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# SUBSTANCE ABUSE TREATMENT AS A PREVENTATIVE TOOL FOR OPIOID USE: A CAUTIONARY TALE

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## Abstract

**Objective.—**Using a large, panel sample of men who have been released from prison, the current study seeks to explore whether substance use treatment before and after release from prison helps reduce opioid use.

**Methods.—**To explore how pre-release and post-release substance abuse treatment might restrain opioid use, we estimate a two-level mixed-effects model which regresses opioid use at several waves of data onto both treatment measures and control variables.

**Results.—**Pre-release substance use treatment is not related to opioid use after release from prison. Although post-release substance use treatment is statistically significant, the direction of the post-release substance abuse treatment effect demonstrates that increased odds of opioid use are found among those who participated in treatment programs.

**Conclusions.—**Substance use treatment does not appear to have the desired effect on opioid use for those coming home from prison. Instead, it appears to gradually increase opioid use over time. Due to the possibility that returning persons may establish deviant peer ties in substance use treatment programs, there is a strong substantive need to better understand the implications of substance abuse treatment programs on opioid misuse and abuse.

### Keywords

Reentry; opioids; substance abuse treatment; family; peers

## Introduction

Despite drug use trending downward across the United States in the past few years (National Institute on Drug Abuse, 2016), the use of opioids and opiates is garnering increasing attention in the media (Netherland & Hansen, 2016). In the process, there is an increasing sentiment that users of opioids – painkillers designed to mimic the effects of morphine – may 'graduate' from opioids and move into the use of a similar, but much more potent and dangerous, class of drugs which are directly derived from opium (opiates; see Cicero et al., 2014). Due to the widespread availability of opioids (see Cicero et al., 2014; Lembke, 2012), there is a pressing need to continue to find ways to reduce opioid use among vulnerable populations.

Although many populations are at risk of opioid use, there is perhaps no population more vulnerable than those who have been formerly incarcerated. Recent estimates report that over 80% of people in state prisons in the United States either currently have or have had a problem with substance abuse and/or dependency (National Center on Addiction and Substance Abuse, 2010). This fact is made worse by the observation that the majority of people who end up in prison make their way there either as direct result of drug use or because they committed another crime while intoxicated that led to their incarceration (National Center on Addiction and Substance Abuse, 2010; West & Sabol, 2008).

Regardless of the means through which a person arrives in prison, the fact remains that nearly everyone will be released from prison at some point. The time after release from prison, referred to as "reentry" (see Travis, 2005), poses a number of challenges to the formerly incarcerated as they are forced to reintegrate back into their old lives, reestablish social relationships, and secure employment. The stress associated with reentry (see Western et al., 2015) makes this time ripe for people to turn to opioid-based substances. This risk is elevated even more since the majority of persons who are released from prison have had a legitimate problem with substance abuse in their lives (Karberg & James, 2002). As such, a common way that substance use needs are responded to as people approach reentry is to assign them to substance use and abuse treatment programs (see Wallace et al., 2016).

For those who are undergoing reentry, there are two fundamental ways through which a substance use treatment program might have an impact on opioid use. First, a treatment program that was administered during the time they were still incarcerated may have a lasting effect on a person with substance use needs. Second, people who are released may continue to receive substance use treatment during the time when they are transitioning back into the community. Building on these observations, it is imperative to recognize that substance use treatment may actually carry two different effects on post-release opioid use, thus raising attention to the goals of the current study.

## Current Study

Using data from the Serious and Violent Offender Reentry Initiative (SVORI), the current study's goal is to investigate the extent to which substance use treatment both during incarceration and after release from prison relates to the misuse of opioid-based pain killers. Because the general idea underpinning substance use treatment is to reduce use, we hypothesize (H1) that attending substance use treatment classes while persons are incarcerated will reduce opioid use following release from prison. In the same light, we also expect (H2) that substance use treatment following the person's release back into the community will continue to restrain the misuse of opioids.

## Methods

### Data

Data for this project come from the Serious and Violent Offender Reentry Initiative (SVORI) which was collected between 2005 and 2007 (see Lattimore & Steffey, 2010). SVORI, a U.S.-based sample, encompasses a total of 1,697 incarcerated men preparing for reentry.

Respondents were surveyed at four independent waves. Wave one data were collected approximately 30 days prior to release, wave two approximately 3 months post-release, wave three about 9 months post-release, and wave four data about 15 months post-release (Lattimore Visher, 2009). Descriptives for all measures used in the analysis are shown in Table 1.

### Dependent Measure

The dependent variable is a binary measure asking the respondent if they have "used pain relievers or opioids such as codeine, morphine, T's, blues, Demerol, or Vicodin, without a prescription or for other reasons than were prescribed" since the prior survey wave. This question was asked at each post-release wave, and respondents could answer 'yes' (coded as '1') or 'no' (coded as '0'). About 6.8 percent of the sample reported misusing opioids at each wave.

### Independent Measures

The focal independent measures in this analysis encompass participation in pre- and post-release substance abuse treatment. For pre-release substance abuse treatment, respondents were asked if they had received treatment for substance abuse during incarceration. About 42.9 percent of respondents indicated they had participated in pre-release substance treatment. A similar question at waves 2 through 4 inquired if respondents participated in substance abuse treatment after release from prison. Overall, 22.4 percent of respondents indicated they participated in substance abuse treatment post-release.

### Control Measures

**General controls.—**The first control variable we include is a measure capturing the person's *self-reported pain*, as this has been found to relate to opioid use (Gilson, 2009). One item asked the respondents how much pain interfered with their normal work life (higher scores indicate more interference from pain). Ranging from 1 ('no interference from pain') to 5 ('a great deal of interference from pain'), this measure has a mean of 2.198 and a standard deviation of 1.088. As health may relate to opioid abuse (Gilson, 2009), we also control for a measure asking whether they perceived they had *poor physical health*. Higher scores indicating worse health (range 1 [excellent health] to 5 [very poor health]; M = 1.505; SD = 0.967). In addition to physical health, mental health (Mallik-Kane & Visher, 2008) is captured via a 5-item index used in prior research (Wallace et al., 2016). With a range of 5 to 25, higher values indicate worse mental health (M = 9.371, SD = 3.914).

Following prior literature (Bahr et al., 2010; Travis, 2005; Wehrman, 2010), we control for a host of demographic measures. Binary measures for *race* are included to indicate whether the respondent is Black (53.3 percent) or Other Race (12.7 percent) in contrast to White (34.0 percent). We also control for whether the respondent was *married* at wave one (10.9 percent) in contrast to not married (89.1 percent). The *age* of the respondent is also controlled (M = 29.203, SD = 7.287, range 18 – 73).

Prior experiences within the criminal justice system are captured through a variable capturing the *total number of days the respondent was incarcerated*. This measure has a

mean of 918 (SD = 932; range 44 – 9,486). The person's *primary conviction type* is covaried by including binary measures indicating whether it was a sexual (5 percent of the sample), violent (23 percent), property (12 percent), or drug offense (22 percent) in contrast to some other offense (38 percent).

**Post-release controls.—**As changes in family support, depression, and employment during reentry may impact outcomes (Bahr et al., 2010; Mallik-Kane & Visher, 2008), we include measures accounting for these influences. To capture *family support*, we control a 3-item scale used in prior work (Mowen & Visher, 2015). Higher scores indicate greater levels of family support (M = 10.039, SD = 1.70, range 3 [lowest support] to 12 [highest support]). Following prior research (Wallace et al., 2016), we also include a 5-item measure of *depression*. Higher values indicate more depression (M = 7.843, SD = 2.872, range 5 – 25). Finally, we include a binary measure indicating that the respondent was *employed* (65.7 percent of the sample; contrast is not employed [34.3 percent]).

### Analytic Strategy

To analyze longitudinal panel data, researchers often use mixed-effects models (Rabe-Hesketh & Skrondal, 2012). Mixed-effects models estimate both within-individual and between-individual estimates across time. As our outcome is binary, we use a logistic transformation of the mixed-effects model, a popular technique in analyzing reentry data (see Mowen & Culhane, 2017 for a description of the application of this model in reentry research). We present coefficients and odds ratios for ease of interpretation.

## Results

Table 2 presents results. The mixed model fits the data closely based on the significant chi-square statistic (Rabe-Hesketh & Skrondal, 2012). Pre-release substance abuse treatment is not associated with opioid use after release from prison. However, post-release substance abuse treatment is significantly associated with opioid use, although in a direction other than hypothesized. Unfortunately, participating in a post-release substance abuse program is associated with a 66.1 percent increase in the logged-odds of opioid use during reentry.

Other results indicate that Black and Other race respondents report significantly lower odds of opioid use relative to White respondents by 93.3 and 61.7 percent, respectively. Individuals convicted of a drug offense report a 92.8 percent increase in the logged-odds of opioid use post-release, while sexual offenders report 87.2 percent reduction in the odds of opioid use compared to an individual convicted of some other offense. Results also show that family support is related to a 16.6 percent reduction and employment a 26.6 percent reduction in opioid use during reentry. Depression, on the other hand, relates to a 12.9 percent increase in the logged-odds of opioid use.

## Discussion and Conclusions

The current study sought to investigate the extent to which pre- and post-release substance abuse treatment related to opioid use for those returning home from prison. The first hypothesis, that pre-release substance use treatment would restrain opioid use after release

from prison, was not supported. The lack of a significant effect of pre-release substance use treatment on post-release opioid use leads us to reject H1 in favor of the null.

The second hypothesis premised that substance use treatment after release from prison would help restrain opioid use among those who are reentering the community. While this effect was significant, it related to *increased* odds of opioid use. As such, the results demonstrate that those who attend substance use treatment programs after they are released from prison are significantly *more* likely – not less likely – to use opioids in a manner not medically prescribed. This leads us to reject H2 because it appears that substance use treatment exacerbates opioid use during the reentry time period rather than restraining it.

Due to mixed findings on the efficacy of substance use treatment for a variety of substances in the SVORI data (e.g., see Lattimore & Visher, 2009), scholars have sought to explore why substance use treatment may have harmful effects. Among these various (and numerous) possibilities, one of the more well-received notions is that substance use treatment places people together who have no other connection other than they all have had a problem with substance use at some point in their lives. Following the conclusion of the meetings, persons in these burgeoning social networks may choose to spend unstructured time with their new peers. This unstructured time with peers – all who share a common problem with substance use – can later produce substance use itself (see Osgood & Anderson, 2004). Applying this argument to the current findings, it seems completely possible that persons in substance use treatment upon reentry into the community may meet new friends who have easy access to opioids. These deviant peer associations that are established in substance use treatment may then have a direct impact on increasing opioid use and abuse for those who are transitioning back into the community. While the current study cannot test for this precise possibility, it is important nonetheless to understand that all the necessary pieces are in place for this to occur. In fact, research has found that being an opiate user is enough to establish a friendship among people who have a proclivity towards opiate and opioid use (Hawkins & Fraser, 1985). As such, easy access to opioids created by the establishing of drug-using network ties in community-based substance use treatment classes make this a keen possibility that future research should explore.

Despite some valuable findings, the current study has important limitations. First, the SVORI sample contains only men in state prisons in fourteen states. Not only might people in different state prison systems have different experiences, the sample cannot speak to how the opioid use of women may be influenced by substance use treatment programming either during or after incarceration. Second, although the data are ideal in that they represent a longitudinal panel sample, there is considerable attrition in the SVORI sample. However, prior studies (e.g., Wallace et al., 2016) have determined that the attrition issues inherent in the SVORI data are at random and they do not affect results, perhaps reducing the extent to which this is a limitation. Third, the data are ten years old, meaning that patterns of opioid and opiate use may have shifted since then.

Despite some limitations, this study speaks to the importance of paying careful attention to what is actually being accomplished in substance use treatment programs for opioid use. If anything, the current study raises attention to the possibility that treatment programs may be

directly increasing patterns of opioid use in a sample that is already at high-risk of using. As researchers and practitioners struggle to find effective ways to respond to the opioid and opiate crisis, moving research towards a better understanding of why these programs may be putting people at a heightened risk for opioid use must become a top priority.

## Acknowledgments

## References

Bahr SJ, Harris L, Fisher JK, & Armstrong A (2010). Successful reentry: What differentiates successful and unsuccessful parolees? International Journal of Offender Therapy and Comparative Criminology, 54, 667–692. [PubMed: 19638473]

Cicero TJ, Ellis MS, Surratt HL, & Kurtz SP (2014). The changing face of heroin use in the United States: A retrospective analysis of the past 50 years. JAMA Psychiatry, 71, 821–826. [PubMed: 24871348]

Hawkins JD, & Fraser MW (1985). Social networks of street drug users: A comparison of two theories. Social Work Research and Abstracts, 21, 3–12.

Gilson AM (2009). The burden of the nonmedical use of prescription opioid analgesics. Pain Medicine, 10, S89–S100. [PubMed: 19691688]

Karberg JC, & James DJ (2005). Bureau of Justice Statistics Special Report: Substance dependence, abuse, and treatment of jail inmates, 2002 Washington, D.C: US Department of Justice.

Lattimore PK, & Steffey DM (2010). The multi-site evaluation of SVORI: Methodology and analytic approach U.S. Department of Justice, Document 230424. Available at: https://www.ncjrs.gov/pdffiles1/nij/grants/230424.pdf.

Lattimore PK, & Visher CA (2009). Multi-site evaluation of SVORI: Summary and synthesis Raleigh, NC: RTI International.

Lembke A (2012). Why doctors prescribe opioids to known opioid abusers. New England Journal of Medicine, 367, 1580–1581. [PubMed: 23094719]

Mallik-Kane K, & Visher CA (2008). Health and prisoner reentry: How physical, mental, and substance abuse conditions shape the process of reintegration Urban Institute Policy Center Available at: http://www.urban.org/sites/default/files/alfresco/publication-pdfs/411617-Health-and-Prisoner-Reentry.pdf.

Mowen TJ, & Culhane SE (2017). Modeling recidivism within the study of offender reentry: Hierarchical generalized linear models and lagged dependent variable models. Criminal Justice and Behavior, 44, 85–102.

Mowen TJ, & Visher CA (2015). Drug use and crime after incarceration: The role of family support and family conflict. Justice Quarterly, 32, 337–359.

National Center on Addiction and Substance Abuse. (2010). Behind bars II: Substance abuse and America's prison population Available at: https://www.centeronaddiction.org/addictionresearch/reports/behind-bars-ii-substance-abuse-and-america%E2%80%99s-prison-population.

National Institute on Drug Abuse (NIDA). 2016 Monitoring the Future Study: Trends in Prevalence of Various Drugs Available at https://www.drugabuse.gov/trends-statistics/monitoring-future/monitoring-future-study-trends-in-prevalence-various-drugs.

Netherland J, & Hansen HB (2016). The war on drugs that wasn't: Wasted whiteness, "dirty doctors," and race in media coverage of prescription opioid misuse. Culture, Medicine, and Psychiatry, 40, 664–686.

Osgood DW, & Anderson AL (2004). Unstructured socializing and rates of delinquency. Criminology, 42, 519–550.

Rabe-Hesketh S, & Skrondal A (2012). Multilevel and longitudinal modeling using Stata College Station, TX: Stata Press.

Travis J (2005). They All Come Back: Facing the Challenges of Prisoner Reentry Washington, D.C.: Urban Institute.

Wallace D, Fahmy C, Cotton L, Jimmons C, McKay R, Stoffer S, & Syed S (2016). Examining the role of familial support during prison and after release on post-incarceration mental health. International Journal of Offender Therapy and Comparative Criminology, 60, 3–20. [PubMed: 25156422]

Wehrman MM (2010). Race, concentrated disadvantage, and recidivism: A test of interaction effects. Journal of Criminal Justice, 38, 538–544.

West HC, & Sabol WJ (2008). Prisoners in 2007. Bureau of Justice Statistics, Washington, D.C.: Department of Justice.

Western B, Braga AA, Davis J, & Sirois C (2015). Stress and hardship after prison. American Journal of Sociology, 120, 1512–1547.

**Table 1.**

Descriptive Statistics for the SVORI Sample (*n = 1,272*)

| Variable | Mean | S.D. | Range |
|---|---|---|---|
| **Dependent Measure** | | | |
| Opioid Use | 0.068 | 0.251 | 0, 1 |
| **Substance Abuse Treatment** | | | |
| Pre-Release | 0.429 | 0.495 | 0, 1 |
| Post-Release | 0.224 | 0.417 | 0, 1 |
| **General Controls** | | | |
| Self Reported Pain | 2.198 | 1.088 | 1–5 |
| Poor Health Perceptions | 1.505 | 0.967 | 1–5 |
| Mental Health | 9.371 | 3.914 | 5–25 |
| Race | | | |
| *Black* | 0.533 | 0.499 | 0, 1 |
| *Other* | 0.127 | 0.333 | 0, 1 |
| Married | 0.109 | 0.312 | 0, 1 |
| Age | 29.203 | 7.287 | 18–73 |
| Length of Incarceration | 918.300 | 932.350 | 44–9,486 |
| Primary Conviction | | | |
| *Sexual Offense* | 0.050 | 0.219 | 0, 1 |
| *Violent Offense* | 0.230 | 0.421 | 0, 1 |
| *Property Offense* | 0.118 | 0.323 | 0, 1 |
| *Drug Offense* | 0.222 | 0.516 | 0, 1 |
| **Post-Release Controls** | | | |
| Family Support | 10.039 | 1.696 | 3–12 |
| Depression | 7.843 | 3.872 | 5–25 |
| Employment | 0.657 | 0.475 | 5–25 |

*Notes:* S.D. = Standard Deviation, SVORI = Serious and Violent Offender Reentry Initiative

**Table 2.**

Results of a Multi-Level Logistic Mixed-Effects Regression Model Examining Opioid use (*n = 1,272*)

| Variable | Coefficient | Standard Error | Odds Ratio |
|---|---|---|---|
| **Substance Abuse Treatment** | | | |
| Pre-Release | −0.256 | 0.254 | 0.774 |
| Post-Release | 0.507 | 0.241* | 1.661 |
| **General Controls** | | | |
| Self Reported Pain | 0.016 | 0.125 | 1.016 |
| Poor Health Perceptions | 0.003 | 0.130 | 1.003 |
| Mental Health | −0.005 | 0.034 | 0.995 |
| Race | | | |
| *Black* | −2.701 | 0.348*** | 0.067 |
| *Other* | −0.961 | 0.355** | 0.383 |
| Married | −0.479 | 0.421 | 0.620 |
| Age | −0.030 | 0.020 | 0.971 |
| Length of Incarceration | −0.001 | 0.001 | 0.999 |
| Primary Conviction | | | |
| *Sexual Offense* | −2.056 | 0.877* | 0.128 |
| *Violent Offense* | 0.145 | 0.309 | 1.156 |
| *Property Offense* | 0.421 | 0.347 | 1.523 |
| *Drug Offense* | 0.657 | 0.333* | 1.928 |
| **Post-Release Controls** | | | |
| Family Support | −0.182 | 0.063** | 0.834 |
| Depression | 0.121 | 0.026*** | 1.129 |
| Employment | −0.456 | 0.229* | 0.634 |
| Constant | −0.801 | 0.929 | |
| Wald $\chi^2$ | 102.24*** | | |
| Intra-Class Correlation | 0.492 | 0.068*** | |

*
$p < .05$

**
$p < .01$

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$p < .001$