



Opioid use disorder treatment in rural settings: The primary care perspective

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ABSTRACT

Despite the efficacy of medications for treating opioid use disorder (OUD), they are underutilized, especially in rural areas. Our objectives were to determine the association between primary care practitioners (PCPs) rurality and concerns for patient substance use, and to identify factors associated with PCP comfort treating OUD, focusing on barriers to treatment. We developed a web-based survey completed by 116 adult-serving PCPs located in Vermont's rural and non-rural counties between April–August 2020. The instrument included PCP-identified concerns for substance use among patients, barriers to treating patients with OUD, and current level of comfort treating patients with OUD. On a scale from 0 to 10, rural PCPs reported higher concern for heroin (mean difference; Mdiff = 1.38, 95% CI: 0.13 to 2.63), fentanyl (Mdiff = 1.52, 95% CI: 0.29 to 2.74), and methamphetamine (Mdiff = 1.61, 95% CI: 0.33 to 2.90) use among patients compared to non-rural PCPs, and practitioners in both settings expressed high concern regarding their patients' use of tobacco (7.6 out of 10) and alcohol (7.0 out of 10). There was no difference in reported comfort in treating patients with OUD among rural vs. non-rural PCPs (Mdiff = 0.65, 95%CI: 0.17 to 1.46; $P = 0.119$), controlling for higher comfort among male PCPs and those waived to prescribe buprenorphine ($P_s < 0.05$). Lack of training/experience and medication diversion were PCP-identified barriers associated with less comfort treating OUD patients, while time constraints was associated with more comfort ($P_s < 0.05$). Taken together, these data highlight important areas for dissemination of evidence-based training, support, and resources to expand OUD treatment capacity in rural communities.

1. Introduction

The efficacy of opioid agonist treatment (OAT; i.e. methadone and buprenorphine) for opioid use disorder (OUD) is well established for reducing morbidity, mortality and spread of infectious disease among patients with OUD (Ball and Ross, 1991; Johnson et al., 2000; Schwartz et al., 2013; Stotts et al., 2009). However, there continues to be significant underutilization in many areas of the United States (Blevins et al., 2018; Friedmann et al., 2003; Harlow et al., 2013; Volkow et al., 2014), and lack of availability of OAT treatment is directly associated with

higher mortality (Haffajee et al., 2019; Jones et al., 2018). The issue of insufficient access to OAT is especially urgent in rural areas (Heil et al., 2008; Hirschak and Murphy, 2017; Paulozzi and Xi, 2008; Rosenblum et al., 2011; Stein et al., 2015).

OAT has expanded from highly specialized and regulated opioid treatment programs (i.e., methadone clinics) to general medical settings (i.e. primary care) with primary care practitioners (PCPs) able to prescribe buprenorphine. Increasing the availability of OAT prescribers and settings could substantially increase availability of treatment, especially in rural areas where patients with OUD and treatment programs

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are widely dispersed (Sigmon, 2014). However, there remains low prevalence of buprenorphine-waivered physicians in rural areas (Andrilla et al., 2019), with a national study showing rural counties continued to have relatively fewer providers than metropolitan counties, despite an overall increase in waived prescribers over time (Ghertner, 2019). A further complication is low patient volume among physicians who are waived to prescribe buprenorphine, with a recent study showing that only about half of waived physicians prescribed buprenorphine in the last month and the majority of those had active OAT patient panels that were well below their allowable patient limits (Duncan et al., 2020). Efforts to expand OAT in Vermont (Brooklyn and Sigmon, 2017; Rawson et al., 2019a; Rawson et al., 2019b) have helped our state to reach the highest per-capita prevalence of buprenorphine-waivered physicians in the United States (Pashmineh Azar et al., 2020) and informed similar efforts in other states (Miele et al., 2020; Reif et al., 2020). Despite this, however, the majority of buprenorphine prescribers in the state are still treating fewer than 10 patients (Vermont Department of Health, 2020b).

Possible reasons for buprenorphine underutilization in primary care settings are likely varied and complex, but may include reimbursement challenges, belief that OUD is not a primary care issue, induction logistics, stigma around the patient population, potential for medication diversion, lack of professional support for the clinicians, and lack of psychosocial services or clinical supports for patients (Andraka-Christou and Capone, 2018; Cioe et al., 2020; Louie et al., 2019; McGinty et al., 2020; Walley et al., 2008). A recent national study of PCPs also found that while 78% believed that buprenorphine was an effective treatment, only 20% were interested in treating patients with OUD (McGinty et al., 2020). This lack of interest may be related to provider self-efficacy (Louie et al., 2019) or perceived comfort in treating OUD (Pytell et al., 2019). PCPs that had never prescribed buprenorphine reported lack of confidence in treating OUD without further training (Andraka-Christou and Capone, 2018; Kissin et al., 2006; Molfenter et al., 2015), and PCPs in general (both prescribers and non-prescribers of buprenorphine) preferred to refer OUD patients to specialists (Kermack et al., 2017; Netherland et al., 2009).

In September 2019, the University of Vermont Center on Rural Addiction (UVM CORA) was established with support from HRSA's Rural Communities Opioid Response Program - Rural Centers of Excellence on Substance Use Disorders (RCORP-RCOE) program to provide consultation, resources, education, and technical assistance in evidence-based best practices to addiction-treatment providers and staff in rural communities. As part of UVM CORA efforts, we are conducting baseline needs assessments of health care practitioners in Vermont, New Hampshire, Maine, and Northern New York to identify current and future addiction treatment needs and barriers. In the present study, our overall goal was to assess PCP perspectives on patient substance use, barriers to treatment, and their level of comfort treating patients with OUD. Our first objective was to determine the association between concern for patient substance use and rurality of PCPs. We hypothesized that rural PCPs would have higher concern about patient substance use, specifically opioid use. Our second objective was to determine what factors were associated with PCP comfort treating OUD, focusing on barriers to treatment and including PCP characteristics. We hypothesized that PCP-identified barriers would be associated with less comfort treating OUD. A better understanding of PCP comfort in treating patients with OUD and what predicts less comfort may be vital to expanding treatment services, particularly in rural areas.

2. Methods

2.1. Sample

Our survey population included practitioners with an active medical license as reported by the Vermont Department of Health, limited to specific practitioner taxonomies that had a reasonable opportunity to

provide direct care and treatment for patients with OUD (e.g., primary care, obstetrics, emergency medicine, and other specialties such as psychiatry; $N = 1462$). We received 381 responses to our online survey (response rate = 26%) and excluded 49 individuals (12 retired, three out of state, 33 only completed demographic questions, one skipped the county question for designation of geographic region) for a final sample of 332 eligible survey respondents. Given the focus of this study on adult-serving PCPs, our final study sample was limited to 116 respondent surveys from family practice and internal medicine PCPs. Respondents were categorized into rural and non-rural geographic regions based on the county in which they work. Counties that are not designated as metropolitan areas by the Office of Management and Budget (U. S. Census Bureau, 2020) are considered rural, and as a comparison, we refer to the metropolitan counties as non-rural throughout. Eleven of Vermont's 14 counties are designated-rural (Fig. 1) and the breakdown of participants in our PCP sample included 73 practitioners in rural counties and 43 practitioners in the remaining three non-rural counties.

2.2. Study design

In an effort to identify practitioner concerns and real-time needs for addressing substance use disorders in their clinical practice, we conducted this online survey over two periods: the first (April 28–May 31, 2020) targeted practitioners working in rural counties based on the primary ZIP code associated with their national provider identifier number, and the second (July 27–August 31, 2020) targeted practitioners working in non-rural counties. Surveys were sent via email and



Fig. 1. Map of designated rural (shaded darker) and non-rural counties in Vermont. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

participants were offered a \$99 online gift-card incentive immediately upon survey completion.

2.3. Survey instrument

The survey was comprised of 42 multiple-choice, scale (0–10), and open-ended questions ranging from demographics to practitioner substance use disorder treatment training and resource needs. Survey questions, based on existing validated tools and rooted in the literature (Andraka-Christou and Capone, 2018; Pullen and Oser, 2014; University of Michigan Behavioral Health Workforce Research Center, 2019; Watson et al., 2007), were developed in consultation with the state department of health, modified from existing surveys and qualitative interviews used in previous evaluations in Vermont (Rawson et al., 2019a; Rawson et al., 2019b) and Maine (Gallo et al., 2019; Smith et al., 2019a, 2019b; Smith et al., 2020a; Smith et al., 2020b), and finalized through consensus with clinicians, stakeholders, and researchers. For this study, we focused on two main questions for our outcomes related to practitioner perspectives rated on a visual analog scale from 0 (Not at all) to 10 (Extremely). The first question was, “How concerned are you about use of these substances among your patients?”, which included common substances (alcohol, tobacco, and cannabis), opioids (heroin, fentanyl, prescription), other substances (cocaine, methamphetamine, prescription stimulants, and benzodiazepines), and opioids in combination with other substances (alcohol, benzodiazepines, and prescription stimulants). The second question was, “How comfortable are you addressing/treating opioid use disorder in your patients?” Covariates in the analyses included practitioner's rurality (rural vs. non-rural, described above), gender (female vs. male), buprenorphine waiver status (yes vs. no), and eight barriers to treating patients with OUD (lack of training / experience, insurance or reimbursement issues, managing patients with OUD, medication diversion, organizational / clinic, constraints on time or staffing, stigma of OUD, effectiveness of OAT) presented in a randomized order. The barriers were identified from responses to the prompt, “Please select the top three provider-related barriers to treating patients with opioid use disorder in your practice,” and we combined responses for the first, second, or third top barrier into a single indicator for each of the eight barrier categories. We obtained gender for each practitioner from their National Provider Identifier record on the National Plan and Provider Enumeration System's website (U.S. Centers for Medicare and Medicaid Services, 2021). We determined waiver status from their answer to the following question in our needs assessment, “Have you received the waiver to prescribe or dispense buprenorphine for the treatment of opioid use disorder?”

2.4. Statistical analyses

We summarized the overall average level of concern for patient use of 10 substances and three substance combinations with opioids. We tested for rural vs. non-rural differences in average level of concern for each substance and substance combination separately using multiple linear regressions controlling for the potential confounding effects of gender and waiver status. Next, we tested the association between the average level of comfort treating OUD and PCP rurality, using multiple linear regression controlling for the potential confounding effects of gender and waiver status. Then we tested the association between the eight barriers to treatment and average level of comfort treating OUD by adding them to one multiple linear regression, controlling for rurality, gender, and waiver status. Associations were considered statistically significant with a cutoff $P < 0.05$.

As this survey was being conducted as part of an ongoing quality improvement project, the University of Vermont Institutional Review Board deemed it to be exempt from needing Institutional Review Board approval.

3. Results

Of the present study sample of PCPs, 48% of respondents were female, 53% were currently waived to prescribe buprenorphine, and 63% reported currently practicing in a rural county (Table 1). The sample had a larger percentage of female PCPs in rural compared to non-rural areas ($\chi^2 = 5.77$, $P = 0.02$) while there was no difference in waiver status by rurality ($\chi^2 = 1.50$, $P = 0.22$; Table 1).

3.1. Concern about opioid and other substance use

With regard to PCPs' levels of concern about substance use among their patients, the overall PCP sample reported highest concern about their patients' tobacco use (7.6 out of 10), alcohol use (7.0 out of 10), use of opioids combined with either alcohol or benzodiazepines (both 6.8 out of 10) and use of prescription opioids (6.5 out of 10). In multiple linear regression models adjusted for covariates, rural PCPs reported higher mean levels of concern for their patients' use of heroin by 1.38 points, fentanyl by 1.52 points, and methamphetamine by 1.61 points, than non-rural PCPs ($P < 0.05$; Table 2). Although the average level of concern for cocaine use, after adjusting for covariates, was over one point higher among rural PCPs, the 95% confidence interval (CI) included the null (-0.09 , 2.37 ; Table 2). There was less than a one-point difference between rural and non-rural PCPs in their level of concern for prescription opioids, combinations with opioids, or other common (alcohol, tobacco, and cannabis) substance use; none were significantly different ($P > 0.05$; Table 2). In the adjusted models, the two confounders, sex and waiver status, were generally not associated with level of concern for patient substance use, except females had lower concern about fentanyl use (coefficient; $\text{coeff} = -1.44$, 95% CI = -2.63 , -0.26 , $P = 0.017$) and waived PCPs had higher concern about fentanyl use ($\text{coeff} = 1.53$, 95% CI = 0.37 , 2.69 , $P = 0.010$) and benzodiazepine use ($\text{coeff} = 1.18$, 95% CI = 0.25 , 2.12 , $P = 0.014$).

3.2. Comfort treating patients with OUD

Overall, PCPs in our survey reported on average 6.6 out of 10 in self-reported comfort with treating patients with OUD. In simple comparisons, there was less than a one-point difference in the level of comfort treating OUD for rural (Mean; $M = 6.8$, Standard Deviation; $SD = 2.4$) vs. non-rural ($M = 6.2$, $SD = 2.0$) PCPs ($P = 0.179$), whereas higher levels of comfort were reported by male ($M = 7.3$, $SD = 2.0$) vs. female ($M = 5.9$, $SD = 2.4$) PCPs ($P = 0.002$), and waived ($M = 7.6$, $SD = 1.7$) vs. non-waived ($M = 5.5$, $SD = 2.5$) PCPs ($P < 0.0005$). Simple comparisons between barriers and level of comfort treating OUD indicated that lower levels of comfort were reported by those that identified lack of training as a barrier ($M = 5.1$, $SD = 2.2$) vs. those that did not ($M = 7.3$, $SD = 2.1$) report that barrier ($P < 0.0005$). In contrast, those reporting barriers of insurance or reimbursement issues reported higher comfort ($M = 8.5$, $SD = 1.1$) than those not ($M = 6.3$, $SD = 2.3$) reporting these barriers ($P = 0.0008$), and PCPs reporting constraints on time or staffing as a barrier also reported higher comfort ($M = 7.1$, $SD = 2.0$) than those not ($M = 5.9$, $SD = 2.6$) reporting that barrier ($P = 0.009$).

In the multiple regression of comfort treating OUD on rurality, gender, and waiver status, rurality was still not significantly associated with comfort (mean difference; $\text{Mdiff} = 0.65$; 95%CI = -0.17 to 1.46 ; $P = 0.119$), while higher reported comfort levels remained for male PCPs ($\text{Mdiff} = 1.08$; 95%CI = 0.31 to 1.86 ; $P = 0.007$) and those waived to prescribe buprenorphine ($\text{Mdiff} = 2.11$; 95%CI = 1.34 to 2.88 ; $P < 0.0005$). When we extended our multiple regression analyses to include all potential barriers in the model with rurality, gender, and waiver status (Table 3), we found that PCPs indicating lack of training and experience as a barrier reported 1.2 points lower average comfort treating OUD and PCPs indicating medication diversion as a barrier reported 0.9 points lower average comfort treating OUD. However, PCPs

Table 1

Sample distribution of sex, waiver status, and geographic location (rural vs. non-rural) of primary care practitioners (family practice and internal medicine) and differences in sex and waiver status by rurality.

	Total		Rural		Non-rural	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Sex = male	60	52%	44	60%	16	37%
Female	56	48%	29	40%	27	63%
Waivered to prescribe MOUD ¹ = yes	61	54%	35	50%	26	62%
No	51	46%	35	50%	16	38%
Geographic location = rural	73	63%	–	–	–	–
Non-rural	43	37%	–	–	–	–

Notes: OUD: Opioid Use Disorder, MOUD: Medications for Opioid Use Disorder, ¹ 4 missing waiver status.

Table 2

Rural vs. non-rural difference in the average level of concern (scale from 0 to 10) for patient use of opioids, combinations with opioids, and other substances.

Substances	N	Unadjusted mean level of substance use concern	Coefficient	95% confidence intervals		p-value
				Lower	Upper	
Methamphetamine						
Rural	65	5.34	1.61	0.33	2.90	0.015
Non-rural	39	3.54	Reference			
Fentanyl						
Rural	66	6.59	1.52	0.29	2.74	0.016
Non-rural	39	4.85	Reference			
Heroin						
Rural	67	6.64	1.38	0.13	2.63	0.031
Non-rural	40	5.00	Reference			
Cocaine						
Rural	67	5.63	1.14	−0.09	2.37	0.068
Non-rural	40	4.35	Reference			
Opioids/stimulants						
Rural	67	6.49	1.00	−0.29	2.29	0.127
Non-rural	41	5.29	Reference			
Opioids/alcohol						
Rural	68	7.24	0.84	−0.29	1.96	0.143
Non-rural	42	6.31	Reference			
Opioids/benzodiazepines						
Rural	68	7.25	0.74	−0.41	1.89	0.203
Non-rural	42	6.38	Reference			
Cannabis						
Rural	67	4.51	−0.64	−1.64	0.37	0.213
Non-rural	42	5.43	Reference			
Prescription opioids						
Rural	69	6.77	0.56	−0.46	1.58	0.277
Non-rural	42	6.24	Reference			
Tobacco						
Rural	69	7.81	0.43	−0.43	1.30	0.324
Non-rural	42	7.33	Reference			
Alcohol						
Rural	69	6.91	−0.36	−1.10	0.39	0.343
Non-rural	42	7.14	Reference			
Benzodiazepine						
Rural	68	5.88	0.31	−0.68	1.30	0.538
Non-rural	42	5.81	Reference			
Prescription stimulant						
Rural	65	5.40	0.16	−0.94	1.26	0.777
Non-rural	39	5.15	Reference			

Notes: All models were controlled for the potential confounding effects of sex (female vs. male) and whether waived to prescribe buprenorphine (yes vs. no).

indicating constraints on time or staffing as a barrier reported 0.8 points higher average comfort treating OUD (Table 3), but this was borderline with respect to the statistical significance cutoff. In these adjusted models with barriers included (Table 3), rurality was not associated with levels of comfort treating OUD, while female PCPs reported 1.1 points lower average comfort treating OUD than males and waived PCPs reported 1.7 points higher average comfort treating OUD than non-waived (Table 3).

4. Discussion

In this study, we examined rural PCPs' concerns regarding use of

substances among their patients and PCP-identified barriers with, and level of comfort in, treating patients with OUD. Concerns were highest for more common substances and for opioid combinations. Rurality was associated with a higher level of concern for use of specific substances among patients, but not in level of comfort treating OUD. Lack of PCP-identified training/experience and medication diversion were barriers associated with lower levels of comfort treating OUD, while barriers related to office constraints were associated with higher levels of comfort with treatment.

With regard to PCPs' concerns about the substances being used among their patients, overall, PCPs expressed the highest levels of concern for patient use of tobacco, alcohol, opioids combined with

Table 3

Difference in the average level of comfort (scale from 0 to 10) treating opioid use disorders among practitioners reporting barriers to treating opioid use disorder vs. no barrier, controlling for other barriers and practitioner characteristics.

	Coefficient	Lower 95% CI	Upper 95% CI	p-value
Barriers to treating OUD, yes vs. no				
Lack of training / experience	-1.21	-2.17	-0.24	0.02
Medication diversion	-0.87	-1.72	-0.03	0.04
Constraints on time or staffing	0.81	-0.04	1.66	0.06
Insurance or reimbursement issues	0.55	-0.69	1.80	0.38
Organizational / clinic	-0.45	-1.39	0.49	0.34
Managing patients with OUD	-0.35	-1.22	0.52	0.42
Stigma of OUD	0.34	-0.98	1.65	0.61
Effectiveness of OAT	0.16	-1.10	1.43	0.80
Practitioner characteristics				
Rural vs. non-rural	0.46	-0.35	1.26	0.27
Female vs. male	-1.12	-1.94	-0.29	0.01
Waiver status				
Waivered vs. non- waivered	1.65	0.81	2.49	<0.0005

Notes: OUD: Opioid Use Disorder, OAT: Opioid Agonist Treatment.

alcohol or benzodiazepines, and prescription opioids. The high levels of concern about tobacco and alcohol use were somewhat surprising given the intense focus on the continued US opioid epidemic; however, the concern may reflect the higher relative prevalence of use of these drugs compared to opioids (i.e., 10% of Americans smoke cigarettes daily, 5.4% have an alcohol use disorder, and 0.7% have an OUD (Substance Abuse and Mental Health Services Administration, 2019)). While PCP level of concern for patient substance use was highest for more common substances of abuse, PCPs in rural areas reported higher levels of concern about heroin, fentanyl, and methamphetamine use among their patients compared to PCPs in non-rural areas. This aligns with recent reports by Vermont's Department of Health, showing that from 2017 to 2019, the number of deaths related to fentanyl and heroin decreased in the three non-rural counties while they increased in almost all of our rural counties. (Vermont Department of Health, 2020a). Rural PCPs' concern with methamphetamine use is also in line with national trends, with results suggesting that odds of using methamphetamine is 1.5 times higher in non-metropolitan as compared to metropolitan areas (Jones et al., 2020).

Vermont PCPs reported only moderate comfort treating patients with OUD, and those levels of comfort did not differ based on whether the PCP worked in a rural or non-rural setting, after accounting for PCP-identified barriers, waiver status, and gender. In relation to PCP-identified barriers, lack of training/experience was associated with lower levels of comfort treating OUD. Insufficient training has been associated with feeling unprepared to treat patients' substance use disorders among internal medicine residents (Wakeman et al., 2013). Similarly, internal medicine physicians with more clinical experience have reported feeling better prepared, providing more evidence-based clinical practice and having more favorable attitudes towards patients with substance use disorders (Wakeman et al., 2016). PCP concern regarding potential diversion of treatment medication was also associated with lower levels of comfort treating OUD, and this is consistent with prior reports in the literature (Louie et al., 2019). Interestingly, PCPs reporting barriers related to time/staffing had higher average comfort treating OUD. This may be because those that feel more comfortable treating OUD may treat more patients and therefore experience more difficulties with time- or staff-related constraints. Our findings suggest that connecting PCPs to additional training, providing avenues for gaining more experience in treating patients with OUD, and

sharing evidence-based interventions to deter medication diversion may help improve comfort levels related to treatment. Among PCPs who already feel more comfortable and are taking on more patients, assistance or support with addressing time/staffing barriers may help them to further increase the number of patients they treat.

As expected, PCPs waived to prescribe buprenorphine reported greater comfort treating patients with OUD than non-waivered physicians. The educational program currently required for waived practitioners may contribute to higher comfort in treatment of OUD, which may be important to consider given the recent recommendation to exempt physicians from waiver requirements needed to prescribe buprenorphine for OUD (U.S. Department of Health and Human Services, 2021). However, additional ongoing support beyond the initial waiver training is likely needed to help practitioners navigate barriers to increasing their buprenorphine treatment capacity (Jones and McCance-Katz, 2019). In a survey of rural waived practitioners, for example, while fewer than 10% reported a lack of confidence in their ability to manage patients, over 25% reported lack of specialty backup, and over 40% reported lack of mental health support services as barriers to providing buprenorphine treatment (Andrilla et al., 2017). Therefore, ongoing support in clinical operations is likely a critical element in expanding access to OUD treatment in primary care settings.

Finally, our results suggest that male PCPs may be more comfortable treating patients with OUD, even after accounting for waiver status, PCP-identified barriers, and rurality. To our knowledge, there are no other published data on potential gender differences in comfort treating OUD and results from the limited literature on related topics, like recognizing opioid abuse in HIV patients (Lum et al., 2011) and managing opioid use among chronic pain patients (Pearson et al., 2017), have reported mixed results with regard to practitioner gender. The potential influence of PCP gender and perhaps other characteristics on comfort with treating OUD warrants further investigation.

There are some limitations to consider with this work. This was a convenience sample limited to PCPs within Vermont who responded to survey requests. This may limit generalizability to other parts of the country. Notably, our response rate was low, despite a sizeable financial incentive and up to six reminder emails. However, the sample did include practicing family and internal medicine PCPs, had almost equal distribution of male and female practitioners similar to the PCP workforce demographics in Vermont (Pettersen et al., 2018), and had good representation from both rural and non-rural counties across the state. Finally, the survey items were not validated, but instead were based on survey and qualitative interviews questions used in previous evaluations and finalized by consensus with local stakeholders. However, prior studies addressing these topics in similar depth have had small samples ($n = 20$; (Andraka-Christou and Capone, 2018) or have addressed attitudes regarding treatment in a slightly larger number of PCPs ($n = 336$; (McGinty et al., 2020) from a national sample with tremendous variability in state-level treatment policy and practice. Our sample of 116 PCPs in a single state with robust treatment policies in-place highlights remaining barriers to treating OUD in rural and non-rural providers and opportunities to address these barriers and reduce disparities in care. The targeted nature of the surveys will provide valuable information to support efforts to expand and improve availability of treatment for OUD across rural areas in the Northeastern United States.

5. Conclusion

There continues to be significant underutilization of agonist medications for treating OUD in office-based settings, and this has been especially the case in rural geographic areas. An improved understanding of the barriers being experienced and level of comfort treating OUD among rural PCPs may inform efforts to address and expand treatment availability. Our data suggest several potential opportunities for disseminating outreach, education, technical assistance, and resources to rural PCPs around evidence-based approaches for addressing

opioid-related harm reduction as well as use of drugs other than opioids among their patients. Additional efforts should also aim to understand the complex relationship between PCP-identified barriers to providing OAT to their patients and their comfort in doing so.

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Declaration of Competing Interest

None.

The authors have no conflicts of interest to disclose.

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