7	6.0
Full-time, %	2.4	4.0	0.7
Housing arrangement			
Stable, %	34.3	34.7	34.0
Temporary (e.g., recovery/halfway house), %	32.0	54.7	9.3
Unstable (homeless/shelter), %	33.7	10.7	56.7
Prior treatment experience (lifetime)			
Any treatment for OUD, %	94.0	92.7	95.3
Buprenorphine treatment, %	46.7	69.3	24.0
Methadone treatment, %	62.7	53.3	72.0
Naltrexone (oral or injectable), %	7.0	10.7	3.3
Criminal justice involvement			
Currently on probation or parole, %	32.7	54.7	10.7
	10.6	10.7	10.4
Weeks since release, mean (SD)	(7.9)	(7.7)	(8.1)
	67.9	57.1	78.8
Days in jail, past 12 m, mean (SD)	(80.6)	(77.1)	(82.9)
	36.5	42.8	30.3
Days in prison, past 12 m, mean (SD)	(90.2)	(94.6)	(85.4)

or while incarcerated), use of non-prescribed buprenorphine in the absence of other opioid use (heroin/illicit street opioids, non-prescribed methadone, or other non-prescribed opioids) was rare. Only 3.0% of participants ($n = 9$, all from Maryland) reported sole use of non-prescribed buprenorphine without any other opioid use in the past year, all during an incarceration episode.

3.3. Perceived availability of non-prescribed buprenorphine

When the interviewers asked participants whether non-prescribed buprenorphine or other opioids were easier to get in the criminal justice system, 60.7% of participants endorsed non-prescribed buprenorphine and 13.0% endorsed other non-prescribed/illicit opioids, with 24.0% reporting no difference in availability (2.3% reported "don't know"). Compared to participants recruited in New York, participants recruited in Maryland were more likely to report that non-prescribed buprenorphine was easiest to get (79.3% MD vs. 42.0% NY, $p < 0.001$).

Fig. 1 summarizes perceived availability of specific opioids in the criminal justice system. Non-prescribed buprenorphine had the greatest availability (54.7% "very easy to get" and 26.0% "somewhat easy to get" for the combined sample). Participants in New York reported relatively high levels of perceived availability in the criminal justice system for heroin and other opioids, whereas in Maryland, non-prescribed buprenorphine was more available relative to other opioid alternatives.

Table 2

Substance use, perceived availability, and cost of opioids in the criminal justice system.

	Full Sample (n = 300)	Maryland (n = 150)	New York (n = 150)
<i>Use in the past 12-months, %</i>			
Non-prescribed buprenorphine			
Any	51.7	62.0	41.3
While incarcerated	38.7	46.7	30.7
Heroin/illicit street opioids			
Any	87.3	83.3	91.3
While incarcerated	45.0	36.0	54.0
Non-prescribed methadone			
Any	31.0	28.0	34.0
While incarcerated	9.7	4.7	14.7
Other non-prescribed opioids			
Any	42.4	44.7	40.0
While incarcerated	16.4	14.0	18.7
Cocaine			
Any	60.0	62.7	57.3
While incarcerated	9.4	8.0	10.7
Amphetamines			
Any	14.3	13.3	15.3
While incarcerated	2.7	1.3	4.0
Benzodiazepines			
Any	43.0	43.3	42.7
While incarcerated	14.7	12.7	16.7
<i>Perceived availability</i>			
Which is easier to get in jail/prison?			
Non-prescribed buprenorphine	60.7	79.3	42.0
Other opioids	13.0	11.3	14.7
No difference in ease of availability	24.0	6.7	41.3
Don't know	2.3	2.7	2.0
<i>Cost of non-prescribed buprenorphine^a</i>			
Community, \$USD, mean (SD)	7.1 (3.1)	7.4 (2.9)	6.9 (3.3)
Criminal justice system, \$USD, mean (SD)	76.9 (48.3)	92.7 (53.3)	56.4 (30.6)

Note: Rates are not mutually exclusive.

^a $n = 102$ (MD) and 78 (NY) among participants with direct knowledge of prices for non-prescribed buprenorphine in both community and criminal justice settings.

3.4. Contraband market for non-prescribed buprenorphine

On average, participants reported that the cost of non-prescribed buprenorphine in jail/prison was more than 10 times higher than in the community for an 8-mg dose. There were no significant differences between Maryland and New York participants in the reported cost of an 8-mg dose of sublingual non-prescribed buprenorphine in the community (~\$7 USD; Table 2). However, non-prescribed buprenorphine was more expensive in jail/prison in Maryland than in New York (mean \$93 vs. \$56; $p < 0.001$). Participants also reported that availability can vary based on "who you know" and across different facilities. Participants reported a variety of transactions involving non-prescribed buprenorphine, the most common of which were arranging payment between third parties on the outside (70.0%), trade/barter (69.0%), and direct payment (typically through mobile payment applications).

3.5. Perspectives on medication treatment expansion

Most participants reported that increasing access to MOUD treatment in criminal justice settings would reduce illicit opioid use (including non-prescribed buprenorphine use), with 56.0% reporting that expanding MOUD access would reduce such use "a lot", 20.0% reporting "moderately", and 18.0% reporting "a little". Only 6.0% of participants thought that expanding treatment in jails and prisons would not reduce use of illicit opioids during incarceration at all.



Fig. 1. Perceived availability of opioids in the criminal justice system (N = 300; 150 in each state).

3.6. Associations of participant characteristics with non-prescribed buprenorphine use

Logistic regression analyses found that different participant characteristics were associated with history of non-prescribed buprenorphine use in the community and during incarceration (Table 3). Overall, 74.9% of participants in the analytical sample endorsed lifetime use of non-prescribed buprenorphine (19.4% community only, 8.5% incarceration only, 47.0% both settings). Use of non-prescribed buprenorphine during incarceration was associated with younger age (Adjusted Odds Ratio [AOR] = 0.96 [95% Confidence Interval = 0.93, 0.99]; $p = 0.006$) and lifetime years of incarceration (AOR = 1.09 [1.05, 1.13]; $p < 0.001$). Use of non-prescribed buprenorphine in the community was associated with MD site (AOR = 3.92 [1.69, 9.10]; $p = 0.001$), not being married (AOR = 4.02 [1.78, 9.11]; $p < 0.001$), and prior buprenorphine treatment experience (AOR = 3.10 [1.63, 5.90]; $p < 0.001$). Housing status was also associated with non-prescribed buprenorphine use in the community (joint test: $p = 0.01$). Compared to participants living in temporary housing (e.g., halfway or recovery house), participants were more likely to report non-prescribed buprenorphine use in the community if they lived in stable housing (AOR = 2.25 [1.04, 4.88]; $p = 0.04$) or had an unstable housing situation (i.e., homeless or shelter, AOR = 3.77 [1.55, 9.15]; $p = 0.003$).

3.7. Motivations for using non-prescribed buprenorphine

Table 4 shows reasons for using non-prescribed buprenorphine in the community and the criminal justice system among 137 participants with experience using it in both settings. There were substantive and statistically significant differences in the main motivations attributed to non-prescribed buprenorphine use in community and criminal justice contexts ($p < 0.001$). In reflecting on their "main reason" for using non-prescribed buprenorphine in the community, participants were most likely to endorse "to keep from getting sick/avoid withdrawal" (41.6%), followed by "to self-treat my opioid addiction" (32.1%), while 25.6% endorsed "to get high or alter my mood." However, when these same participants reflected on their "main reason" for using non-prescribed buprenorphine in the criminal justice system, the most commonly endorsed response was "to get high or alter my mood" (53.3%), with 34.3% reporting use for withdrawal management, and only 9.5% reporting use intended as self-treatment. These findings were corroborated by the set of items asking participants to reflect on specific reasons in each context (i.e., akin to "select all that apply"); the response patterns skewed more toward potentially therapeutic categories in the community, and more toward euphorogenic and opportunistic motives

Table 3

Logistic regression analyses examining history of non-prescribed buprenorphine use in the community (Model 1) and during incarceration (Model 2).

	Model 1			Model 2		
	In the community		p	During incarceration		p
	AOR	95% CI		AOR	95% CI	
<i>Site</i>						
MD (ref = NY)	3.92	(1.69, 9.10)	0.002	1.52	(0.71, 3.25)	0.29
<i>Age</i>						
Age (years)	1.00	(0.97, 1.04)	0.77	0.96	(0.93, 0.99)	0.006
<i>Sex</i>						
Female (ref = Male)	0.81	(0.39, 1.71)	0.58	0.70	(0.35, 1.39)	0.31
<i>Race</i>						
White (ref = not White)	0.95	(0.41, 2.21)	0.91	1.47	(0.65, 3.31)	0.35
Black (ref = not Black)	1.15	(0.51, 2.57)	0.74	0.84	(0.39, 1.83)	0.67
<i>Living situation</i>						
Stable (ref = temporary)	2.25	(1.04, 4.88)	0.04	0.85	(0.44, 1.65)	0.62
Unstable (ref = temporary)	3.77	(1.55, 9.15)	0.003	1.61	(0.73, 3.53)	0.23
<i>Marital status</i>						
Not married (ref = currently married)	4.02	(1.78, 9.11)	<0.001	2.02	(0.91, 4.49)	0.08
<i>Incarceration history</i>						
Lifetime years of incarceration	1.04	(1.00, 1.08)	0.07	1.09	(1.05, 1.13)	<0.001
<i>Prior OUD treatment history</i>						
Buprenorphine (ref = no)	3.10	(1.63, 5.90)	<0.001	1.65	(0.93, 2.93)	0.09
Methadone (ref = no)	1.08	(0.58, 2.03)	0.81	0.67	(0.38, 1.19)	0.17
<i>Age of onset</i>						
Age at first non-medical opioid use	0.99	(0.95, 1.03)	0.70	0.99	(0.96, 1.03)	0.80

Note: AOR = Adjusted Odds Ratio; CI = Confidence Interval; N = 283 due to missing data on predictors and excluding several cases with potential logical inconsistencies across interview questions for the dependent variables.

Table 4

Motivations for using non-prescribed buprenorphine in the community and while incarcerated.

	In the Community	While Incarcerated	p
Main reason (select only one main reason)			
To keep from getting sick/avoid opioid withdrawal	41.6	34.3	
To self-treat my opioid addiction	32.1	9.5	<0.001
To get high or alter my mood	25.6	53.3	
Other ¹	0.7	2.9	
Reasons endorsed (select all that apply)			
To maintain abstinence from other drugs	57.7	38.0	<0.001
To get high or alter my mood	61.3	75.2	0.001
To hold over during work/social events	41.6	29.2	<0.001
No access to other drugs for a time	48.2	45.3	0.41
It is/was my drug of choice to get high with	23.4	24.1	0.82
For bodily pain, other drugs unavailable	47.4	43.1	0.20
To avoid or ease withdrawal symptoms	73.0	60.6	0.002
It was the only drug that was available	32.1	40.9	0.02
Trying to wean myself off of drugs on my own	49.6	32.8	<0.001
To treat anxiety, depression, or other psych issues	34.3	40.9	0.049
It gives a better high than other drugs	10.9	20.4	<0.001
Cheaper/easier to find than other drugs	33.6	36.5	0.45
Drug of choice was unavailable	37.2	37.2	1.0

Note: $N = 137$, restricted to participants with experience using non-prescribed buprenorphine in both community and criminal justice settings. P -values are based on the test of symmetry (main reason) and McNemar χ^2 application for paired comparisons (any endorsement). ¹“Other” reasons included to self-treat pain (1 in the community) and as a way to cope with incarceration (4 for the criminal justice system).

while incarcerated.

4. Discussion

This study, conducted with individuals with OUD or opioid misuse and recent incarceration experiences in Maryland and New York, found that use of non-prescribed or illicit opioids during incarceration is a fairly common phenomenon. Diverted buprenorphine appears to have emerged in both states as a popular non-prescribed opioid in criminal justice settings, although it is not the only opioid that participants used in these settings. Nevertheless, participants perceived non-prescribed buprenorphine as the most widely available opioid in the criminal justice system, though it appeared to play a more outsized role within the broader contraband opioid landscape in Maryland compared to New York. Non-prescribed buprenorphine was also more expensive in Maryland jails and prisons than in prisons and jails in New York. Notably, at the time of the study, buprenorphine treatment was still generally unavailable to inmates in Maryland, whereas it was relatively widely available in the New York City jail system (although availability was more limited in the state prison system). Although participants reported that non-prescribed buprenorphine was widely available in the criminal justice system and easier to obtain than other non-prescribed/illegal opioids, the cost was high—on average, 10 times higher than in the community for a given dose. The findings on prices and availability suggest that there was high demand for non-prescribed buprenorphine in criminal justice settings.

Previous research has documented a rise in non-prescribed buprenorphine use nationally (Cicero et al., 2014b; Johanson et al., 2012;

Lofwall & Walsh, 2014; Wish et al., 2012). Research has found non-prescribed buprenorphine to play a versatile role among some people with OUD, most commonly as a stopgap when preferred opioids are unavailable; for managing opioid withdrawal; and as self-treatment of OUD, pain, and psychological problems, with very few people reporting buprenorphine as their preferred opioid of choice (Cicero et al., 2014b). In the current study, we found that motivations ascribed to use of non-prescribed buprenorphine can differ markedly based on the context of incarceration or freedom in the community. This study found distinct participant characteristics to be associated with non-prescribed buprenorphine use in the community and during incarceration.

Consistent with prior literature, most use of non-prescribed buprenorphine in the community was aligned with the medication’s therapeutic objectives, such as managing opioid withdrawal or as perceived self-treatment of OUD (Cicero et al., 2014b; Lofwall & Walsh, 2014). Although some use of non-prescribed buprenorphine in the criminal justice system was for therapeutic purposes, participants were more likely to report using buprenorphine for purposes of seeking euphoria or mood alteration in these settings.

These differences in reported motivations likely reflect the distinct contexts of use in the community compared to during incarceration. Non-prescribed buprenorphine use during incarceration may have therapeutic dimensions, even if participants do not perceive their use as such. Chronic opioid use leads to dysregulation of the reward system and hyperkatifeia, or a cluster of negative emotional states and motivational responses to repeated withdrawal. The related dysphoria can persist well beyond the period of acute withdrawal after major physiological symptoms have resolved (Koob, 2020). During incarceration, if OUD maintenance treatment is not available, people who are opioid dependent typically go through a period of partial or complete withdrawal. Moreover, the negative state of post-withdrawal dysphoria may be amplified by the aversive situational context of incarceration. From this perspective, some participants may use buprenorphine while incarcerated to alleviate dysphoria, even as they frame their use in terms of getting high or altering mood. Some findings in the current study are consistent with this possibility, such as the higher rate of endorsing self-treatment of anxiety or depression as a reason for use during incarceration compared to in the community. As reported elsewhere, qualitative interviews with a subset of participants in this study corroborated the common perception of using buprenorphine during incarceration to “get high”, but also provided deeper insights into motivations that included alleviating the aversive emotional and mental states arising from confinement (Monico et al., 2021).

Buprenorphine has unique pharmacological properties that make it especially well-suited for treating OUD (high mu-receptor affinity coupled with low agonist efficacy and high potency; Coe, Lofwall, & Walsh, 2019; Lewis, 1985; National Institute on Drug Abuse [NIDA], 1992). Buprenorphine also has the advantage of exhibiting less lethality than full agonists due to ceiling effects on respiratory depression (Walsh, Preston, Stitzer, Cone, & Bigelow, 1994; Yokell et al., 2011). A recent analysis of drug- and alcohol-associated deaths in U.S. jails found no deaths associated with buprenorphine (Fiscella et al., 2020). However, as a partial mu-receptor agonist, buprenorphine can be reinforcing (Yokell et al., 2011). To the extent that individuals in jail/prison experience reduced opioid tolerance, they may also be more likely to experience subjective effects from taking relatively small amounts of buprenorphine (Walsh et al., 1994; Yokell et al., 2011). While the typical maintenance dose of buprenorphine for treating OUD in individuals with significant opioid tolerance ranges between 8 and 24 mg, the active analgesic dose is much lower. Diminished opioid tolerance among inmates could make non-prescribed buprenorphine an especially attractive opioid in correctional settings due to its potency. Another factor could be the practicality of sublingual film (small, flat, easy to transport, easy to cut into smaller dose units), as qualitative interviews from this study noted (Monico et al., 2021). Use of buprenorphine in the criminal justice system may best be understood as shaped by a confluence of

contextual factors, including the individual's state of mind, diminished opioid tolerance, potential dysphoria from protracted abstinence compounded by the incarceration experience, availability of non-prescribed buprenorphine and other substances, the pharmacological properties of the medication, and various policies and practices in the criminal justice system.

The findings of the current study suggest that expanding the availability of buprenorphine treatment could reduce (but not eliminate) demand for non-prescribed buprenorphine in jails and prisons. When asked directly, a majority of participants indicated that illicit opioid misuse in the criminal justice system (including non-prescribed use of buprenorphine) could be reduced if jails and prisons made OUD treatment more readily available. Importantly, while participants perceived non-prescribed buprenorphine as easily available, they also reported that other drugs (including opioids that carry a much higher risk of overdose than buprenorphine) were available in these settings. The findings of the current study highlight the difficulty of preventing drug use in correctional settings, and illustrate the high level of need for treatment.

Unfortunately, concerns about diversion have long served as a barrier to making treatment available to those who would benefit from it most (Doernberg et al., 2019). Buprenorphine diversion and its status as contraband should not be deciding factors in whether correctional systems make buprenorphine treatment available. Rather, jails and prisons should make buprenorphine treatment available because it is an effective treatment for OUD. There is a tremendous level of unmet need among people in jails and prisons, and corrections-based treatment is a largely untapped opportunity to improve public health. More broadly, the criminal justice system should make buprenorphine and other MOUD available on the grounds of prisoner health equity and human rights (Bone, Eysenbach, Bell, & Barry, 2018; Bruce & Schleifer, 2008; Kerr, Wood, Betteridge, Lines, & Jürgens, 2004). A recent report by the National Academies of Sciences, Engineering, and Medicine (2019) argued that denying effective medication treatment for OUD in any setting is potentially unethical. Medications are available that can mitigate the acute distress of opioid withdrawal, reduce overdose risks during confinement and postrelease, and promote OUD recovery over the long-term. That these medications exist creates a compelling ethical imperative for the criminal justice system to ensure that these treatments are made available and accessible for individuals across the entire system (Brinkley-Rubinstein et al., 2018).

There is a growing recognition that it is essential to engage the criminal justice system in the national response to the opioid epidemic. Given the influx of resources to combat the opioid epidemic, many states and municipalities are moving to expand the availability of MOUD treatment in criminal justice settings (for example, through recent legislation in Maryland mandating the adoption of MOUD in correctional settings, the Helping to End Addiction Long Term (HEAL) Justice Community Opioid Innovation Network (JCOIN), and other initiatives). Future research should monitor the impact of expanding treatment on peoples' substance use while incarcerated, as well as on long-term outcomes postrelease.

4.1. Limitations

This study has several limitations that must be considered when interpreting the findings. It consisted of a one-time interview and is best viewed as an exploratory study of a sensitive topic in a vulnerable population. In light of the target population, topic of inquiry, and methodological and logistical/feasibility considerations, we sought to recruit individuals who would be able to provide information about the phenomenon of interest. Thus, we are unable to make estimates of non-prescribed buprenorphine use in the overall criminal justice population. Recruitment of individuals with recent incarceration experience in the community is a strength, insofar as it could improve candor of responses compared to conducting interviews during incarceration.

Although the study used a multipronged recruitment strategy, the extent to which participants were representative of the broader population of individuals with OUD and recent incarceration experiences is unknown. Differences in participant background characteristics at the two recruitment sites could be due to differences in the populations and/or criminal justice system characteristics of New York and Baltimore, or could reflect that the recruitment sites tapped into different subpopulations who met inclusion criteria. The interview development drew upon our team's experience with the population and prioritized face validity, but the questions did not undergo cognitive testing prior to conducting the study. Unfortunately, we did not inquire about costs of opioids other than non-prescribed buprenorphine. Despite these limitations, the current study provides new insights into the phenomenon of non-prescribed buprenorphine in jails and prisons.

5. Conclusion

The criminal justice system provides a nexus point to address the OUD epidemic. Understanding the dynamics of non-prescribed buprenorphine and other opioid use within correctional settings can inform policy and public health efforts to expand MOUD treatment across the criminal justice system. Given the large unmet need for OUD treatment in criminal justice populations and principles of health care equity, expanding access to effective OUD treatments in these settings must be a public health priority.

Funding

This study was funded by Indivior, Inc., the pharmaceutical company that manufactures Suboxone® and Sublocade® buprenorphine products, via a contract to Friends Research Institute. Neither the content of the manuscript nor the decision to submit it for publication required the funder's approval. HDC and AD-G, who are employed by Indivior, are co-authors on the manuscript.

Contributors

JG and HDC conceived the study. JG was PI of the overall study, JDL was the site PI for New York, while HDC and AD-G were collaborators from the funding organization (Indivior). JG drafted the initial interview questions, which were refined with input from JDL, KD, RM, and HC. KD programmed the interview into the web-based data collection system, oversaw its technical implementation, and supervised data collection in Maryland. AS conducted interviews and contributed to manuscript preparation. LM was a Co-Investigator on the study and led its qualitative component. RM supervised data collection in New York, with assistance from MM and AC. JG wrote the first draft of the manuscript. All authors critically revised the manuscript.

Declaration of competing interest

Study team members received funding from Indivior for the present research, which included standard salary support provided via contract or subcontract to their institutions (Friends Research Institute, New York University). HDC and AD-G are employees of Indivior. Unrelated to the present study, JG is part owner of COG Analytics, LLC, which has received funding from the National Institutes of Health to develop various healthcare technologies, including applications focused on opioid use disorder and criminal justice-involved populations. JDL reports receiving grant support and study medication from Alkermes and study medication from Indivior, all unrelated to the present study.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jsat.2021.108349>.

References

- Allen, B., & Harocopos, A. (2016). Non-prescribed buprenorphine in New York City: Motivations for use, practices of diversion, and experiences of stigma. *Journal of Substance Abuse Treatment*, 70, 81–86. <https://doi.org/10.1016/j.jsat.2016.08.002>.
- Bi-Mohammed, Z., Wright, N. M., Hearty, P., King, N., & Gavin, H. (2017). Prescription opioid abuse in prison settings: A systematic review of prevalence, practice and treatment responses. *Drug and Alcohol Dependence*, 171, 122–131. <https://doi.org/10.1016/j.drugalcdep.2016.11.032>.
- Binswanger, I. A., Blatchford, P. J., Mueller, S. R., & Stern, M. F. (2013). Mortality after prison release: Opioid overdose and other causes of death, risk factors, and time trends from 1999 to 2009. *Annals of Internal Medicine*, 159(9), 592–600. <https://doi.org/10.7326/0003-4819-159-9-201311050-00005>.
- Bone, C., Eysenbach, L., Bell, K., & Barry, D. T. (2018). Our ethical obligation to treat opioid use disorder in prisons: A patient and physician's perspective. *The Journal of Law, Medicine & Ethics*, 46(2), 268–271. <https://doi.org/10.1177/1073110518782933>.
- Brinkley-Rubinstein, L., Zaller, N., Martino, S., Cloud, D. H., McCauley, E., Heise, A., & Seal, D. (2018). Criminal justice continuum for opioid users at risk of overdose. *Addictive Behaviors*, 86, 104–110. <https://doi.org/10.1016/j.addbeh.2018.02.024>.
- Bruce, R. D., & Schleifer, R. A. (2008). Ethical and human rights imperatives to ensure medication-assisted treatment for opioid dependence in prisons and pre-trial detention. *The International Journal on Drug Policy*, 19(1), 17–23. <https://doi.org/10.1016/j.drupo.2007.11.019>.
- Chilcoat, H. D., Amick, H. R., Sherwood, M. R., & Dunn, K. E. (2019). Buprenorphine in the United States: Motives for abuse, misuse, and diversion. *Journal of Substance Abuse Treatment*, 104, 148–157. <https://doi.org/10.1016/j.jsat.2019.07.005>.
- Cicero, T. J., Ellis, M. S., & Chilcoat, H. D. (2018). Understanding the use of diverted buprenorphine. *Drug and Alcohol Dependence*, 193, 117–123. <https://doi.org/10.1016/j.drugalcdep.2018.09.007>.
- Cicero, T. J., Ellis, M. S., & Harney, J. (2015). Shifting patterns of prescription opioid and heroin abuse in the United States. *The New England Journal of Medicine*, 373(18), 1789–1790. <https://doi.org/10.1056/NEJMfc1505541>.
- Cicero, T. J., Ellis, M. S., Surratt, H. L., & Kurtz, S. P. (2014a). The changing face of heroin use in the United States: A retrospective analysis of the past 50 years. *JAMA Psychiatry*, 71(7), 821–826. <https://doi.org/10.1001/jamapsychiatry.2014.366>.
- Cicero, T. J., Ellis, M. S., Surratt, H. L., & Kurtz, S. P. (2014b). Factors contributing to the rise of buprenorphine misuse: 2008–2013. *Drug and Alcohol Dependence*, 142, 98–104. <https://doi.org/10.1016/j.drugalcdep.2014.06.005>.
- Coe, M. A., Lofwall, M. R., & Walsh, S. L. (2019). Buprenorphine pharmacology review: Update on transmucosal and long-acting formulations. *Journal of Addiction Medicine*, 13(2), 93–103. <https://doi.org/10.1097/ADM.00000000000000457>.
- Csete, J. (2019). Criminal justice barriers to treatment of opioid use disorders in the United States: The need for public health advocacy. *American Journal of Public Health*, 109(3), 419–422. <https://doi.org/10.2105/AJPH.2018.304852>.
- Dart, R. C., Surratt, H. L., Cicero, T. J., Parrino, M. W., Severtson, S. G., Bucher-Bartelson, B., & Green, J. L. (2015). Trends in opioid analgesic abuse and mortality in the United States. *The New England Journal of Medicine*, 372(3), 241–248. <https://doi.org/10.1056/NEJMsa1406143>.
- Degenhardt, L., Larney, S., Kimber, J., Gisev, N., Farrell, M., Dobbins, T., ... Burns, L. (2014). The impact of opioid substitution therapy on mortality post-release from prison: Retrospective data linkage study. *Addiction*, 109(8), 1306–1317. <https://doi.org/10.1111/add.12536>.
- Doernberg, M., Krawczyk, N., Agus, D., & Fingerhood, M. (2019). Demystifying buprenorphine misuse: Has fear of diversion gotten in the way of addressing the opioid crisis? *Substance Abuse*, 40(2), 148–153. <https://doi.org/10.1080/08897077.2019.1572052>.
- Farabee, D. (2018). Current and promising pharmacotherapies for substance use disorders among justice-involved populations. *European Journal on Criminal Policy and Research*, 24(2), 145–153. <https://doi.org/10.1007/s10610-017-9349-y>.
- Fiscella, K., Moore, A., Engerman, J., & Meldrum, S. (2004). Jail management of arrestees/inmates enrolled in community methadone maintenance programs. *Journal of Urban Health*, 81(4), 645–654. <https://doi.org/10.1093/jurban/jth147>.
- Fiscella, K., Noonan, M., Leonard, S. H., Farah, S., Sanders, M., Wakeman, S. E., & Savolainen, J. (2020). Drug- and alcohol-associated deaths in U.S. Jails. *Journal of Correctional Health Care*, 26(2), 183–193. <https://doi.org/10.1177/1078345820917356>.
- Genberg, B. L., Gillespie, M., Schuster, C. R., Johanson, C. E., Astemborski, J., Kirk, G. D., ... Mehta, S. H. (2013). Prevalence and correlates of street-obtained buprenorphine use among current and former injectors in Baltimore, Maryland. *Addictive Behaviors*, 38(12), 2868–2873. <https://doi.org/10.1016/j.addbeh.2013.08.008>.
- Gomes, T., Tadrous, M., Mamdani, M. M., Patterson, J. M., & Jeurink, D. N. (2018). The burden of opioid-related mortality in the United States. *JAMA Network Open*, 1(2), Article e180217. <https://doi.org/10.1001/jamanetworkopen.2018.0217>.
- Gordon, M. S., Kinlock, T. W., Schwartz, R. P., Fitzgerald, T. T., O'Grady, K. E., & Voccio, F. J. (2014). A randomized controlled trial of prison-initiated buprenorphine: Prison outcomes and community treatment entry. *Drug and Alcohol Dependence*, 142, 33–40. <https://doi.org/10.1016/j.drugalcdep.2014.05.011>.
- Gordon, M. S., Kinlock, T. W., Schwartz, R. P., O'Grady, K. E., Fitzgerald, T. T., & Voccio, F. J. (2017). A randomized clinical trial of buprenorphine for prisoners: Findings at 12-months post-release. *Drug and Alcohol Dependence*, 172, 34–42. <https://doi.org/10.1016/j.drugalcdep.2016.11.037>.
- Green, T. C., Clarke, J., Brinkley-Rubinstein, L., Marshall, B. D. L., Alexander-Scott, N., Boss, R., & Rich, J. D. (2018). Postincarceration fatal overdoses after implementing medications for addiction treatment in a statewide correctional system. *JAMA Psychiatry*, 75(4), 405–407. <https://doi.org/10.1001/jamapsychiatry.2017.4614>.
- Gryczynski, J., Jaffe, J. H., Schwartz, R. P., Dusek, K. A., Gugsa, N., Monroe, C. L., ... Mitchell, S. G. (2013). Patient perspectives on choosing buprenorphine over methadone in an urban, equal-access system. *The American Journal on Addictions*, 22(3), 285–291. <https://doi.org/10.1111/j.1521-0391.2012.12004.x>.
- Hedegaard, H., Minino, A. M., & Warner, M. (2018). Drug overdose deaths in the United States, 1999–2017. *NCHS data brief*(329), 1–8. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/30500323>.
- Johanson, C. E., Arfken, C. L., di Menza, S., & Schuster, C. R. (2012). Diversion and abuse of buprenorphine: Findings from national surveys of treatment patients and physicians. *Drug and Alcohol Dependence*, 120(1–3), 190–195. <https://doi.org/10.1016/j.drugalcdep.2011.07.019>.
- Joudrey, P. J., Khan, M. R., Wang, E. A., Scheidell, J. D., Edelman, E. J., McInnes, D. K., & Fox, A. D. (2019). A conceptual model for understanding post-release opioid-related overdose risk. *Addiction Science & Clinical Practice*, 14(1), 17. <https://doi.org/10.1186/s13722-019-0145-5>.
- Kerr, T., Wood, E., Betteridge, G., Lines, R., & Jürgens, R. (2004). Harm reduction in prisons: A "rights based analysis". *Critical Public Health*, 14(4), 345–360. <https://doi.org/10.1080/0958159040027478>.
- Koob, G. F. (2020). Neurobiology of opioid addiction: Opponent process, hyperkatefia, and negative reinforcement. *Biological Psychiatry*, 87, 44–53.
- Krinsky, C. S., Lathrop, S. L., Brown, P., & Nolte, K. B. (2009). Drugs, detention, and death: A study of the mortality of recently released prisoners. *The American Journal of Forensic Medicine and Pathology*, 30(1), 6–9. <https://doi.org/10.1097/PAF.0b013e318173784>.
- Lewis, J. W. (1985). Buprenorphine. *Drug and Alcohol Dependence*, 14(3–4), 363–372. [https://doi.org/10.1016/0376-8716\(85\)90067-5](https://doi.org/10.1016/0376-8716(85)90067-5).
- Lofwall, M. R., & Walsh, S. L. (2014). A review of buprenorphine diversion and misuse: The current evidence base and experiences from around the world. *Journal of Addiction Medicine*, 8(5), 315–326. <https://doi.org/10.1097/ADM.0000000000000045>.
- Magura, S., Lee, J. D., Hershberger, J., Joseph, H., Marsch, L., Shropshire, C., & Rosenblum, A. (2009). Buprenorphine and methadone maintenance in jail and post-release: A randomized clinical trial. *Drug and Alcohol Dependence*, 99(1–3), 222–230. <https://doi.org/10.1016/j.drugalcdep.2008.08.006>.
- Matusow, H., Dickman, S. L., Rich, J. D., Fong, C., Dumont, D. M., Hardin, C., ... Rosenblum, A. (2013). Medication assisted treatment in US drug courts: Results from a nationwide survey of availability, barriers and attitudes. *Journal of Substance Abuse Treatment*, 44(5), 473–480. <https://doi.org/10.1016/j.jsat.2012.10.004>.
- Merrall, E. L., Karimnia, A., Binswanger, I. A., Hobbs, M. S., Farrell, M., Marsden, J., ... Bird, S. M. (2010). Meta-analysis of drug-related deaths soon after release from prison. *Addiction*, 105(9), 1545–1554. <https://doi.org/10.1111/j.1360-0443.2010.02990.x>.
- Mitchell, S. G., Kelly, S. M., Brown, B. S., Schacht Reisinger, H., Peterson, J. A., Ruhf, A., ... Schwartz, R. P. (2009). Uses of diverted methadone and buprenorphine by opioid-addicted individuals in Baltimore, Maryland. *American Journal on Addictions*, 18(5), 346–355. <https://doi.org/10.3109/10550490903077820>.
- Monico, L. B., Gryczynski, J., Lee, J. D., Dusek, K., McDonald, R., Malone, M., ... Chilcoat, H. (2021). Exploring nonprescribed use of buprenorphine in the criminal justice system through qualitative interviews among individuals recently released from incarceration. *Journal of Substance Abuse Treatment*, 123, Article 108267.
- Monico, L. B., Mitchell, S. G., Gryczynski, J., Schwartz, R. P., O'Grady, K. E., Olsen, Y. K., & Jaffe, J. H. (2015). Prior experience with non-prescribed buprenorphine: Role in treatment entry and retention. *Journal of Substance Abuse Treatment*, 57, 57–62. <https://doi.org/10.1016/j.jsat.2015.04.010>.
- Moore, K. E., Roberts, W., Reid, H. H., Smith, K. M. Z., Oberleitner, L. M. S., & McKee, S. A. (2019). Effectiveness of medication assisted treatment for opioid use in prison and jail settings: A meta-analysis and systematic review. *Journal of Substance Abuse Treatment*, 99, 32–43. <https://doi.org/10.1016/j.jsat.2018.12.003>.
- National Academies of Sciences, Engineering, and Medicine. (2019). *Medications for opioid use disorder save lives*. Washington, DC: The National Academies Press.
- National Institute on Drug Abuse (NIDA). (1992). Buprenorphine: An alternative treatment for opioid dependence. In J. D. Blaine (Ed.), *NIDA research monograph 121*. U. S. Department of Health and Human Services: Rockville, MD.
- Nunn, A., Zaller, N., Dickman, S., Trimbur, C., Nijhawan, A., & Rich, J. D. (2009). Methadone and buprenorphine prescribing and referral practices in US prison systems: Results from a nationwide survey. *Drug and Alcohol Dependence*, 105(1–2), 83–88. <https://doi.org/10.1016/j.drugalcdep.2009.06.015>.
- Scholl, L., Seth, P., Kariisa, M., Wilson, N., & Baldwin, G. (2019). Drug and opioid-involved overdose deaths - United States, 2013–2017. *MMWR Morb Mortal Wkly Rep*, 67(5152), 1419–1427. <https://doi.org/10.15585/mmwr.mm675152e1>.
- Schuman-Olivier, Z., Albanese, M., Nelson, S. E., Roland, L., Puopolo, F., Klinker, L., & Shaffer, H. J. (2010). Self-treatment: Illicit buprenorphine use by opioid-dependent treatment seekers. *Journal of Substance Abuse Treatment*, 39(1), 41–50. <https://doi.org/10.1016/j.jsat.2010.03.014>.
- Seaman, S. R., Bettle, R. P., & Gore, S. M. (1998). Mortality from overdose among injecting drug users recently released from prison: Database linkage study. *BMJ*, 316 (7129), 426–428. <https://doi.org/10.1136/bmj.316.7129.426>.
- Sharma, A., Kelly, S. M., Mitchell, S. G., Gryczynski, J., O'Grady, K. E., & Schwartz, R. P. (2017). Update on barriers to pharmacotherapy for opioid use disorders. *Current Psychiatry Reports*, 19(6), 35. <https://doi.org/10.1007/s11920-017-0783-9>.
- Tompkins, C. N., Wright, N. M., Waterman, M. G., & Sheard, L. (2009). Exploring prison buprenorphine misuse in the United Kingdom: A qualitative study of former prisoners. *International Journal of Prisoner Health*, 5(2), 71–87. <https://doi.org/10.1080/17449200902880482>.

- Walsh, S. L., Preston, K. L., Stitzer, M. L., Cone, E. J., & Bigelow, G. E. (1994). Clinical pharmacology of buprenorphine: Ceiling effects at high doses. *Clinical Pharmacology and Therapeutics*, 55, 569–580.
- White, N., Ali, R., Larance, B., Zador, D., Mattick, R. P., & Degenhardt, L. (2016). The extramedical use and diversion of opioid substitution medications and other medications in prison settings in Australia following the introduction of buprenorphine-naloxone film. *Drug and Alcohol Review*, 35(1), 76–82. <https://doi.org/10.1111/dar.12317>.
- Winkelmann, T. N. A., Chang, V. W., & Binswanger, I. A. (2018). Health, polysubstance use, and criminal justice involvement among adults with varying levels of opioid use. *JAMA Network Open*, 1(3), Article e180558. <https://doi.org/10.1001/jamanetworkopen.2018.0558>.
- Wish, E. D., Artigiani, E., Billing, A., Hauser, W., Hemberg, J., Shipton, M., & DuPont, R. L. (2012). The emerging buprenorphine epidemic in the United States. *Journal of Addictive Diseases*, 31(1), 3–7. <https://doi.org/10.1080/10550887.2011.642757>.
- Yokell, M. A., Zaller, N. D., Green, T. C., & Rich, J. D. (2011). Buprenorphine and buprenorphine/naloxone diversion, misuse, and illicit use: An international review. *Current Drug Abuse Reviews*, 4(1), 28–41.