

Polysubstance use and association with opioid use disorder treatment in the US Veterans Health Administration

Running head: Polysubstance use and OUD treatment

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Abstract

Aims: To understand the role of comorbid substance use disorders (SUDs), or polysubstance use, in the treatment of opioid use disorder (OUD), this study compared patients with OUD only to those with additional SUDs and examined association with OUD treatment receipt.

Design, setting, participants: Retrospective national cohort study of veterans diagnosed with OUD (n=65,741) receiving care from the US Veterans Health Administration (VHA) in fiscal year 2017.

Measurements: Patient characteristics were compared among those diagnosed with OUD only versus those with one other SUD (OUD+1 SUD) and with multiple SUDs (OUD+ \geq 2 SUDs). The study examined the relationship between comorbid SUDs and receipt of buprenorphine, methadone and SUD outpatient treatment during 1 year follow-up, adjusting for patient demographic characteristics and clinical conditions.

Findings: Among the 65,741 veterans with OUD in FY2017, 41.2% had OUD only, 22.9% had OUD+1 SUD, and 35.9% had OUD+ \geq 2 SUDs. Common comorbid SUDs included alcohol use disorder (41.3%), cocaine/stimulant use disorder (30.0%) and cannabis use disorder (22.4%). Adjusting for patient characteristics, patients with OUD+1 SUD (AOR=0.91, 95% CI:0.86-0.96) and patients with OUD+ \geq 2 SUDs (AOR=0.72, 95% CI:0.68-0.76) had lower odds of receiving buprenorphine compared with OUD only patients. The findings were inconclusive for whether there was a significant association in receiving methadone for patients with OUD+1 SUD (AOR=0.96, 95% CI:0.90-1.02) but differences were seen for those with OUD+ \geq 2 SUDs (AOR=0.88, 95% CI:0.83-0.94). Patients with OUD+1 SUD (AOR=1.91, 95% CI:1.83-2.00) and patient with OUD+ \geq 2 SUDs (AOR=3.51, 95% CI:3.35-3.68) were much more likely to have a

SUD clinic visit.

Conclusions: The majority of veterans in the US Veterans Health Administration diagnosed with opioid use disorder appeared to have at least one comorbid substance use disorder (SUD) and many have multiple SUDs. Despite the higher likelihood of a SUD clinic visit, having a non-opioid SUD is associated with lower likelihood of buprenorphine treatment, suggesting the importance of addressing polysubstance use within efforts to expand treatment for OUD.

Introduction

Opioid overdose mortality continues to rise in the US and other countries (1–3), but trends have shifted toward overdoses involving illicit opioids and multiple other substances, with the vast majority of opioid overdoses in some areas involving more than one substance (1,4–6). Having multiple comorbid substance use disorders (SUDs), described as polysubstance use, is one of the most prominent risk factors for opioid overdose (7–9). Comorbid SUDs is common in patients with opioid use disorder (OUD), with over 57% of adults with OUD having an additional comorbid SUD among US adults (10). Beyond the impact on overdose risk, comorbid SUDs among patients with OUD are associated with numerous other negative health and legal consequences and increased healthcare utilization (11,12). Thus, it is important to understand the treatment needs of patients with polysubstance use in order to successfully address the opioid epidemic in the US and other countries.

Despite the demonstrated benefits of medication treatment for OUD (MOUD)(13,14) including reduced mortality (15), rates of receipt of MOUD remain low in the US, with fewer than 20-40% of patients with OUD receiving these treatments (16–18). Clinic and clinician policies and attitudes are key drivers of treatment use, particularly in patients with comorbid SUDs (19,20). For example, a recent survey study of buprenorphine prescribers in the US suggested that buprenorphine prescribers may be less willing to initiate buprenorphine in patients with binge alcohol use or misuse of benzodiazepines (20). However, due to concerns that "withholding" MOUD treatment may actually worsen outcomes, a 2017 US Food and Drug Administration (FDA) Safety Communication recommended to clinicians that "buprenorphine and methadone should not be withheld from patients taking benzodiazepines or other drugs that

depress the central nervous system... excluding patients from <medication assisted treatment> or discharging patients from treatment because of use of benzodiazepines or <central nervous system> depressants is not likely to stop them from using these drugs together. Instead, the combined use may continue outside the treatment setting, which could result in more severe outcomes (21)."

However, little is known about polysubstance use within real-world treatment settings for patients with OUD and how treatment patterns may differ between those with and without polysubstance use. We examined the population of Veterans receiving treatment from the Veterans Health Administration (VHA), the largest integrated health system in the US and largest single provider of addiction treatment in the US (22). The aims of the current study were to: 1) describe prevalence of specific comorbid SUDs and compare patient characteristics across three categories of patients: patients diagnosed with OUD only versus those with one other SUD (OUD+1 SUD) and with multiple SUDs (OUD+ \geq 2 SUDs) and 2) estimate the association of the polysubstance groups with treatment receipt. We hypothesized that patients with a comorbid SUD or greater number of comorbid SUDs would be less likely to receive either buprenorphine or methadone treatment, although these same patients, with their greater burden of illness, would be more likely to access general SUD clinic services.

Methods

Study design and data source

This study was a retrospective cohort study of Veterans in the US receiving VHA care. All patient demographic and clinical information are from the VHA Corporate Data Warehouse

(CDW), the national repository of VHA electronic medical records. Study protocols were approved by the Ann Arbor Veterans Affairs Institutional Review Board.

Sample

We examined the cohort of Veterans age 18 and older with at least one VHA inpatient or outpatient encounter at any VHA facility in the US with a diagnosis of OUD in fiscal year (FY) 2017 (October 1, 2016 through September 30, 2017). Diagnoses of OUD were assessed using the International Classification of Disease (ICD-10) diagnosis codes (Appendix Table 1). Patients were required to have at least one VHA visit (for any health condition) in the prior year to restrict to patients who actively utilized VHA care.

Measures

Outcome variables

The main outcomes of interest were receipt of: a) methadone, b) buprenorphine and c) any outpatient SUD treatment. We focused on buprenorphine and methadone, both opioid agonist medications, which are the most utilized and most effective treatments for OUD (13–15,22,23). In contrast, extended-release naltrexone, a newer treatment for OUD was used by < 1% of VHA patients with OUD in FY 2017(22). Outcomes were assessed in the twelve-month period after the first visit with a diagnosis of OUD (i.e. latest date possible was September 30, 2018). Receipt of buprenorphine was defined as any VHA fill of oral buprenorphine medication. Similar to prior studies (24–26), clinic “stop codes” in CDW data, which indicate the clinical setting or type of services received during a specific encounter with VHA providers, were examined to determine receipt of methadone treatment and any SUD treatment (see Appendix

Table 2). Receipt of methadone for pain diagnosis in the absence of OUD diagnosis was not included. Outpatient SUD treatment included any outpatient treatment in a SUD clinic setting, including individual or group psychotherapy, evaluation, treatment planning and medication visits.

Primary independent variable

The primary predictor of interest was comorbid diagnoses of other SUDs. Specific SUD diagnoses included: alcohol use disorder, stimulant use disorder, cannabis use disorder, sedative use disorder, and other substance use disorders (including hallucinogen, inhalant, and other unspecified psychoactive substance use disorders). SUDs were assessed using International Classification of Disease-10 (ICD-10) diagnosis codes (Appendix Table 2) during inpatient and outpatient clinical encounters in the 12-month baseline period prior to first OUD diagnosis in FY 2017. Comorbid SUDs were coded into the following categories: OUD only, OUD plus one other SUD (OUD + 1 SUD), and OUD plus more than one other SUD (OUD + \geq 2 SUDs).

Covariates

Demographic characteristics were: age, sex, race, Hispanic ethnicity, rural/urban residence (categorized as urban, large rural, small/isolated rural, and unknown), and homelessness. Rurality was categorized using the Rural-Urban Commuting Areas (RUCAs) geographic taxonomy (27). Homelessness was determined by the presence of ICD-10 codes for housing status or utilization of homeless Veteran services (see Appendix).

Given prior data indicating differences in receipt of specialty treatment for patients receiving the majority of their care at a large VHA medical center versus smaller community-

based outpatient clinics (CBOCs) that are affiliated with VHA medical centers (28,29), a variable indicating whether the patient received >50% of their primary care visits in a VHA medical center versus CBOC was also included (29). Additional clinical characteristics reflecting diagnoses made by VHA treatment providers were assessed in the 12-month baseline period prior to first OUD diagnosis in FY 2017. Comorbid mental health diagnoses examined were major depressive disorder, bipolar disorder, PTSD, other anxiety disorders, and psychotic disorders (see Appendix Table 2). The Charlson Comorbidity Index was included to indicate severity of comorbid medical conditions (30). Nicotine use disorder was defined using ICD-10 codes (see Appendix Table 2). To control for the effects of unmeasured facility-level differences in the use of OUD treatment, the 130 facilities where patients received their index OUD diagnosis in FY2017 were included as random effects in the regression model.

Statistical Analysis

After descriptively examining the distribution of specific SUD diagnoses in this cohort of VHA patients with OUD, baseline patient demographic and clinical characteristics were compared across the three groups: OUD only, OUD+1 SUD and OUD+ \geq 2 SUDs using χ^2 tests. Generalized linear mixed models for each of the OUD treatment outcomes using binomial distributions with logit link was used to test whether comorbid SUD groups were associated with each OUD treatment receipt. Each model included facilities as random intercepts and was adjusted for all covariates (listed under Table 2). Intraclass correlation coefficient (ICC) for each model was calculated from the intercept-only model using methods for estimating the ICC for categorical outcomes (31).

In order to assess the relationship between comorbid SUDs and starting new treatment for OUD, we conducted sensitivity analyses focusing on the subgroup of patients with OUD who did not receive any OUD treatment in the 3 months prior to their first visit with OUD diagnosis in FY 2017. We examined factors associated with newly starting each OUD treatment in this subgroup. All analyses were performed using SAS Enterprise Guide 7.1. Analyses were not pre-registered so the results should be considered exploratory.

Results

In FY 2017, 65,843 Veterans receiving VHA care had a diagnosis of OUD. The study excluded patients with missing age (n = 101), gender (n = 100) or with no VHA visit for any health condition in the prior year (n = 1) for a total of 102 patients excluded, leaving a final study cohort of 65,741 Veterans. Among the cohort of patients, 41.2% (n = 27,078) had OUD only while 22.9% (n = 15,075) had one other comorbid SUD and 35.9% (n = 23,588) had two or more comorbid SUDs (see Table 1). Alcohol use disorder was the most common comorbid SUD followed by stimulant use disorder. Among all patients diagnosed with OUD in FY 2017, 59.4% (n = 39,068) utilized treatment in an outpatient SUD clinic, but only 16.9% (n = 11,098) received buprenorphine treatment and 16.9% (n = 11,112) received treatment in a methadone clinic. The gap between receipt of any outpatient SUD treatment and medication treatment increased with increasing polysubstance use.

Table 2 describes patient characteristics comparing individuals across the three groups: OUD only, OUD+1 SUD and OUD+ \geq 2 SUDs. Patients with comorbid SUDs were more likely to be in younger age groups, less likely to be White, more likely to be homeless, and more likely

to be seen in large VHA medical centers rather than VHA Community-based Outpatient Clinics (CBOCs). Prevalence of all mental health disorders increased as number of comorbid SUDs increased. The most prevalent mental health disorder was major depressive disorder, which was diagnosed in about a third of patients with OUD only, but in almost two thirds of patients with OUD+ ≥ 2 SUDs.

We examined the association between the substance comorbidity groups with each of the three outcomes, while adjusting for all of the patient characteristics and controlling for the random effects of VHA facilities. The intraclass correlation coefficient (ICC) from the intercept-only model indicated that 20% of the total variation in buprenorphine treatment was explained by variation across facilities, while only 11% of the variation was explained by facility variation for SUD clinic visits. A number of patient characteristics were associated with lower likelihood of receiving any of the three types of OUD treatment including: older age, female gender, patients receiving majority of their care in CBOCs, patients with psychotic disorders, and patients with Charlson Comorbidity Index > 1 (see Table 3).

For the primary predictor variable of interest, patients with OUD+1 SUD and patients with OUD+ ≥ 2 SUDs were less likely to receive buprenorphine treatment compared to patients with OUD only. There were no significant differences in methadone treatment for patients with OUD+1 SUD, but decreased likelihood for patients with OUD+ ≥ 2 SUDs. In contrast, patients with OUD+1 SUD and patients with OUD+ ≥ 2 SUDs were much more likely to receive other outpatient SUD treatment.

Sensitivity analyses

Among this cohort, 49.6% of patients with OUD (N=33,128) were newly initiated on treatment (i.e., not receiving any OUD treatment in the 3 months prior to their first diagnosis in FY 2017). In this subgroup of patients, having OUD+ \geq 2 SUDs (AOR=0.87, 95% CI:0.76, 0.99) was associated with lower likelihood of receiving buprenorphine treatment compared to patients with OUD only, though the results for the OUD+1 SUD group was no longer significant (AOR=1.08, 95% CI:0.96, 1.22). There were no significant differences in methadone treatment for patients with OUD+1 SUD (AOR=0.99, 95% CI:0.87, 1.12) or patients with OUD+ \geq 2 SUDs (AOR=0.92, 95% CI:0.81, 1.05). Similar to the primary analyses, patients with OUD+1 SUD (AOR=1.71, 95% CI:1.60, 1.82) and patients with OUD+ \geq 2 SUDs (AOR=2.61, 95% CI:2.44, 2.80) were much more likely to receive other outpatient SUD treatment.

Discussion

In this study examining treatment receipt among patients with OUD receiving care within the VHA in FY 2017, close to sixty-percent of patients had at least one additional SUD diagnosis and over a third of patients had multiple comorbid SUDs. The most common comorbid SUD diagnosis was alcohol use disorder, which was present in the majority of those with polysubstance use, followed by cocaine/stimulant use disorder. At the same time, although those with polysubstance use were much more likely to receive outpatient SUD care, they were less likely to receive buprenorphine treatment for OUD. These findings suggest polysubstance use, especially with alcohol and stimulant use disorders, are the norm and not the exception among patients with OUD, but these patients with polysubstance use are less likely to receive buprenorphine treatment.

There are several potential explanations for this treatment paradox, including lack of models of care within current OUD frameworks for patients with OUD and polysubstance use, patient factors, clinician and system factors. Patients with comorbid SUDs are more likely to receive SUD visits, which encompass numerous treatment modalities including psychotherapy, treatment planning and evaluation, but less likely to receive or initiate buprenorphine treatment. These findings are in contrast to the preponderance of studies indicating that patients with higher burden of other chronic medical conditions are much more likely to receive higher rates of medical and mental health treatment (32–34). It is possible patients with comorbid SUDs may perceive lower need for treatment compared to those with OUD only, but the higher utilization of SUD visits suggest there may be additional factors.

Clinicians' attitudes and expectations for patients as requirements for initiating and sustaining treatment likely also drive treatment utilization for patients with SUDs. Variations in approaches to SUD treatment across clinicians can be characterized using different treatment thresholds (35,36). Specifically, the expectation of some providers that patients have complete abstinence from all substances as a requirement for medication treatment for OUD may directly contribute to decreased initiation and retention on medications for patients with polysubstance use (37). Some treatment programs in Canada and many European countries have adopted “low threshold” models that incorporate harm reduction approaches (38–40), but many treatment programs in the US still operate under high threshold models. Unfortunately, no data were available on treatment philosophies of individual clinicians so it is not possible to directly assess how this influenced the decision to initiate or continue delivery of MOUD. However, the finding that many of the patients at highest risk for negative outcomes, (i.e., those with comorbid SUDs)

are not receiving medication treatment suggest the need to better understand clinician attitudes in order to improve treatment delivery for these patients.

The high prevalence of these conditions among the OUD patient population indicates the urgent need for treatment models that can deliver evidence based treatments for OUD as well as other SUDs. Effective treatments for other SUDs include medications for alcohol use disorder (41,42), but also rely on evidence-based psychosocial interventions such as cognitive behavioral therapy and contingency management (43–46). To date, much of the focus to improve treatment of OUD has been on increasing access to and use of medication treatment for patients with OUD. Moving forward, treatment considerations also need to incorporate effective treatments for comorbid SUDs, a group of patients often characterized with worse treatment outcomes, including lower treatment retention, increased legal consequences and poorer health outcomes overall (11,16,47). Further work is needed to examine treatment strategies that may be particularly effective in patients with polysubstance use, for example, examining the effectiveness of long-acting naltrexone among patients with comorbid alcohol and opioid use disorder.

In addition, models of care for patients with OUD must also consider how to address treatment needs of more complex patients with comorbid SUDs. Specialty SUD treatment settings, especially those in the VHA, compared to primary care, may have the capacity to deliver evidence-based psychotherapies for SUDs (48,49), but there is still a dearth of treatment models that incorporate both medication and psychosocial interventions for polysubstance use even within specialty SUD settings. In primary care and other non-specialty care settings, models such as collaborative care and other care management models that can help deliver effective treatments for multiple substance use disorders may be particularly promising (50,51). Future

studies should examine effectiveness of different models of care for the large population of patients with polysubstance use found in real-world clinic settings.

There are several important limitations in this study. This study used administrative data to capture treatments for patients with OUD, including buprenorphine, methadone and outpatient visits in SUD clinics, which includes the most effective and commonly used treatments (13,14,16,52). However, we were not able to further specify the type of outpatient treatment, including individual or group psychotherapy, versus treatment planning and medication visits. It is also possible that increased use of naltrexone and extended-release naltrexone may account for some of the decreased use of buprenorphine and methadone in patients with polysubstance use. Although < 1% of VHA patients with OUD received extended-release naltrexone in 2017 (22), both utilization and effectiveness of naltrexone in patients with OUD and polysubstance use should be examined in future studies. Also, other unmeasured factors (e.g., treatment adherence) may have influenced the present findings though we found similar results among patients initiating treatment. Furthermore, we did not examine duration or severity of OUD or other SUDs. In addition, patients with polysubstance use may be more likely seen in SUD settings and those seen in SUD settings are more likely to be diagnosed with additional SUDs. However, this should not alter the finding that polysubstance use associated with lower likelihood of receiving buprenorphine treatment, especially because the vast majority of buprenorphine prescribing in the VHA occurs in SUD specialty settings (53). The study focuses on Veterans, an important population at higher risk for overdose than the general population (54) and with similar prevalence of OUD compared to the non-Veteran population in the US (55). However, Veterans obtain medications and other treatments outside of the VHA, which are not captured by this data

and many patients with OUD do not seek treatment so there is under-diagnosis of OUD (56). Finally, the population is predominantly male, which may not generalize to other populations.

Despite these limitations, we found that comorbid SUDs are highly prevalent among patients with OUD, but on average are associated with lower likelihood of patients receiving buprenorphine treatments for OUD, but with higher likelihood of patients accessing any outpatient SUD treatment. To date, there have been few studies addressing access to treatment and treatment outcomes for patients with OUD and other comorbid SUDs. Future studies should explore how clinician and other system-level factors may be associated with choice of treatment for patients with polysubstance use and how to better address treatment needs for the majority of patients with OUD who have multiple SUD diagnoses.

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Table 1. Prevalence of specific substance use disorders (SUD) across SUD comorbidity groups among patients with an opioid use disorder (OUD) diagnosis¹

	Among OUD + 1 other SUD (N=15,075) % (N)	Among OUD+≥2 other SUDs (N=23,588) % (N)	Among total OUD cohort (N=65,741)
Alcohol use disorder	50.0% (7,531)	83.1% (19,592)	41.3% (27,123)
Cannabis use disorder	13.1% (1,968)	54.4% (12,728)	22.4% (14,696)
Cocaine/Stimulant use disorder	18.7% (2,823)	71.7% (16,915)	30.0% (19,738)
Sedative use disorder	6.7% (1,010)	23.4% (5,509)	9.9% (6,519)
Other substance use disorder	11.6% (1,743)	47.6% (11,234)	19.7% (12,977)

¹Mean(SD) for number of non-alcohol substance use disorders is 0.5 (0.5) in OUD+1 SUD, and 1.97 (0.86) in OUD+≥2 SUDs patients.

Table 2. Demographic, clinical and treatment characteristics across SUD comorbidity groups among patients with OUD¹

	OUD only N=27,078 (41.2%) % (N)	OUD + 1 other SUD N=15,075 (22.9%) % (N)	OUD+≥2 other SUDs N=23,588 (35.9%) % (N)	X ²	p-value
Age				2103.35	<.001
	18-29 5.5% (1,487)	7.4% (1,109)	9.2% (2,170)		
	30-64 66.6% (18,038)	72.9% (10,987)	78.9% (18,619)		
	65 & over 27.9% (7,553)	19.8% (2,979)	11.9% (2,799)		
Female	8.3% (2,249)	7.1% (1,070)	6.9% (1,626)	41.20	<.001
Race				945.18	<.001

White	77.5% (20,998)	74.5% (11,225)	68.5% (16,157)		
Black	14.7% (3,989)	18.4% (2,771)	25.2% (5,954)		
Other/Multi-race	1.7% (464)	1.8% (267)	1.7% (406)		
Unknown/Missing ²	5.1% (1,384)	4.5% (681)	3.5% (831)		
Hispanic (vs. non)	5.0% (1,361)	5.8% (874)	6.2% (1,458)	32.91	<.001
Residence				186.00	<.001
Urban	81.2% (21,977)	83.7% (12,612)	84.9% (20,023)		
Large Rural City/Town	6.5% (1,773)	5.6% (846)	4.8% (1,144)		
Small/Isolated Rural	5.4% (1,463)	4.2% (635)	3.6% (841)		
Unknown/Missing ³	6.9% (1,865)	6.5% (982)	6.7% (1,580)		
Homeless	7.6% (2,064)	17.8% (2,681)	41.5% (9,793)	8621.43	<.001
Care location				750.17	<.001
CBOC	36.9% (9,992)	32.5% (4,899)	27.9% (6,587)		
VAMC	46.6% (12,615)	50.4% (7,591)	58.4% (13,773)		
Unknown/Missing ³	16.5% (4,471)	17.1% (2,585)	13.7% (3,228)		
<i>Mental health disorders⁴</i>					
Major Depression	35.1% (9,511)	47.6% (7,182)	63.0% (14,872)	3939.39	<.001
Bipolar Disorder	6.2% (1,666)	10.8% (1,621)	20.4% (4,815)	2417.23	<.001
PTSD	29.2% (7,917)	38.6% (5,814)	50.8% (11,994)	2474.27	<.001
Other Anxiety disorder	21.2% (5,732)	30.0% (4,529)	40.6% (9,578)	2260.47	<.001
Psychotic disorder	5.2% (1,401)	7.6% (1,143)	14.5% (3,412)	1372.67	<.001
Charlson Index				155.09	<.001
= 0	50.5% (13,673)	50.9% (7,677)	47.0% (11,084)		
= 1	20.6% (5,589)	21.1% (3,182)	24.8% (5,854)		
> 1	28.9% (7,816)	28.0% (4,216)	28.2% (6,650)		
Nicotine use disorder	18.2% (4,926)	29.5% (4,449)	47.0% (11,085)	4902.27	<.001
<i>Treatments received</i>					
Buprenorphine	18.8% (5,104)	17.9% (2,698)	14.0% (3,296)	227.99	<.001
Methadone	17.3% (4,689)	17.5% (2,639)	16.0% (3,784)	19.65	<.001
SUD clinic visits	43.4% (11,746)	61.5% (9,269)	76.5% (18,053)	5782.20	<.001

¹ All variables from Table 2 were included as covariates across all three models in Table 3 using the same categories depicted, except for the treatment variables which were the outcomes in these models.

² For race, the "unknown/missing category" includes those with "missing," "blank," "declined," and "unknown by patient."

³ For residence and care location variables, the "unknown/missing" category represented all missing data.

⁴ Mean(SD) for number of mental health disorders is 0.97 (0.99) in OUD only, 1.35 (1.07) in OUD+1 SUD, and 1.89 (1.16) in OUD+≥2 SUDs patients.

Table 3. Generalized linear mixed regression models examining the relationship between SUD comorbidity and receipt of OUD treatment

Characteristic	Buprenorphine, AOR (95% CI)	Methadone, AOR (95% CI)	SUD clinic visits, AOR (95% CI)
OUD only	ref	ref	ref
OUD+1 SUD	0.87 (0.82, 0.93)	0.91 (0.86, 0.97)	1.85 (1.77, 1.93)
OUD+ >1 SUD	0.65 (0.61, 0.69)	0.79 (0.74, 0.84)	3.25 (3.10, 3.41)
Age			
18-29	ref	ref	ref
30-64	0.88 (0.81, 0.95)	0.94 (0.85, 1.03)	0.67 (0.62, 0.72)
>= 65	0.45 (0.40, 0.50)	0.77 (0.69, 0.86)	0.36 (0.33, 0.39)
Female	0.85 (0.78, 0.92)	0.84 (0.77, 0.93)	0.78 (0.73, 0.83)
Race			
White	ref	ref	ref
Black	0.54 (0.50, 0.58)	1.12 (1.05, 1.19)	1.23 (1.16, 1.29)
Other/Multi-race	0.77 (0.66, 0.88)	1.01 (0.87, 1.18)	0.91 (0.82, 1.02)
Unknown	0.85 (0.76, 0.96)	0.94 (0.84, 1.06)	0.95 (0.87, 1.03)
Hispanic	0.91 (0.81, 1.01)	1.26 (1.13, 1.40)	1.25 (1.15, 1.36)
Location			
Urban	ref	ref	ref
Large Rural City/Town	1.10 (1.00, 1.21)	0.57 (0.50, 0.66)	0.75 (0.69, 0.82)
Small/Isolated Rural Town	1.07 (0.96, 1.19)	0.51 (0.43, 0.60)	0.80 (0.73, 0.88)
Unknown	0.54 (0.48, 0.60)	0.56 (0.51, 0.63)	0.55 (0.51, 0.60)
Homeless	0.81 (0.77, 0.87)	1.01 (0.95, 1.07)	1.76 (1.68, 1.85)
Care location			

VAMC	ref	ref	ref
CBOC	0.79 (0.75, 0.83)	0.77 (0.72, 0.82)	0.74 (0.71, 0.77)
Unknown	1.03 (0.96, 1.10)	1.11 (1.03, 1.19)	1.32 (1.25, 1.40)
Major Depression	0.97 (0.93, 1.02)	0.82 (0.77, 0.86)	0.96 (0.93, 1.00)
Bipolar Disorder	0.86 (0.80, 0.92)	0.76 (0.70, 0.83)	0.93 (0.88, 0.99)
Other Anxiety	1.19 (1.13, 1.24)	0.98 (0.93, 1.03)	1.18 (1.14, 1.23)
PTSD	0.96 (0.91, 1.01)	0.83 (0.78, 0.88)	0.90 (0.86, 0.94)
Schizophrenia/Other psychosis	0.64 (0.58, 0.70)	0.70 (0.64, 0.76)	0.73 (0.69, 0.78)
Charlson Index			
= 0	ref	ref	ref
= 1	0.82 (0.77, 0.87)	1.03 (0.97, 1.09)	0.81 (0.77, 0.84)
> 1	0.52 (0.49, 0.56)	0.80 (0.75, 0.85)	0.53 (0.50, 0.55)
Nicotine Use Disorder	1.55 (1.48, 1.64)	1.83 (1.74, 1.93)	1.53 (1.47, 1.59)