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Longitudinal Trends in Nonmedical Prescription Opioid Use in a Cohort of Rural Appalachian People who Use Drugs

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Abstract

Rural Appalachia remains an epicenter of the prescription opioid epidemic. In 2008, a cohort study was undertaken to examine longitudinal trends in nonmedical prescription opioid use (NMPOU). Eight waves of data (2008 – 2020) from the Social Networks among Appalachian People (SNAP) cohort were utilized for the current analysis. Only those who reported recent (past 6-month) NMPOU at baseline are included (n=498, 99%). Mixed-effects logistic regression was used to model factors associated with NMPOU over time. Recent NMPOU declined significantly over the past decade ($p < 0.001$). However, 54.1% of participants still engaged in NMPOU at their most recent follow-up. Receipt of benefits for a physical or mental disability (adjusted odds ratio [aOR]: 3.11, 95% Confidence Interval [CI]: 1.98, 4.90) and self-described poor health status (aOR: 3.67, 95% CI: 1.61, 8.37) were both associated with NMPOU. All treatment modalities (methadone maintenance, residential, outpatient counseling) tested in the model, with the notable exception of detoxification, were associated with significantly lower odds of NMPOU. Although significant declines in prescription opioid misuse were observed in the cohort, more than half of all participants were engaged in NMPOU more than a decade after entering the study. Substance use disorder (SUD) treatment (excluding detoxification) was shown associated with reduced odds of continued NMPOU; therefore, increasing access to evidence-based treatments should be a priority in rural areas affected by the ongoing opioid epidemic.

Introduction

The majority of the early epidemiologic data on the opioid epidemic emerged from rural areas. Case reports (Hays et al., 2003; Katz and Hays, 2004) and cross-sectional studies (Havens et al., 2007) reporting nonmedical prescription opioid use (NMPOU), often noting OxyContin® use in particular, were published in the early 2000's. Almost two decades later, the crisis has yet to be fully realized (Compton et al., 2016), though investments have

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increased to address the epidemic and its related harms (Collins et al., 2018; Volkow and Collins, 2017).

Examination of opioid use trajectories is not novel; however, the majority of those data were gleaned from urban heroin users and/or those actively enrolled in treatment for opioid use disorder (OUD)(Hser et al., 2001; McGinnis et al., 2019). Only more recently have studies began to differentiate NMPOU and heroin when examining longitudinal use. A recent study by Krebs and colleagues (Krebs et al., 2017) comparing treatment engagement among NMPOU and heroin users found few clinically relevant differences in transitions in and out of treatment. Reports among NMPOUs suggest there is also significant risk of transitioning to heroin use (Cerdá et al., 2015; Jones, 2013; Pollini et al., 2011); however, this has not been demonstrated in all geographic areas adversely affected by the prescription opioid epidemic.

What is still unknown among those who have not transitioned to heroin or other substances is the long-term impact of continued NMPOU. We are now at the point in the epidemic where longitudinal data can truly inform efforts to address the opioid crisis. Therefore, the purpose of this analysis is to examine trends in NMPOU over the past decade in a cohort of rural Appalachia people who use drugs (PWUD).

Methods

Individuals included in the current analysis are participants in the Social Networks among Appalachian People (SNAP) study (Havens et al., 2013; Young et al., 2014). Briefly, eligible participants for the SNAP study were rural residents age 18 and older who self-reported past 30-day use of either prescription opioids, methamphetamine, cocaine or heroin for the purposes of getting high. Those enrolled (N=503) have been followed since 2008, with eight total waves of data collected in that time frame. Subjects were remunerated \$50 for each visit, and the study protocol was approved by the Institutional Review Board at the University of Kentucky. All but five of the 503 participants (99%) reported recent NMPOU at baseline and are, therefore, included in the current analysis. All 503 reported lifetime NMPOU. Data from the baseline and six follow-up visits were utilized. Retention rates were 92.3%, 92%, 93.7%, 90%, 89.1%, 89.7%, and 83.9% for the first through seventh follow-ups, respectively. To date, 50 deaths (10% of the original cohort) have been reported.

Given the correlated nature of the dependent variable over time, mixed-effects logistic regression was utilized. The dependent variable, recent (past 6-month) NMPOU, was created by combining responses for misuse of the following drugs: oxycodone (other than OxyContin®), hydrocodone, OxyContin®, morphine, buprenorphine, methadone, and other opioids (including hydromorphone, meperidine, morphine, fentanyl, oxymorphone, codeine). This variable was created for the baseline and each follow-up visit. The visit number was used as the measure of time. Of note, survey questions specifically queried participants about use “to get high”, not about use for therapeutic purposes. Past 6-month use of cocaine and methamphetamine were also examined at baseline and each follow-up visit. Independent variables tested in the model included age (in years), race (white/non-white), gender, education (in years) and employment (yes/no, including full-, part-time,

student) at baseline. Time-varying covariates included study visit (time), receiving benefits for a physical or mental disability (yes/no), self-perceived health status (Likert-type scale, poor to excellent), and past 6-month initiation in substance use disorder (SUD) treatment, with separate time-varying variables for methadone maintenance, detoxification, residential and outpatient counseling-only treatment. In order to visualize changes in the probability of opioid and stimulant use over time, separate models were also constructed for heroin, oxycodone, hydrocodone, buprenorphine, cocaine and methamphetamine using the “melogit” and “margins” commands in Stata, version 16.0 (College Station, TX).

Results

At baseline, the median age was 31 years (interquartile range: 26, 38) and more than half of participants were male (56.8%). Consistent with the demographic composition of Appalachian Kentucky, the majority of participants were white (94.2%). Participants were using a variety of prescription and illicit opioids at baseline (Table 1), and 79.3% reported NMPOU of three or more opioids in the past 6-months. About half of participants had any history of treatment for SUD; the most commonly reported treatment modality at baseline was residential (33.7%).

To contextualize changes in NMPOU overtime, mixed effects models were constructed for heroin, oxycodone, hydrocodone, buprenorphine (illicit), cocaine and methamphetamine, adjusting for time. Recent use significantly ($p<0.001$) declined over the past decade for NMPOU, oxycodone, hydrocodone, heroin, and cocaine (Figure 1). Significant ($p<0.001$) increases in use of illicit buprenorphine and methamphetamine were observed between 2008 and 2020.

The multivariable mixed effects model examined associations with NMPOU over the study period. Although not associated with long-term changes in NMPOU, age, race and gender were included in the model. Those receiving disability benefits (adjusted odds ratio [AOR]: 3.11, 95% confidence interval [CI]: 1.98, 4.90) and participants who, compared to those in excellent health, considered themselves to be in poor (AOR: 3.67, 95% CI: 1.61, 8.37) or fair health (AOR: 2.41, 95% CI: 1.30, 4.32) were more likely to be NMPOUs. However, recent (past year) engagement in SUD treatment was associated with reduced odds of NMPOU (Table 2). Specifically, accessing methadone maintenance (AOR: 0.29, 95% CI: 0.15, 0.60), residential (AOR: 0.22, 95% CI: 0.12, 0.42), and outpatient counseling-type treatments (AOR: 0.40, 95% CI: 0.22, 0.71) all resulted in reduced odds of NMPOU.

Conclusions

A significant decline was observed in the prevalence of NMPOU over time. While seemingly encouraging, reduction in use was not as profound as expected, with more than half of participants continuing NMPOU a full decade after initial study enrollment. There were also reductions in heroin use in the same time frame, which is unlike many other areas in the U.S. where a marked shift to heroin abuse has been observed (Cerdá et al., 2015; Jones, 2013; Pollini et al., 2011). Other drugs of abuse have emerged as well. Methamphetamine use significantly increased at the last follow-up visit, consistent with

emerging national data on the twin epidemics of methamphetamine and NMPOU (Daniulaityte et al., 2020; Ellis et al., 2018; Strickland et al., 2019). Data from this cohort also show that the primary drug of abuse since 2015 is not a prescription opioid, but gabapentin (Smith et al., 2015). Data from both substance users (Smith et al., 2015) and decedents (Slavova et al., 2018) suggested increased nonmedical use of gabapentin, which led to the recent scheduling of the drug Kentucky (Peckham et al., 2018). These findings demonstrate how prescription drug monitoring programs (PDMPs) can be successfully scaled-up and utilized to track potential drugs of abuse.

More than half of NMPOUs continue to report opioid use more than a decade after enrollment. Although this particular cohort is comprised entirely of NMPOUs, as we navigate a second decade of this epidemic, parallels can be drawn with other longitudinal studies of opioid users. In one of the few studies comparing NMPOU and heroin users, the authors found better outcomes for NMPOU with regard to retention in treatment and the transition from detoxification to medications for OUD (Krebs et al., 2017). Other long-term studies of people who use heroin find that, much like this cohort, use has decreased over time (Hser et al., 2001). While not entirely comparable, similarities in mortality rates, decreasing substance use over time, and poor health were observed (Hser et al., 2015; Hser et al., 2001). Lessons learned from these studies may help to inform interventions aimed at addressing the opioid epidemic moving forward.

The most encouraging finding was that SUD treatments, apart from detoxification, were protective against continued NMPOU over time. The odds of long-term NMPOU were significantly reduced with recent methadone maintenance, residential and outpatient counseling-type treatment. This is consistent with the scientific literature (Joe et al., 1999; Marsch, 1998; Stahler et al., 2016), although the evidence for effectiveness of medications for the treatment of opioid use disorder is stronger than that for the other modalities (Lee et al., 2018; Mattick et al., 2009, 2014). For the majority of the study period, methadone was the only medication that was regularly available through reputable treatment providers in the study county. Unfortunately, Kentucky's Medicaid program did not cover methadone treatment for the majority of the follow-up period, limiting its uptake, in part, due to cost barriers. However, as of 2019, Kentucky's Medicaid program reimburses for methadone treatment. Notably, there are an increasing number of buprenorphine providers in the study county, which may lead to greater decreases in NMPOU over time despite few providers accepting Medicaid reimbursement for all aspects of care. In an earlier study we found that the strongest predictor of buprenorphine misuse/diversion was the inability to access formal buprenorphine treatment programs (Lofwall and Havens, 2012). It should be noted that buprenorphine and naltrexone were not examined in the models because they were not consistently measured across study visits. Improving access to evidence-based treatments should be a priority in rural areas adversely impacted by the epidemic (Volkow et al., 2018).

Those receiving disability benefits were three times more likely as those not receiving benefits to engage in NMPOU longitudinally. Likewise, participants in self-reported poor or fair health were also significantly more likely to use NMPO compared to those who saw themselves as being in excellent health. These findings suggest that continued NMPOU may be driven, to some extent, by pain, and that this population has significant comorbidities,

including more severe OUD that may itself have contributed to significant medical morbidities (e.g., endocarditis)(Hartman et al., 2016). This population may benefit from attempts to shift from opioids for the treatment of chronic non-cancer pain (Dowell et al., 2016; Nicol et al., 2017) to non-opioid modalities in accordance with the latest scientific literature (Eccleston et al., 2017) and emerging guidelines from CDC (Dowell et al., 2016). In addition, a recent review concluded that buprenorphine was safe and well-tolerated for the treatment of chronic non-malignant pain (Aiyer et al., 2018). Unfortunately, like many advances in medical care, access to non-opioid treatments such as physical therapy, massage therapy and mindfulness may be limited in rural areas, and as a result, uptake slowed. The upside to promoting these alternatives is great, however, as there is still potential to prevent long-term NMPOU if patients are not introduced to these medications for chronic non-malignant pain treatment.

During the past decade, Kentucky has enacted laws aimed at curbing NMPOU by reducing the supply of prescription opioids available for diversion, including enhancement of the state's prescription drug monitoring system (PDMP)(Luu et al., 2019) to include mandatory registration with the system and use of the PDMP prior to writing prescriptions for controlled substances (Haffajee et al., 2018). Recent studies highlight Kentucky's success in reducing the supply (Haffajee et al., 2018; Wen et al., 2019), which may have also had an impact on the reductions in NMPOU observed over time in this cohort.

There are limitations to the current analysis that warrant mention. First, given the longitudinal study design, the results may be impacted by attrition bias. However, this is likely mitigated by the high follow-up rates (>80%) even a decade after study enrollment. In addition, a comparison of those who were lost to follow-up to those retained demonstrated no differences in the baseline demographic or drug use characteristics utilized in the current study. However, those lost to follow-up were more likely to self-report poor health compared to those retained in the study. The advantage of this longitudinal analysis lies in the ability to make inferences about continuing NMPOU over the past decade.

In conclusion, while marked reductions in NMPOU were observed, more than half of participants continued nonmedical opioid use a decade later. SUD treatment, apart from detoxification, was shown reduce the odds of NMPOU long-term; thus an obvious conclusion should be improving access to clearly established effective treatment in this population. High-quality, evidence-based treatments are likely to have the biggest impact in reducing NMPOU. Alternative strategies for pain management may also be warranted, as participants on disability and those in poor health were more likely to be using NMPO. There is clearly still potential to prevent opioid initiation and the transition to nonmedical use and opioid use disorder.

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References

- Aiyer R, Gulati A, Gungor S, Bhatia A, Mehta N, 2018 Treatment of Chronic Pain With Various Buprenorphine Formulations: A Systematic Review of Clinical Studies. *Anesth Analg* 127:529–38. [PubMed: 29239947]
- Cerdá M, Santaella J, Marshall BD, Kim JH, Martins SS, 2015 Nonmedical Prescription Opioid Use in Childhood and Early Adolescence Predicts Transitions to Heroin Use in Young Adulthood: A National Study. *J Pediatr* 167:605–12.e1-2. [PubMed: 26054942]
- Collins FS, Koroshetz WJ, Volkow ND, 2018 Helping to End Addiction Over the Long-term: The Research Plan for the NIH HEAL Initiative. *Jama* 320:129–30. [PubMed: 29896636]
- Compton WM, Jones CM, Baldwin GT, 2016 Relationship between Nonmedical Prescription-Opioid Use and Heroin Use. *N Engl J Med* 374:154–63. [PubMed: 26760086]
- Daniulaityte R, Silverstein SM, Crawford TN, Martins SS, Zule W, Zaragoza AJ, Carlson RG, 2020 Methamphetamine Use and Its Correlates among Individuals with Opioid Use Disorder in a Midwestern U.S. City. *Subst Use Misuse*:1–9. [PubMed: 31426693]
- Dowell D, Haegerich TM, Chou R, 2016 CDC Guideline for Prescribing Opioids for Chronic Pain--United States, 2016 *Jama* 315:1624–45. [PubMed: 26977696]
- Eccleston C, Fisher E, Thomas KH, Hearn L, Derry S, Stannard C, Knaggs R, Moore RA, 2017 Interventions for the reduction of prescribed opioid use in chronic non-cancer pain. The Cochrane database of systematic reviews 11:CD010323. [PubMed: 29130474]
- Ellis MS, Kasper ZA, Cicero TJ, 2018 Twin epidemics: The surging rise of methamphetamine use in chronic opioid users. *Drug Alcohol Depend* 193:14–20. [PubMed: 30326396]
- Haffajee RL, Mello MM, Zhang F, Zaslavsky AM, Larochelle MR, Wharam JF, 2018 Four States With Robust Prescription Drug Monitoring Programs Reduced Opioid Dosages. *Health Aff (Millwood)* 37:964–74. [PubMed: 29863921]
- Hartman L, Barnes E, Bachmann L, Schafer K, Lovato J, Files DC, 2016 Opiate Injection-associated Infective Endocarditis in the Southeastern United States. *Am J Med Sci* 352:603–08. [PubMed: 27916215]
- Havens JR, Lofwall MR, Frost SD, Oser CB, Leukefeld CG, Crosby RA, 2013 Individual and network factors associated with prevalent hepatitis C infection among rural Appalachian injection drug users. *Am J Public Health* 103:e44–52.
- Havens JR, Walker R, Leukefeld CG, 2007 Prevalence of opioid analgesic injection among rural nonmedical opioid analgesic users. *Drug Alcohol Depend* 87:98–102. [PubMed: 16959437]
- Hays L, Kirsh KL, Passik SD, 2003 Seeking drug treatment for OxyContin abuse: a chart review of consecutive admissions to a substance abuse treatment facility in Kentucky. *Journal of the National Comprehensive Cancer Network* : JNCCN 1:423–8. [PubMed: 19761073]
- Hser YI, Evans E, Grella C, Ling W, Anglin D, 2015 Long-term course of opioid addiction. *Harv Rev Psychiatry* 23:76–89. [PubMed: 25747921]
- Hser YI, Hoffman V, Grella CE, Anglin MD, 2001 A 33-year follow-up of narcotics addicts. *Arch Gen Psychiatry* 58:503–8. [PubMed: 11343531]
- Joe GW, Simpson DD, Broome KM, 1999 Retention and patient engagement models for different treatment modalities in DATOS. *Drug and alcohol dependence* 57:113–25. [PubMed: 10617096]
- Jones CM, 2013 Heroin use and heroin use risk behaviors among nonmedical users of prescription opioid pain relievers - United States, 2002–2004 and 2008–2010. *Drug Alcohol Depend* 132:95–100. [PubMed: 23410617]
- Katz DA, Hays LR, 2004 Adolescent OxyContin Abuse. *J Am Acad Child Adolesc Psychiatry* 43:231–4. [PubMed: 14726731]
- Krebs E, Min JE, Evans E, Li L, Liu L, Huang D, Urada D, Kerr T, Hser YI, et al., 2017 Estimating State Transitions for Opioid Use Disorders. *Med Decis Making* 37:483–97. [PubMed: 28027027]
- Lee JD, Nunes EV Jr., Novo P, Bachrach K, Bailey GL, Bhatt S, Farkas S, Fishman M, Gauthier P, et al., 2018 Comparative effectiveness of extended-release naltrexone versus buprenorphine-naloxone for opioid relapse prevention (X:BOT): a multicentre, open-label, randomised controlled trial. *Lancet* 391:309–18. [PubMed: 29150198]

- Lofwall MR, Havens JR, 2012 Inability to access buprenorphine treatment as a risk factor for using diverted buprenorphine. *Drug Alcohol Depend* 126:379–83. [PubMed: 22704124]
- Luu H, Slavova S, Freeman PR, Lofwall M, Browning S, Bush H, 2019 Trends and Patterns of Opioid Analgesic Prescribing: Regional and Rural-Urban Variations in Kentucky From 2012 to 2015. *J Rural Health* 35:97–107. [PubMed: 29664203]
- Marsch LA, 1998 The efficacy of methadone maintenance interventions in reducing illicit opiate use, HIV risk behavior and criminality: a meta-analysis. *Addiction* 93:515–32. [PubMed: 9684390]
- Mattick RP, Breen C, Kimber J, Davoli M, 2009 Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence. The Cochrane database of systematic reviews: Cd002209. [PubMed: 19588333]
- Mattick RP, Breen C, Kimber J, Davoli M, 2014 Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. *Cochrane Database Syst Rev*: Cd002207. [PubMed: 24500948]
- McGinnis KA, Fiellin DA, Skanderson M, Hser YI, Lucas GM, Justice AC, Tate JP, 2019 Opioid use trajectory groups and changes in a physical health biomarker among HIV-positive and uninfected patients receiving opioid agonist treatment. *Drug Alcohol Depend* 204:107511. [PubMed: 31546119]
- Nicol AL, Hurley RW, Benzon HT, 2017 Alternatives to Opioids in the Pharmacologic Management of Chronic Pain Syndromes: A Narrative Review of Randomized, Controlled, and Blinded Clinical Trials. *Anesth Analg* 125:1682–703. [PubMed: 29049114]
- Peckham AM, Ananickal MJ, Sclar DA, 2018 Gabapentin use, abuse, and the US opioid epidemic: the case for reclassification as a controlled substance and the need for pharmacovigilance. *Risk Manag Healthc Policy* 11:109–16. [PubMed: 30154674]
- Pollini RA, Banta-Green CJ, Cuevas-Mota J, Metzner M, Teshale E, Garfein RS, 2011 Problematic use of prescription-type opioids prior to heroin use among young heroin injectors. *Subst Abuse Rehabil* 2:173–80. [PubMed: 23293547]
- Slavova S, Miller A, Bunn TL, White JR, Kirschke D, Light T, Christy D, Thompson G, Winecker R, 2018 Prevalence of gabapentin in drug overdose postmortem toxicology testing results. *Drug Alcohol Depend* 186:80–85. [PubMed: 29554591]
- Smith RV, Lofwall MR, Havens JR, 2015 Abuse and diversion of gabapentin among nonmedical prescription opioid users in Appalachian Kentucky. *Am J Psychiatry* 172:487–8.
- Stahler GJ, Mennis J, DuCette JP, 2016 Residential and outpatient treatment completion for substance use disorders in the U.S.: Moderation analysis by demographics and drug of choice. *Addict Behav* 58:129–35. [PubMed: 26925821]
- Strickland JC, Havens JR, Stoops WW, 2019 A nationally representative analysis of “twin epidemics”: Rising rates of methamphetamine use among persons who use opioids. *Drug Alcohol Depend* 204:107592. [PubMed: 31586804]
- Volkow ND, Collins FS, 2017 The Role of Science in Addressing the Opioid Crisis. *N Engl J Med* 377:391–94. [PubMed: 28564549]
- Volkow ND, Jones EB, Einstein EB, Wargo EM, 2018 Prevention and Treatment of Opioid Misuse and Addiction: A Review. *JAMA psychiatry*.
- Wen H, Hockenberry JM, Jeng PJ, Bao Y, 2019 Prescription Drug Monitoring Program Mandates: Impact On Opioid Prescribing And Related Hospital Use. *Health Aff (Millwood)* 38:1550–56. [PubMed: 31479368]
- Young AM, Rudolph AE, Quillen D, Havens JR, 2014 Spatial, temporal and relational patterns in respondent-driven sampling: evidence from a social network study of rural drug users. *J Epidemiol Community Health* 68:792–8. [PubMed: 24692631]

Highlights

- 503 rural opioid users followed between 2008-2017 in rural Appalachia
- Decreases were observed in opioid use across several drugs
- No subsequent increase in heroin use was observed
- Similar decreases observed in cocaine use; use of methamphetamine remained low throughout the follow-up

Figure 1.

Probability of Opioid and Other Drug Use among Rural Appalachian NMPOUs, 2008-2020

*decline over time ($p < 0.001$)

**increase over time ($p < 0.001$)

Table 1.

Baseline Demographic and Drug Use Characteristics among Rural Appalachian NMPOUs

	n	%
Male	283	56.8
Age, median years (IQR)	31 (26, 38)	
White	469	98.2
Employed (full-time, part-time, or student)	360	72.3
Education, median years (IQR)	12 (10, 12)	
Disability Benefits	61	12.3
Health Status		
Poor	60	11.9
Fair	174	34.6
Good	193	38.4
Very Good	57	11.3
Excellent	19	3.8
Recent (Past 6-Month) Opioid Misuse		
Heroin	57	11.4
OxyContin®	408	81.9
Oxycodone (other than OxyContin)	422	84.7
Buprenorphine	52	10.4
Hydrocodone	449	97.0
Other opioids *	137	27.5
Other Recent Drug Use		
Cocaine	210	44.5
Methamphetamine	47	9.4
Baseline History SUD Treatment		
Methadone Maintenance	55	10.8
Residential	168	33.7
Outpatient Counseling	80	16.1
Detoxification	40	8.0

* includes hydromorphone, meperidine, morphine, fentanyl, oxymorphone, codeine

Table 2.

Results from Mixed-Effects Logistic Model for NMPOUs in Rural Appalachia, 2008-2020

	Unadjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI
Male	0.87	0.69, 1.10	0.91	0.66, 1.26
White	0.98	0.60, 1.60	0.98	0.50, 1.95
Age (in years)	1.02	1.01, 1.03	1.00	0.98, 1.02
Follow-Up Visit				
1 (2008-10)	Referent category		Referent category	
2 (2010-11)	0.33	0.19, 0.59	0.33	0.19, 0.60
3 (2010-12)	0.21	0.12, 0.36	0.20	0.12, 0.36
4 (2012-13)	0.15	0.09, 0.27	0.17	0.10, 0.30
5 (2013-14)	0.05	0.03, 0.09	0.06	0.03, 0.10
6 (2014-16)	0.03	0.02, 0.05	0.03	0.02, 0.05
7 (2017-20)	0.02	0.01, 0.04	0.02	0.01, 0.04
Receiving Disability Benefits	3.59	2.33, 5.54	3.11	1.98, 4.90
Health Status				
Poor	4.49	2.00, 10.0	3.67	1.61, 8.37
Fair	2.83	1.59, 5.03	2.41	1.30, 4.32
Good	1.75	1.01, 3.01	1.54	0.89, 2.67
Very Good	1.34	0.77, 2.32	1.31	0.76, 2.29
Excellent	Referent category		Referent category	
Recent Substance Use Disorder Treatment				
Methadone Maintenance	0.29	0.15, 0.56	0.29	0.15, 0.60
Residential	0.19	0.10, 0.36	0.22	0.12, 0.42
Outpatient Counseling	0.38	0.22, 0.66	0.40	0.22, 0.71
Detoxification	4.65	0.54, 40.3	4.85	0.55, 42.5